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**SECTION**

**“NATIONAL ECONOMY AND  
ENTREPRENEURSHIP”**

**SUBSECTION**

**“BUSINESS ENGINEERING, ECONOMICS, FINANCE  
AND MANAGEMENT“**

# Efficiency Assessment Concept Model for Competing Companies

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## Abstract

The efficiency assessment concept model for competing companies is presented in the paper. Efficiency performance is assessed by observing the best practice in the form of a frontier, which is used in a further analysis at three stages of the concept model. The final outcome of the concept model is development of efficiency improvement proposals for each cluster of competing companies based on result discussion and recommendations derived from findings of each stage of concept model.

*Keywords:* performance, efficiency, concept model.

## Introduction

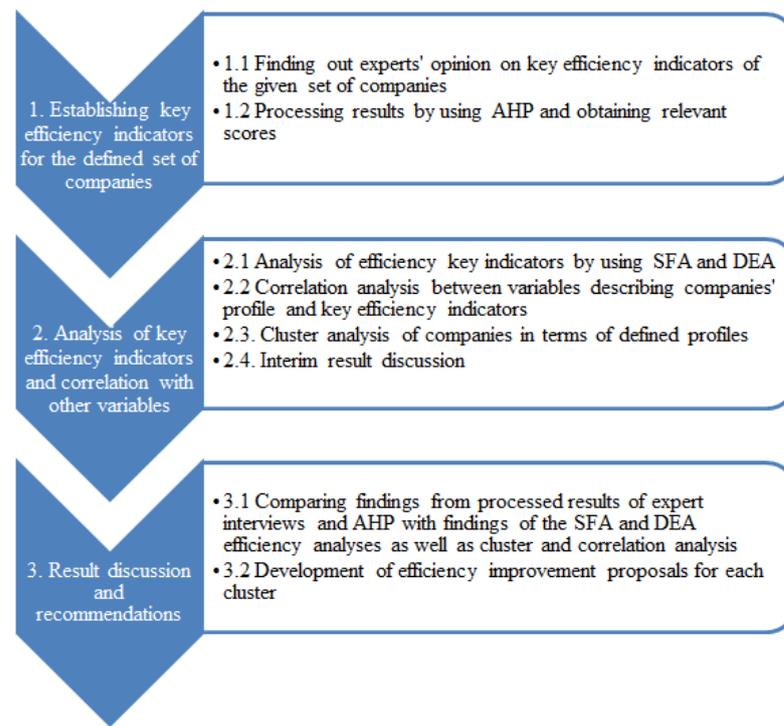
In case of the evaluation of business performance, it is impossible to know “true” potential, whatever the economic objective is. However, it is possible to observe best practice and its change through time, and we also observe variation in performance among producers operating beneath best practice. This leads to the association of “efficient” performance with undominated performance, or operation on a best practice “frontier,” and of inefficient performance with dominated performance, or operation on the wrong side of a best practice frontier. Interest naturally focuses on the identification of best practice producers, and of benchmarking the performance of the rest against that of the best.

Typically, accounting, market, economic value added or balance scorecard based measurements are used for performance assessment purposes. Accounting and market based performance indicators are prevailing in diversification research. Accounting performance measurements can be also used when non-listed firms are included. Efficiency measurements have appeared in various research fields, including marketing (Keh et al., 2006), athletics (Garcia-Sanchez, 2007), technology (Jerzmanowski, 2007), information systems (Philip, 2007), public policy (Durlauf, 2005), banking efficiency (McCune, 2007). The art of efficiency assessment lies in the establishment of the appropriate model for the given circumstances.

## Methodology of Research

The efficiency assessment concept model developed by the author consists of the three stages (Figure 1). The first one is establishing key efficiency indicators for the defined set of companies. The analytic hierarchy process (AHP) is a systematic approach developed in late 1970s to give decision making based on experience, intuition and heuristic in the structure of a well-defined methodology derived from sound mathematical principles (Bhushan, Rai, 2004). The goal of the expert interviews is to finding out experts' opinion on key efficiency indicators and process results by using AHP and obtaining relevant scores for further assessment.

The second stage brings analysis of key efficiency indicators into play. To measure the efficiency levels of firms, two separate methods have been developed by researchers under the rubric of mathematical programming approach and the econometric approach. Mathematical programming approach which is also known as Data Envelopment Analysis (DEA) was originated by Charnes et al. (1978). In DEA, multiple outputs and inputs are reduced into a single output-input form in which efficiency measure is yielded after necessary calculations are completed with linear programming. Although DEA is frequently used in efficiency analysis its non-stochastic nature prevents researchers to attain comprehensive and sustainable results in many cases. Therefore, econometric approach or Stochastic Frontier Analysis (SFA) became preferable owing to its ability to distinguish the impact of variation in technical efficiency from external stochastic error on the firm's output. A general correlation analysis between variables describing companies' profile and key efficiency indicators contributes to a conclusion whether certain variables describing companies' profile (eg., market shares, turnover, product range etc.) correlate with efficiency scores. Furthermore, the cluster analysis of companies in terms of pre-defined profiles helps to categorise companies into groups in terms in accordance with their similarities and closely study clusters, which constitute the highest interest.



**Figure 1.** Efficiency assessment concept model (prepared by the author)

The third stage is result discussion and recommendations. Findings from processed results of expert interviews and AHP with findings of the SFA and DEA efficiency analyses as well as cluster and correlation analysis are compared and lay out a foundation for development of efficiency improvement proposals for each cluster.

## Conclusions

Business performance can be assessed by observing best practice. This leads to the association of “efficient” performance with undominated performance, or operation on a best practice “frontier.” The three stage efficiency assessment concept model was developed by the author. The first one is establishing key efficiency indicators for the defined set of companies. The second stage is supposed for an analysis of key efficiency indicators by using DEA and SFA as well as general correlation analysis between variables describing companies' profile and key efficiency indicators and finally, a cluster analysis to facilitate further inter cluster efficiency assessment. The third stage is result discussion and recommendations. Findings derived from first and second staged of the concept model are compared and lay out a foundation for development of efficiency improvement proposals for each cluster of competing companies.

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## Sustainable Ecosystem for Small Business

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### Abstract

The term ecosystem has become more and more popular when referring to the increasingly dynamic and interconnected business world. For a business to be successful it needs to be in a constant and effective evolution adapting to the fluctuating environment. For this, companies can't view themselves as single entities but part of an ecosystem that involves a variety of industries. In this article, the term ecosystem will be defined as "dynamic and co-evolving communities of diverse actors who create and capture new value through increasingly sophisticated models of both collaboration and competition." (Kelly, 2015).

Members in a business ecosystem all benefit, invest and contribute to develop a sustained success regarding their common interest. It can include suppliers, lead producers, competitors and other stakeholders that are coevolving and creating proactive and mutual beneficial relationships hence accelerating new technologies and innovation.

Usually the term ecosystem is explained by examples of large corporations such as Apple, Facebook, Google, among others. Where does this leave the Small Medium-Sized Enterprises (SMEs)? Is it possible to apply this successful business model for smaller organizations? How? This article discusses the sustainable application of ecosystem for small businesses and analyses different approaches and benefits achieved by breaking boundaries among other members and uniting to thrive for a shared goal.

*Keywords:* Ecosystem, Small and Medium Enterprises.

### Research Methodology

The methodology used in this article is Literature Review.

### Findings/Results

SMEs are a very important part of the economy, as they represent around 99 % of all enterprises and employ an increasing number of persons. They make up over 99 % of all enterprises in all EU countries and in Norway, account for around two-thirds of total employment and contribute 57 % of value added in the EU.

### Conclusions

Ecosystems can be applied to a diverse range of organizations (large corporations and SMEs) to create, scale and serve markets. There are factors that define the successful SME ecosystem, behaviour and values must be shared among members. Small business should use different approaches to achieve successful businesses. Ecosystems can be designed and adapted to solve all types of problems and reach defined goals.

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# Knowledge-Driven Development and Innovative Growth of the European Economies

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## Abstract

Significant disparities in innovation capacity and a quality of economic growth of the European economies will complicate process of innovation convergence in the EU. To increase innovation performance of the European economies it is necessary on the one hand, to reduce the funding gap in innovation activity and technological gap between the EU member states and, on the other hand, to encourage international cooperation for development of large joint researches and innovation projects aimed at strengthening industrial competitiveness. The search for effective methods of macroeconomic adjustment is more linked to the changes in all components of aggregate demand and creating of long-term innovative economic growth. This paper analyses the relationship between innovation activity and gross value added. The empiric study focuses on revealing key factors determining innovation susceptibility and knowledge-driven development of the EU new member states.

*Keywords:* innovation performance, business cycle, development, innovation diffusion, growth.

## Introduction

Under the conditions of global imbalance the international economic relations to a great extent will be determined by trends of the European economy as open complicated dynamic system. The search for new methods of economy governance is more linked to transition to a holistic model of long-run innovative economic growth of which quality it is advisable to consider in three dimensions of smart, sustainable, and inclusive growth. These strategic priorities of the European economy can be implemented using a system approach for enhancing quality of growth through constant innovations to meet economic, social, environmental demands. The problem of sustainable development can be exacerbated for lack of successful innovations giving new ways of creating high value added. Hence, there arises need to examine why innovations do not happen? Macroeconomic adjustment analysis has revealed that when instead of technological innovations and transforming business the price stability becomes a key priority of development, economic policy is focused on short term aims. However, development of the knowledge-based economy and creation of sustainability are a long-run process.

In terms of a global competition innovation capacity of the New European countries economies should be provided by transmission and application of knowledge, bridging the funding gap between R&D and commercialisation, increasing venture capital to finance innovative technology SMEs in their early stage of development, and promoting sales of innovative products. Here it is important to attract venture capital, corporate investors and to develop new financing instruments in order to stimulate the knowledge transfer and to absorb high-tech innovations. At the same time, comparative analysis of knowledge-driven development showed that low gross domestic expenditure on R&D, low employment in high-tech industry, decreasing turnover from innovation can hamper R&D activity and innovation susceptibility especially of New Europe economies. Enhancement of the interrelationship between knowledge, research and innovations will depend on investment throughout the value chain of innovative SMEs development including their later growth stages.

Investigation of interconnection between innovations and sustainable industrial development shows that the cluster of radical innovations technologically determines the innovation diffusion. Emerged in the science-intensive industries, the cluster becomes a benchmark of developing quasi-optimal technological trajectories. It should be noted that the diffusion of technology takes place as the process of allometric growth with a typical element of heterogeneity. The innovation growth of the business activity, as a continuous process of the qualitative changes, always proceeds under the conditions of uncertainty and in the cyclical form. Here complex non-linear interrelations of trend, endogenous and exogenous factors take place. Fluctuations of the supply due to changes in the technology level have rather greater influence on the dynamics of a real business-cycle than changes in the demand. Moreover, the cycle itself is the result of the subjects' behaviour caused by the technological innovations. At the same time, for European countries, where innovation performance is considerably below the EU average, the transfer of technology can be the key determinant of the sustainable development of manufacturing and smart growth. Recent theories of

endogenous economic growth emphasize significance of foreign direct investment (FDI) as one of determinants of technological innovations that contribute to creating sustainable long-term growth. There are studies that revealed a positive effect of FDI on economic growth (Borensztein et al., 1998, Yao and Wei, 2007, Kottaridi and Stengos, 2010) and showed evidence of the pro-cyclicality of innovation activity (Barlevy, 2007, Lucchese and Pianta, 2012, Arvanitis and Wörter, 2014). Some empirical studies show a positive correlation of product innovation and employment growth in manufacturing (Hall et al., 2008, Vivarelli, 2012, Harrison et al., 2014).

In terms of accelerated technological changes, the macroeconomic adjustment should be directed to raising the capacity of knowledge-based enterprises to absorb new technologies and creating the effective investment demand to enhance innovation susceptibility of national economy. This research is aimed at revealing the relationship between innovation activity and increasing gross value added in the EU New member states.

### Methodology of Research

The methodology of research is based on the analysis of the models of endogenous economic growth, and the empirical investigation of the relationship between R&D gross domestic expenditure and innovation activity. This research adds to the correlation analysis between level of innovation activity, productivity and growth rates that allows explain determining factors of equilibrium innovative growth and macroeconomic sustainability in the EU New member states.

### Findings/Results

The empirical study of business cycles and innovation activity in the new EU countries has shown significant cyclical deviation in innovation performance from the EU trend, especially reducing in dynamics of sales new-to-market and new-to-firm innovations. The cyclical behaviour of gross value added, total factor productivity is connected with contribution of innovation factors to economic growth. The effective investment demand should be considered as the initial condition of the upturn phase of the business cycle in these countries.

### Conclusions

The research finds effective instruments for creating the R&D investment and innovation demand as the initial condition for the cyclical growth in the EU new member states. The lack of investment resources and the substantial social differentiation shall hinder the growth of qualitative indicators of sustainable economic development of the EU new member states. From the point of view of efficiency of the macroeconomic adjustment the basis of the dynamic balanced innovative growth model should be determined by the endogenous elements of the self-sustained growth of the national economies.

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# Identification of Cross-Border Contagion Risk Transmission Channels Relevant for the Central and Eastern European Countries: A Quantitative Approach

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## Abstract

Small open economies are exposed to cross-border contagion risk transmission via different channels such as real links, financial links, or capital market imperfections such as herding behaviour or panics. The aim of the research – to identify the cross-border contagion risk transmission channels relevant for the CEECs. The empirical results of this study suggest that the most important cross-border contagion risk transmission channels in CEECs are the following: international trade channel and financial channel.

*Keywords:* cross-border contagion risk, transmission channels, financial and economic openness, CEECs'

## Introduction

Halac et al. (2006), Mendoza & Quadrini (2010) state that financial and economic openness of the Central and Eastern European countries (CEECs') makes these countries more prone to external shocks. Moreover, small open economies are exposed to contagion via different channels such as real links, financial links, or capital market imperfections such as herding behaviour or panics. Dornbusch et al. (2000), Hernandez & Valdes (2001), Pritsker (2001), Forbes & Rigobon (2002), Bae et al. (2003), Caramazza et al. (2004), Bekaert et al. (2005), Corsetti et. al. (2005), Halac et al. (2006), Anoruo et al (2007), Fazio (2007), Tressel (2010), Degryse et al. (2010), Rose & Spiegel (2010, 2012), Beirne & Gieck (2012), etc.) distinguish the following cross-border contagion risk transmission channels: real channel, financial channel, and financial markets channel. Real channel is the fundamental economic relationship existing among economies, whereas, financial links existing when two economies are connected through the international financial system create financial channel. However, herding behaviour by international investors or panic in international financial markets can result external shocks transmission through financial markets channel.

The aim of the research – to identify the cross-border contagion risk transmission channels relevant for the CEECs. Research methods: the systemic, logical and comparative analysis of the scientific literature, and analysis of statistical data.

## Methodology of Research

This empirical study focuses on identification of cross-border contagion risk transmission channels relevant for the 11 CEECs': Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Croatia (HR), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (ROM), Slovakia (SK), and Slovenia (SI)). The identification of cross-border contagion risk transmission channels using a quantitative approach relies on the main indicators characterizing the financial and economic openness of country (see Table 1). The selection of indicators was based on the availability of statistical data, however, many additional indicators could also be involved. The main indicators are normalized across European Union (EU) by using the min-max method. Each indicator  $x_{qc}^t$  for a generic country  $c$  and time  $t$  is transformed in  $X_{qc}^t$  (Eq. 1):

$$X_{qc}^t = \frac{x_{qc}^t - \min_c(x_q^t)}{\max_c(x_q^t) - \min_c(x_q^t)} \quad (1)$$

where  $\min_c(x_q^t)$  and  $\max_c(x_q^t)$  are the minimum and the maximum value of  $x_{qc}^t$  across all EU-28 countries  $c$  at time  $t$ . In this way, the normalised indicators  $X_{qc}^t$  have values lying between 0 (laggard,  $x_{qc}^t = \min_c(x_q^t)$ ), and 1 (leader,  $x_{qc}^t = \max_c(x_q^t)$ ).

While the min-max method normalization method is very sensitive to outliers, the normalization of indicators has been chosen at EU level instead a global level while in the world exist many countries those can be classified as outliers (Hong Kong, Singapore, etc.).

**Table 1.** Indicators characterizing the relevance of cross-border contagion risk transmission channels

Cross-border contagion risk transmission channels	Indicators characterizing the relevance of cross-border contagion risk transmission channels	Data source
Real channel	Sum of imports and exports to GDP (%)	UNCTD
	Inward FDI stock to GDP (%)	
	Outward FDI stock to GDP (%)	
Financial channel	Foreign bank assets among total bank assets (%)	World Bank
Financial markets channel	Stock market capitalization to GDP (%)	
	Outstanding domestic private and public debt securities to GDP (%)	
	Gross portfolio equity liabilities to GDP (%)	
	Gross portfolio equity assets to GDP (%)	
	Gross portfolio debt liabilities to GDP (%)	
Gross portfolio debt assets to GDP (%)		

### Findings/Results

The nominal values of indicators characterizing the relevance of cross-border contagion risk transmission channels are presented in Table 2.

**Table 2.** Indicators characterizing the relevance of cross-border contagion risk transmission channels (in 2014)

Cross-border contagion risk transmission channels																	
Real channel			Financial channel		Financial markets channel												
Sum of imports and exports	Inward FDI stock	Outward FDI stock	Foreign bank assets among total bank assets		Stock market capitalization	Outstanding domestic private and public debt securities		Gross portfolio equity liabilities		Gross portfolio equity assets		Gross portfolio debt liabilities		Gross portfolio debt assets			
			EE	97													
			LT	91													
			HR	90													
			SK	87													
			CZ	85													
			RO	81													
			PL	76													
			BG	62													
			HU	59													
			LV	58													
SK	180																
HU	174																
EE	167																
LT	163						HR	37									
CZ	161																
SI	146																
BG	137					SI	25	PL	34							LV	25
LV	119																
PL	92							CZ	18	HU	52						
HR	91									PL	39						
										CZ	38	PL	8	EE	12	SI	54
																HU	39
																SK	24
																SI	23
																EE	17
		BG	84	HU	29												
		EE	74	EE	24					HU	6	SI	8				
		HU	72	SI	13			SI	15	CZ	4	CZ	6	LT	28		
		CZ	59	PL	12			BG	14	EE	3	LV	5	PL	26		
		SK	53	HR	10			HU	12	SI	2	HU	5	HR	24	BG	11
		HR	52	CZ	9			RO	10	RO	2	LT	4	LV	20	CZ	8
		LV	46	LT	6			LT	9	SK	2	HR	4	LV	20	HR	4
		PL	45	BG	4			EE	8	HR	1	SK	2	CZ	18	LT	4
		RO	37	LV	4			SK	5	LT	1	PL	2	RO	11	HU	2
		LT	30	SK	3			LV	4	BG	1	BG	2	EE	6	RO	1
		SI	26	RO	0					SK	0	RO	0	BG	5	PL	1

The empirical results of this study show that CEECs' are very vulnerable to the external shocks that can be transmitted through real channel. However, CEECs' are less sensitive to the changes in international capital flows directions. The financial systems of the CEECs' are bank-based and dominated by foreign-owned commercial banks with relatively. In most of the CEECs' foreign banks dominate in terms of assets and number of participants (except Slovenia). The results of this study also show that there is a regional integration of CEECs' banking systems, i.e. foreign banks operating in CEECs' are mostly from neighbouring countries, e.g. Scandinavian banks operate in the Baltic countries, Austrian and German banks – in Czech Republic, etc. These empirical results suggest that CEECs' are exposed to external shocks in the financial systems of neighbouring countries and decisions of parent banks shareholders. The CEECs are also sensitive to external shocks occurred in domestic financial markets as well as in international financial markets.

The normalized values of indicators characterizing the relevance of cross-border contagion risk transmission channels in CEECs (in 2014) are presented in Table 3. A higher value of indicator suggests about a higher importance of cross-border contagion risk transmission channel in country.

**Table 3.** Normalized indicators characterizing the relevance of cross-border contagion risk transmission channels in CEECs (in 2014)

Scale	Cross-border contagion risk transmission channels																			
	Real channel						Financial channel		Financial markets channel											
	Sum of imports and exports		Inward FDI stock		Outward FDI stock		Foreign bank assets among total bank assets		Stock market capitalization		Outstanding domestic private and public debt securities		Gross portfolio equity liabilities		Gross portfolio equity assets		Gross portfolio debt liabilities		Gross portfolio debt assets	
1.00-0.91							EE	1.00												
							LT	0.94												
							HR	0.93												
0.90-0.81							SK	0.89												
							CZ	0.87												
							RO	0.83												
0.80-0.71							PL	0.78												
0.70-0.61							BG	0.63												
0.60-0.51							HU	0.60												
							LV	0.59												
0.50-0.41	SK	0.43																		
	HU	0.41																		
0.40-0.31	EE	0.39																		
	LT	0.37							HR	0.31										
	CZ	0.36																		
	SI	0.31																		
0.30-0.21	BG	0.28					SI	0.24	PL	0.29									LV	0.21
	LV	0.22																		
0.20-0.11	PL	0.13							CZ	0.13	HU	0.19	PL	0.12	EE	0.12	SI	0.18	SK	0.20
	HR	0.12									PL	0.12	EE	0.12	HU	0.12	HU	0.12	SI	0.20
											CZ	0.11	PL	0.12	EE	0.12	SK	0.11	SI	0.20
																	SK	0.11	EE	0.14
0.10-0.00	RO	0.09	BG	0.05	HU	0.07							HU	0.08	SI	0.07	LT	0.08	BG	0.09
			EE	0.04	EE	0.06			SI	0.10			CZ	0.05	CZ	0.06	LT	0.08	CZ	0.06
			HU	0.04	SI	0.03			BG	0.09			EE	0.05	LV	0.05	PL	0.07	HR	0.07
			CZ	0.03	PL	0.03			HU	0.08	SK	0.09	SI	0.03	HU	0.05	HR	0.07	HR	0.07
			SK	0.03	HR	0.02			RO	0.06	HR	0.06	RO	0.02	LT	0.04	LV	0.05	LT	0.03
			HR	0.03	CZ	0.02			LT	0.05	SI	0.00	RO	0.01	HR	0.04	CZ	0.05	LT	0.03
			LV	0.02	LT	0.01			EE	0.04			LV	0.01	SK	0.02	RO	0.02	HU	0.01
			PL	0.02	BG	0.01			SK	0.01			HR	0.01	PL	0.02	EE	0.00	RO	0.00
			RO	0.02	LV	0.01			LV	0.00			LT	0.01	PL	0.02	EE	0.00	PL	0.00
			LT	0.01	SK	0.01							BG	0.00	BG	0.01	BG	0.00		
			SI	0.01	RO	0.00							SK	0.00	RO	0.00				

Source: author's calculation

In summary, the most important cross-border contagion risk transmission channels in CEECs are the following: international trade channel and financial channel.

## Conclusions

The empirical results of this study show that CEECs' are very vulnerable to the external shocks that can be transmitted through real channel. However, CEECs' are less sensitive to the changes in international capital flows directions. These empirical results suggest that CEECs' are exposed to external shocks in the financial systems of neighbouring countries and decisions of parent banks shareholders. The CEECs are also sensitive to external shocks occurred in domestic financial markets as well as in international financial markets. The most important cross-border contagion risk transmission channels in CEECs are the following: international trade channel and financial channel.

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# Assessment of Business Cycle Synchronization of the Central and Eastern European Countries

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## Abstract

While small open economies like the Central and Eastern European countries (CEECs') are especially exposed to the external shocks transmission via real links due to the high degree of their economic openness, there is a special importance to investigate the business cycle synchronization of the CEECs with their most important trading partners, i.e., the euro-area. The aim of the research – to assess the business cycle synchronization of the CEECs. The empirical findings suggest about a high degree of the business cycle synchronization of the CEECs at EU level as well as at country level with the largest EU economies: Germany, France, Italy, Spain, United Kingdom. However, business cycle synchronization of the CEECs with their main international trade partners is not always observable due the different size of economies. The empirical findings also suggest that business cycles of the CEECs are also synchronized with some largest world economies such as Canada, Japan, US and China.

*Keywords:* economic integration, business cycle synchronization, CEECs'

## Introduction

After a very intense the European Union (EU) and euro-area enlargement during the last two decades there is a growing importance to analyse the business cycle synchronization of the CEECs. Babetskii et al. (2004) emphasize an ongoing process of convergence of demand shocks, but divergence of supply shocks in the CEECs. Eickmeier and Breitung (2006) argue that business cycle correlations are lower on average for the new member states (NMS) of EU than for European Monetary Union (EMU) countries. They state that the transmission of common euro-area shocks to the NMS are very similar as to EMU countries in most cases, with some exceptions for Latvia, the Czech Republic and Slovakia. Meta-regression analysis performed by Fidrmuc and Korhonen (2006) suggests that some CEECs already have comparably high correlation with the euro-area business cycle. Kolasa (2013) investigated the differences between economic fluctuations in CEECs and the euro-area and suggest that business cycles in the CEECs do differ from the euro-area business cycle, even though substantial convergence has been achieved after the 2004. The aim of the research – to assess the business cycle synchronization of the CEECs.

## Methodology of Research

Assessment of business cycle synchronization of the CEECs will be performed by using the industrial production index which is a business cycle indicator measuring monthly changes in the price-adjusted output of industry. The index measures movements in production output and highlights structural developments in the economy. The time series data on industrial production index appeared non-stationary at level after performing an augmented Dickey–Fuller test (ADF) tests, Johansen cointegration test will be applied in order to assess business cycle synchronization of the CEECs. Engle and Granger (1987) argue that a linear combination of two or more non-stationary series may be stationary. According to Engle and Granger (1987), if such a stationary linear combination exists, the non-stationary time series are said to be cointegrated and may be interpreted as a long-run equilibrium relationship among the variables. This empirical study applied Johansen cointegration test that was developed by Johansen (1991, 1995) (Eq. 1).

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \varepsilon_t, \text{ where } \Pi = \sum_{i=1}^p A_i - I, \quad \Gamma_i = - \sum_{j=i+1}^p A_j \quad (1)$$

where  $\Delta y_t$  – a non-stationary I(1) variable (the seasonally and calendar adjusted industrial production index) at time  $t$ ;  $x_t$  – a deterministic variable (the industrial production index) at time  $t$ ;  $\varepsilon_t$  – an innovation.

Granger's representation theorem asserts that if the coefficient matrix  $\Pi$  has reduced rank  $r < k$ , then there exist  $k \times r$  matrices  $\alpha$  and  $\beta$  each with rank  $r$  such that  $\Pi = \alpha\beta'$  and  $\beta' y_t$  is I(0).  $r$  is the number of

cointegrating relations (the cointegrating rank) and each column of  $\beta$  is the cointegrating vector. Data series may have nonzero means and deterministic trends as well as stochastic trends. Similarly, the cointegrating equations may have intercepts and deterministic trends. Therefore, in order to carry out the Johansen cointegration test, you need to make an assumption regarding the trend underlying statistical data. This empirical study investigates the number of cointegrating relations under each of the five deterministic trend cases considered by Johansen (1995) as (Eq. 2-6 in Table 1). While Johansen cointegration approach is sensitive to the lag length, a maximum lag length (12), as recommended in the scientific literature, has been chosen.

**Table 1.** Hypotheses on cointegrating relationship between two non-stationary time series

Hypothesis on cointegrating relationship	Formulation of hypothesis	Number of equation
The level data $y_t$ have no deterministic trends and the cointegrating equations do not have intercepts	$H_2(r): \Pi y_{t-1} + Bx_t = \alpha \beta' y_{t-1}$	(2)
The level data $y_t$ have no deterministic trends and the cointegrating equations have intercepts	$H_1^*(r): \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0)$	(3)
The level data $y_t$ have linear trends but the cointegrating equations have only intercepts	$H_1(r): \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0) + \alpha_{\perp} \gamma_0$	(4)
The level data $y_t$ and the cointegrating equations have linear trends	$H^*(r): \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha_{\perp} \gamma_0$	(5)
The level data $y_t$ have quadratic trends and the cointegrating equations have linear trends	$H(r): \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha_{\perp}(\gamma_0 + \gamma_1 t)$	(6)

This empirical study focuses on monthly time series data on industrial production index for 11 CEECs: Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Croatia (HR), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovak Republic (SK), and Slovenia (SI) including also time series data on other EU countries and most important international trade partners of EU: Norway, Turkey, Canada, Japan, Korea, Mexico, United States, Brazil, China, and Russia. Monthly industrial production index data for the period of 2000 M01-2016 M06 have been obtained from OECD and Eurostat databases (total number of observations for each country – 198).

## Findings/Results

The industrial production index is one of the most important short-term statistics indicators used to identify turning points in the economic development at an early stage and to assess the future development of GDP. The developments of industrial production index at EU level indicate that since 2003 total industrial output had been on a relatively steady growth path. The production level reached its highest value in April 2008 and then fell continuously for one year until in April 2009 when it was more than 22 percentage points below its former peak. Afterwards the indicator steadily increased again and regained over 90 per cent of its pre-crisis value by May 2011. In the second half of 2011 and in 2012, industrial production in the EU-28 was on a slow downward trend. Since early 2013 the index value is again slightly increasing but still only stands at around 92 per cent of its 2009 peak level. The economic crisis did not start in all EU-28 countries at exactly the same time. Several countries (Estonia, Greece, Spain, Luxembourg, Malta and Portugal) already recorded rates of change below -4 per cent in 2008 but a relatively large number of countries still displayed positive growth rates of industrial production. In 2009 all EU-28 countries experienced a fall in industrial production and the EU-28 average rate of decline was -14 per cent. In 2010 all EU-28 countries with the exception of Greece, Croatia, and Cyprus had returned to positive growth rates. After two years of recovery the EU-28 as a whole in 2012 again displayed a negative industrial development. This downwards trend for the EU-28 continued for the following year, however, the negative growth rates were smaller in 2013 than in 2012. In 2014 the EU returned to a positive growth which increased further in 2015.

The empirical results on assessment of business cycle synchronization of the CEECs suggest about a high level of economic integration of the CEECs at regional level (see Table 2). A very intense business cycle synchronization of the CEECs is observed at EU level as well as at country level with the largest EU economies: Germany, France, Italy, Spain, United Kingdom. Some of the CEECs (Bulgaria, Estonia, Latvia, Romania) are less sensitive to the changes of business cycle in EU, however, all CEECs business cycles are synchronized if less strictly restrictions on the rejection of the hypotheses on cointegrating relationship are

formulated (at least one of the two statistics (Trace statistic or Maximum Eigenvalue statistic) indicates about the rejection of the tested hypothesis).

**Table 2.** The empirical results of the CEECs' business cycle synchronization using Johansen cointegration test (number of cointegrating relations (equations') in parentheses)

Partner	BG	CZ	EE	HR	LV	LT	HU	PL	RO	SI	SK
EU28		$H_2(r)[1]$ $H_1^*(r)[1]$		$H^*(r)[1]$ $H(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_1^*(r)[1]$ $H_1(r)[1]$ $H(r)[2]$	$H_2(r)[1]$ $H_1^*(r)[1]$
EU15	$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_1^*(r)[1]$ $H_1(r)[2]$ $H^*(r)[1]$ $H(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_1^*(r)[1]$ $H(r)[2]$	$H_2(r)[1]$ $H_1^*(r)[1]$
EA19		$H_2(r)[1]$ $H_1^*(r)[1]$		$H_1^*(r)[1]$ $H_1(r)[2]$ $H^*(r)[1]$ $H(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H(r)[2]$	$H_2(r)[1]$ $H_1^*(r)[1]$
BE								$H_2(r)[1]$ $H_1^*(r)[1]$	$H(r)[1]$		
BG					$H(r)[1]$						
CZ								$H_2(r)[1]$		$H(r)[2]$	
DK				$H_1^*(r)[1]$ $H_1(r)[2]$ $H^*(r)[1]$ $H(r)[2]$		$H_2(r)[1]$ $H_1^*(r)[1]$	$H_1^*(r)[1]$			$H_1^*(r)[1]$ $H_1(r)[1]$ $H(r)[2]$	$H_2(r)[1]$ $H_1^*(r)[1]$
DE			$H_1^*(r)[1]$ $H_1(r)[2]$ $H(r)[2]$			$H_2(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[2]$			$H_2(r)[1]$ $H_1^*(r)[2]$ $H_1(r)[1]$ $H^*(r)[1]$ $H(r)[2]$
EE								$H_2(r)[1]$			$H^*(r)[1]$ $H(r)[2]$
IE											
EL	$H_2(r)[1]$		$H(r)[2]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$	$H(r)[1]$	$H_2(r)[1]$			$H_2(r)[1]$ $H_1^*(r)[1]$
ES	$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$ $H^*(r)[1]$ $H(r)[2]$		$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$			$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$
FR	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$ $H_1(r)[1]$ $H^*(r)[1]$ $H(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[2]$		$H_2(r)[1]$ $H_1^*(r)[1]$ $H_1(r)[1]$ $H^*(r)[1]$ $H(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[2]$
HR							$H^*(r)[1]$ $H(r)[1]$				
IT	$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_2(r)[1]$ $H^*(r)[1]$ $H(r)[1]$	$H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$		$H_2(r)[1]$ $H_1^*(r)[1]$ $H^*(r)[1]$ $H(r)[2]$	$H_2(r)[1]$ $H_1^*(r)[1]$
CY								$H_2(r)[1]$			
LV	$H(r)[1]$						$H_2(r)[1]$	$H_2(r)[1]$ $H_1^*(r)[1]$			$H_1^*(r)[1]$ $H(r)[2]$
LT											
LU	$H^*(r)[1]$ $H(r)[2]$	$H_1^*(r)[1]$ $H_1(r)[1]$		$H_2(r)[1]$				$H_2(r)[1]$ $H_1^*(r)[1]$			

Partner	BG	CZ	EE	HR	LV	LT	HU	PL	RO	SI	SK
		H(r)[2]						H <sub>1</sub> (r)[1] H <sup>*</sup> (r)[1] H(r)[2]			
HU				H <sup>*</sup> (r)[1] H(r)[1]	H <sub>2</sub> (r)[1]			H <sub>2</sub> (r)[1]			
MT	H(r)[1]	H <sup>*</sup> (r)[1] H(r)[2]	H <sub>1</sub> (r)[1] H(r)[2]	H <sub>2</sub> (r)[1] H <sup>*</sup> (r)[1] H <sub>1</sub> (r)[2] H(r)[2]	H <sub>1</sub> (r)[1] H(r)[2]	H <sub>2</sub> (r)[1]				H(r)[2]	H <sub>2</sub> (r)[1] H <sup>*</sup> (r)[1] H <sub>1</sub> (r)[1] H(r)[2]
NL								H <sub>2</sub> (r)[1]	H <sup>*</sup> (r)[1] H(r)[1]		H <sub>2</sub> (r)[1]
AT								H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]			
PL		H <sub>2</sub> (r)[1]	H <sub>2</sub> (r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]		H <sub>2</sub> (r)[1]	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[2]	H(r)[1]		
PT								H <sub>2</sub> (r)[1]			H <sup>*</sup> (r)[1] H(r)[2]
RO								H(r)[1]			
SI		H(r)[2]								H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[1] H <sup>*</sup> (r)[1] H(r)[2]	
SK			H <sup>*</sup> (r)[1] H(r)[2]		H <sub>1</sub> <sup>*</sup> (r)[1] H(r)[2]						
FI				H <sub>2</sub> (r)[1]		H <sub>1</sub> <sup>*</sup> (r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]			H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]
SE	H <sub>2</sub> (r)[1] H(r)[1]	H <sub>2</sub> (r)[1]		H <sub>2</sub> (r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]	H <sub>2</sub> (r)[1]	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]			H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]
UK	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[2] H <sup>*</sup> (r)[1] H(r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[1]	H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]
NO											
TR	H <sup>*</sup> (r)[1] H(r)[2]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[1]		H <sup>*</sup> (r)[1] H(r)[2]						H <sub>2</sub> (r)[1]
CA	H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[2]		H <sub>2</sub> (r)[1]			H <sub>2</sub> (r)[1]	H(r)[1]	H <sub>2</sub> (r)[1]			
JP	H(r)[1]			H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[2]	H(r)[2]	H(r)[1]		H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]			H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]
KR							H <sub>2</sub> (r)[1]				H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]
MX			H <sub>1</sub> (r)[1]		H <sub>1</sub> (r)[1]	H <sub>2</sub> (r)[1]		H <sub>2</sub> (r)[1]			
US						H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]		H <sub>2</sub> (r)[1]			H <sub>2</sub> (r)[1] H <sub>1</sub> <sup>*</sup> (r)[1]
BR											
CN						H <sub>2</sub> (r)[1]		H <sub>2</sub> (r)[2] H <sub>1</sub> <sup>*</sup> (r)[2] H <sub>1</sub> (r)[1] H <sup>*</sup> (r)[1]	H <sub>1</sub> <sup>*</sup> (r)[1] H <sub>1</sub> (r)[1] H <sup>*</sup> (r)[1] H(r)[2]		H <sub>2</sub> (r)[1]
RU											H <sub>2</sub> (r)[1]

*Notes. There have been used two statistics (Trace statistic and Maximum Eigenvalue statistic) in order to denote the rejection of the hypothesis at the 0.05 level. This table represents only rejection of the hypothesis when both selected statistics indicate about the rejection of the tested hypothesis.*

*Source: author's calculation*

The empirical results on the business cycle synchronization of the CEECs suggest that there is no cointegration with some countries like Ireland, Norway, Brazil, and South Africa in terms of industrial production index. The results also suggest that business cycle synchronization of the CEECs with their main international trade partners is not always observable due the different size of economies. For this reason, Poland's business cycle is more synchronized at EU and global level compared to other CEECs. The empirical findings also suggest that business cycles of the CEECs are also synchronized with some largest world economies such as Canada, Japan, US and China.

## Conclusions

The empirical findings suggest about a high degree of the business cycle synchronization of the CEECs at EU level as well as at country level with the largest EU economies: Germany, France, Italy, Spain, United Kingdom. However, business cycle synchronization of the CEECs with their main international trade partners is not always observable due the different size of economies. The empirical findings also suggest that business cycles of the CEECs are also synchronized with some largest world economies such as Canada, Japan, US and China.

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# Employees Participation in Corporate Management: European Framework

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## Abstract

The article touches upon an important at present issue concerning the increasing role of employees/workers' participation in modern corporate management strategies. Authors explore various views on the issue with their own suggestion on incorporating additional aspect in employees' participation, namely social corporate responsibility, which is already in the European Commission's agenda.

*Key words:* Management, employees' participation, corporate social responsibility, EU states

## Introduction

The article is aimed at analysing the present trends in evolving corporate management from a traditional "confidential" board-council management style to more employees' involvement and corporate social responsibility's patterns. Particularly, employees' participation has attracted additional attention in management through modern "tax planning" schemes (recently seen in Panama-papers' case).

## Methodology of Research

The research is based on analysis of the present EPM structures in the EU, recommendations from international organisations (ILO) and professional magazines.

## Findings and Results

Employees (or worker's) participation in management (EPM) has become a hot issue in the EU member states due to, first of all, the general socio-political guideline in the Union's development, i.e. so-called "*social market economy*". Undertakers and business in general have to take into consideration both for the optimal management and workers' social protection. Besides, governments have to see that trade unions and national employers' association take active part in corporate management.

EPM, strictly speaking, means "co-determination" of most vital aspects of manufacturing or/and production methods between management and trade unions. In this sense, employees can participate (in some EU states) in company's management structures (e.g. boards, councils, etc.).

It represents a new way of *corporate social responsibility's* (CSR) effect in decision-making.

For example, according to ILO (International Labour Organisation), EPM covers "all forms of association" between employees' representatives and firm's administration, ranging from information exchange and negotiations to collective bargaining and membership in supervisory boards/councils.

In the form of *Joint Consultative Committees*, EPM functions in the UK and Sweden, in *Workers' Committees* in France, *Co-determination Committees* in Germany and *Joint Workers Council* in Belgium. Though these and other forms, EPMs are both informing about company's "affairs" and contributing to management decision-making. Through acquiring shares in JSCs, the EPM can extend their "liquidity confidence" in board's management.

The article explores, as well, the EPM's main characteristics, the changing objectives (from informative participation to administrative and "decisive") and the "levels" of participation in several EU member states.

## Conclusions

The article concludes that EPM is a perspective trend in both international (e.g. UN Global Compact) and the EU (starting with the Small Business Act and recent CSR's recommendations) efforts to make undertakings better contribute to society's growth and progress.

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# Project Governance in Construction Companies: Between Transaction Costs, Stakeholder and Agency Theories

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## Abstract

The main objectives of the paper are to describe the issues of project supervision and design a model of internal project governance. The research problems are analysed applying transaction costs, stakeholder, and agency theories. The literature review and qualitative studies of construction sector were applied. The research showed that the asymmetry of information is key issue in project governance. In order to protect against that, shareholders use methods and frameworks good knowing from corporate governance. The clients employ substitute investor to supervise the construction sites. The construction company managers develop the managerial accounting system to protect against the gap in information flow. Such a system should be further developed because the current supervision is in many cases not enough sufficient.

*Keywords:* construction company, project governance, supervision.

## Introduction

Project governance is a system of project supervision by its stakeholders (Biesenthal & Wilden, 2014, 1291-1308). It evaluated from corporate governance theory, however takes into account peculiarities of project activity. Since the beginning a lot of research in the field was conducted. It resulted with founding of separate school in project management (Söderlund, 2012, 40-42). The project governance in project-based organisation (PBO) should be analysed from three perspectives: client vs. project, shareholders vs. contractor, and PBO vs. project. The key issues to be studied are: asymmetry of information, motivation of project team to achieving the best results in current conditions, and transaction costs related to ensure the efficient governance of the project. The above mentioned issues in construction companies are discussed in the paper from theoretical and practitioners point of view. The objective of the paper is to design the model of project governance analysing the relationship between construction company managers and project manager. The purpose of the study was to fulfil existing in the literature gap. There is a lot of research that analyses the mechanism and relationships between client and contractor or shareholders and contractor. However, it is only a few studies about project governance by company managers. The issues are usually analysed from management point of view. It is a lack of holistic approach using agency, stakeholder, and transaction costs theories.

## Methodology of Research

The study was conducted using triangulation of qualitative methods. First the literature analysis was applied. The current state of research was described and the existing gap identified. Next the indirect observation among construction companies operating in Poland and the UK was carry out. The observation was conducted between June 2015 and June 2016. Simultaneously the non-directive interviews among fifteen company and project managers were conducted. The interviewees were the project and company managers working since years for large general contractors. Finally the conceptual model of project governance in the analysed level of correlation was designed.

## Findings/Results

The study shows that the internal project governance in construction company is complex and multilevel. It is determined especially by organisational framework of project-based organisations, complexity of project environment, conditions of uncertainty related to construction activity, and changeability that results from client decisions and large value of works executed by subcontractors. Internal approach to project governance should be analysed from many perspectives: board of directors (organisation), subportfolio managers (area directors depending on organisational framework of the company), program managers (if a program exists), and project managers. During the study following threats that decrease the project supervision are recognised:

- lack or gap in information about the situation in the construction site (undersupervision of project manager),
- periodic interferences in information flow between project and other levels of internal entities (technical problems, misunderstanding, unintentional mistakes etc.),
- errors in information flows (mistakes in design of supervision system e.g. reporting channels, value aggregation),
- intentional under informing about the threats and potential of the project,
- intentional changing the real information about the project.

Lack or insufficient information results with growing problems on the construction site and could finish without achieving project goals. However, it is not the case that the project managers want always to hide the bad news. In most cases they are convinced that threats can be managed and overcome without support of company managers. Taking into account the above mentioned conditions the model of internal project governance should consist of:

- four levels of supervision (board of directors, subportfolio managers, program managers, project managers),
- units supporting the supervision (service departments of headquarters responsible for reporting system),
- hard tools supporting the supervision (frameworks, reporting system, responsibility account, mechanisms of data cross checking),
- soft tools promoted trust and transparency (organisational culture).

Design, implementation and the use of a such solution costs a lot of effort and money. However it should be the element of early warning system that provides coherent information about the project.

## Conclusions

The system of project governance should be designed, implemented and developed in all large and middle construction companies. It is a vital tool to achieve the company and project objectives, including clients' satisfaction. Holistic approach to design of project governance means taking into account all key stakeholders and provide them the efficient tools delivering the current, detailed, and reliable information about the project.

The study confirmed that agency theory is helpful to understand the relations between supervisors and subordinates. Stakeholder theory deliver the information about the key project stakeholders and their expectations. Finally, the transaction costs theory supports the decision about the implementation and further development of project governance system design.

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## Decision Making Using Expert Interval Estimations

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### Abstract

The article is focused on experimental methodology of using interval's expert estimation at different types of distribution. Interval's estimation is a suitable means of determining expert estimation when an expert has no sufficient information for defining point project estimation. To get adjusted in attractiveness sequence of project range, the authors offered to conduct modelling of expert estimation including intervals and types of deferent distribution (Uniform discrete and continuous, Normal, Triangle). Furthermore as estimation are used mean and median. The work shows that in case of symmetric distribution the sequence of preferred project attractiveness is retained.

*Keywords:* interval's estimation, experts system, attractiveness of projects, modelling,

### Introduction

Investigation of the works in field of using the methods of creating the portfolio of enterprise development projects (Ansin *et. al.*, 2007) enables to single out two main approaches economic mathematic and expert analytic approaches. The 1st approach employs different models relying on financial indicators characterising projects (NPV, IRR, PI *et. al.*). Application of given indicators leads to the increase of the objectivity of taken decisions, at the same time the usage of financial indicators alone restricts the possibilities and application sphere of a given approach, can decrease the mutual connection of project with enterprise general strategy. The second approach includes – scoring models, a model “Stage-gate” as well as different methods: selections, network analysis, hierarchy and fuzzy analytical process. All these models and methods to a certain extent use expert estimations. Expert analytical approach allows to use the evaluation of projects attractiveness at the initial stage of projects portfolio analysis. The quality of the results of projects portfolio expert evaluation depends on the selection and creation of expert group (Ivlev *et. al.*, 2015). The aim of this work is to study the possibilities of using intervals expert evaluation to give grounds to the attractiveness of projects. The object of the research is attractiveness of enterprise development projects. The subject of the research – studies of the possibilities of using interval's estimation for creating enterprise development projects portfolio in the conditions of uncertainty of conducted evaluation. The authors introduce characteristic of 4 distributions types which are applied by experts in interval's estimation (see Table 1).

**Table 1.** Distribution type selection table in case of interval's estimation

Distribution	Symbol	Property	Distribution's parameters
Uniform, discrete	$U_d$	Information about estimation distribution is not available	A, B, (A + B)/2
Uniform, continuous	$U_n$		A, B, (A + B)/2
Normal	$N$	It is known that estimation distribution is strongly concentrated	$\square\square = (A + B)/2$ , $\square = (B - A)/6$
Triangle	$T_r$	It is known that estimation distribution is concentrated	A, B, H = 2/(B - A)

Every expert executes evaluation indicates the range of possible estimations and a type of appropriate distribution (see Table 2).

**Table 2.** Project evaluation table with distribution types

Expert	Project			
	$x_1$	$x_2$	$x_3$	$x_m$
$E_1$	$(A_{11}, B_{11}); N$	$(A_{12}, B_{12}); U_d$	...	$(A_{1m}, B_{1m}); T_r$
$E_2$	$(A_{21}, B_{21}); U_d$	$(A_{22}, B_{22}); N$	...	$(A_{2m}, B_{2m}); N$
...	...	...	...	...
$E_n$	$(A_{n1}, B_{n1}); T_r$	$(A_{n2}, B_{n2}); U_d$	...	$(A_{nm}, B_{nm}); T_r$

## Methodology of Research

The authors carried out processing and analysis of the results of portfolio projects ( $x_i$ ) expert evaluation for enterprise development. As a method of expert evaluation 10 experts offered interval's method (Aleskerov *et al.* 1984) at 10 point scale (the higher is object evaluation the more privileged is the project) taking into account that all interval's distribution types are similar at uniform distribution  $U_d$ . For project creation were used mean arithmetic and median methods. During the expert evaluation experts may face two situation experts can carry out evaluation of projects attractiveness within a narrow interval (I variant) and broad interval (II variant) in case of uncertainty of projects attractiveness. For example, the 1st expert at the at the 1st object evaluation had interval (1;3) - then relative broader margins are (1;5) (see Figure 1) and so on.

Expert	Project						
	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$
$E_1$	(1, 5)	(1, 5)	(1, 4)	(4, 8)	(4, 9)	(2, 7)	(1, 5)
$E_2$	(2, 7)	(4, 9)	(1, 4)	(4, 10)	(6, 10)	(4, 8)	(1, 5)
...	...	...	...	...	...	...	...
$E_{10}$	(2, 7)	(1, 5)	(1, 4)	(4, 10)	(6, 10)	(4, 8)	(4, 9)

Expert	Project						
	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$
$E_1$	(1, 3)	(1, 3)	(1, 2)	(4, 6)	(4, 7)	(2, 4)	(1, 3)
$E_2$	(2, 4)	(4, 7)	(1, 2)	(5, 9)	(7, 10)	(4, 6)	(1, 3)
...	...	...	...	...	...	...	...
$E_{10}$	(2, 4)	(1, 3)	(1, 2)	(5, 9)	(7, 10)	(4, 6)	(4, 7)

**Figure 1.** Expert evaluation by using estimation in narrow and broad interval

The authors carried out modelling of expert group activities 10 times using Excel function  $RANDBETWEEN(A; B)$  that is modelling  $X$  evaluation (a whole number) in segment  $[A, B]$ . i.e.  $A \leq X \leq B$  for two possible situations of expert evaluation of projects attractiveness for enterprise development (see Table 3).

**Table3.** Object interval assessment realization table at 10 realizations. A case of narrow assessment range

Realization, NN	Sum, $S$						
	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$
1	28	25	22	54	66	44	41
...							
10	23	24	20	56	70	41	40
Average, $\bar{X}$	2.36	2.57	1.95	5.71	6.62	4.05	3.86
Median, $M_e$	2.30	2.55	1.95	5.70	6.65	4.05	3.80

By increasing project evaluation interval margins, project creation series II variant remains without changes:

$$\text{Project: } x_5 > x_4 > x_6 > x_7 > x_2 > x_1 > x_3$$

$$I \text{ var. } 6.62 \quad 5.71 \quad 4.05 \quad 3.86 \quad 2.57 \quad 2.36 \quad 1.95$$

$$II \text{ var. } 6.65 \quad 5.70 \quad 4.05 \quad 3.80 \quad 2.55 \quad 2.30 \quad 1.95$$

## Conclusions

Usage of interval's expert estimation for projects evaluation at attractiveness in the uncertainty conditions allows to apply a broader interval's estimation. Employment of narrow and broad interval's ranges with uniform discrete and discrete continuous distribution of expert evaluation does not lead to the change of projects arrangement according to their profitability for further deep research by using economic – mathematical models and financial indicators. Usage of interval's estimation allows expert evaluation modelling, which is important in case of experts numbers increase in case of desire to retain confidentiality of information about enterprise project development.

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# Sensitivity Analysis of Economic Systems in Conditions of Uncertainty Using Modelling

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## Abstract

This paper presents the ability of using of modelling and sensitivity analysis for investigation of economic systems in conditions of uncertainty. The analysis of sensitivity of economic systems is used for the investigation of dependences of the parameters of studied model in changing conditions of factors of the external and internal environment. The adequacy of the model is defined by degree of proximity of values of the parameters of model received as a result of modelling with the actual values of parameters of the investigated economic systems. In the paper methods of statistical modelling are using for the analysis of sensitivity of economic systems.

*Keywords:* Economic system, modelling, sensitivity analysis, uncertainty.

## Introduction

The research is focused on using of statistical modelling methods and sensitivities analysis for investigation of economic systems. The main contribution of this paper is the description of methodology of investigation of economic systems in conditions of uncertainty. Economical researches using imitation statistical modelling methods have numerous challenges and opportunities in the waiting for the twenty-first century, calling for increasing numbers of non-traditional statistical approaches. Imitation statistical modelling is one of the most widespread methods of research of economic systems. Imitation modeling is usually applied for researching economic processes and systems.

The purpose of this article is to show effectiveness of using of statistical modelling methods for the investigation of behavior of economic systems in conditions of uncertainty.

## Methodology of Research

The algorithm of optimization and calculation of order point is traditionally and most frequently used in real-time planning. In reality the function, from the point of view of order TCU (total cost per unit time), is to a great extent dependent on the value of P – frequency of orders.

Two modelling scenarios are considered: given the value P, the rule of distribution is known as F, i.e. P~F (F – distribution function). There is the following interdependence:

$$TCU = \Phi(P, t, t_0, \omega), \quad (1)$$

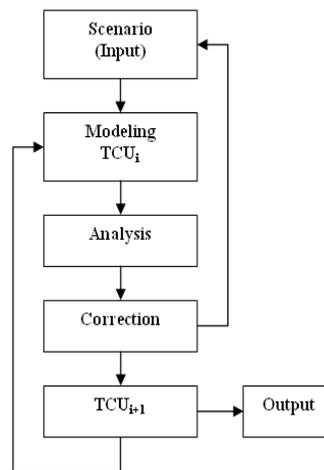
where

$t_0$  – order cycle time (measured in units of time);

t – modelling time;

w – incidental parameter.

In the first scenario there is a sufficiently well-developed mathematical mechanism of modeling and it is necessary only to implement and analyze the data obtained to meet the goals of optimization. For theoretical modelling the authors have used MS Excel and the program MathCad.



**Figure 1.** Algorithm of the implementation of the second scenario of modelling of TCU

For resolving the problem under given conditions, traditional methods of statistical modelling was applied, which allows to develop (imitate) different options of organization of the process of stock management, taking into account the specific characteristics of the particular scenario.

### Findings/Results

The analysis of the modelling results allows to choose the most optimum dynamic mode of replenishing the stock, required raw materials and materials, as well as to minimize total costs TCU, i.e. to choose an optimum strategy for stock management in a stochastic case (the first modeling scenario). In the second scenario of modeling the authors have used modeling methods that allow considering specific characteristics of changes of value P, namely, irregularity of consumption intensity, different lengths of intervals between order points, inability to select an appropriate rule of distribution of value P for the whole modeling time interval. The process of development and implementation of the imitation model implies the following simplified algorithm (see Fig. 1). Sensitivity analysis has been used in this case as the tool for estimation of relevance of modelling parameters to economic system parameters.

### Conclusion

The method of imitation modelling allows developing (imitate) different scenarios of functioning of the investigated economic systems. Imitation modeling may be used for tackling a wide range of economic problems (design and analysis of industrial systems, stock management, balancing of production capacities, allocation of investment funds, optimization of investment funds, optimization of flows of services etc.). Imitation modeling is frequently associated with the factor of uncertainty, whose description goes outside the confines of the traditional statistical modeling, which, in its turn, complicates the imitation modeling process. In the process of imitation modelling the most frequently method used to model multivariate distribution incidental values is the parametric method of modelling. In this case it is necessary to establish parameters of common distribution of incidental values characterizing the factors under consideration. Usually this is done by means of evaluation of parameters of multivariate distribution.

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# Comparative Efficiency of the Inter-Firm Network Organizations

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## Introduction

Considering the functional aspects of hybrids, it should be noted that these institutional forms of organizations create high-performance structures for knowledge production and dissemination, technological and process innovations, and have significant potential for self-study.

### Aspects of the Efficiency Estimation of the Companies

The economic benefits of hybrids are in reducing the transaction costs, occurrence of relational quasi-rents and arranging the procedures for managing the parties' resource dependency, allowing decreasing the possibility of opportunistic behavior of participants (Podolny, 1998). It is reasonable to implement the detailed consideration of these aspects in accordance with the resource and relational approach, existing in the theory of the firm, and the knowledge-based approach.

According to the resource-based approach (resource based view) the inherent heterogeneity of the companies may become sustainable since the various companies have the unique resources which significantly differ in quality and quantity. These resources are the source of a particular performance and characterized by: (1) value (2) scarcity; (3) impossibility of accurate imitation; (4) absence of strategic substitutes for resources that are valuable, and simultaneously are neither scarce nor limited (BarneyJ, 1991).

On the basis of available resources and abilities the firms and their strategic alliances create competitive advantages for obtaining the economic rents. Reproduction of the produced competitive advantages is protected within the firm or strategic association by employing the "mechanisms of isolation" (using the terminology of Ramelta). Unique complementary assets, technological or managerial innovations, industrial technical standards are examples of such protective mechanisms.

The controversy over the procedures of rents creation has led to the emergence of two variations within the resource approach frameworks: the traditional concept and the concept of dynamic capabilities. Regardless of the employed terminology, the main divergence lays in referring the competitive advantages to the appearance of Ricardian or Schumpeterian rents. The mechanism of creation of the first ones suggests that some firms are more efficient than others in the selection of resources, while the mechanism for creating second ones is based on the fact that firms derive economic rent due to greater efficiency in the resources allocation through the development of distinctive organizational capabilities (Katkalo, V., 2002).

It should be noted that dynamic capabilities themselves are not resources, they just form the background for the rational use and achievement of the resources on the basis of sustainable competitive advantages. The contemporary papers, devoted to the resource approach, focus their attention on such resources as the codified and especially non-codified knowledge, specifying them among all other kinds of resources. B. Loasby believes that competences and skills are a special type of knowledge "knowing-how", unlike "knowledge about" ("knowing-that") or information about something (Loasby B., 1998). Special attention to the transition of the non-codified knowledge is connected with the fact that it depends mostly on the social environment and the internal structure of the firm. It is specific at the level of the team or organizational structure; none of the individuals is its only medium. Such knowledge is the "core" of the company, its "core competencies". In this regard, the arrangement of the system of knowledge management involves close cooperation within the network forms of organization of production enterprises, able to create the infrastructure of receiving, accumulation and transfer of non-codified knowledge.

The concept of dynamic capabilities in terms of the knowledge management has entered the theory of strategic management as a "knowledge-based approach" (Knowledge-based view). This concept has given a rise to the most fruitful contemporary developments in this sphere; two approaches towards the knowledge management as a major company resource are widely applied in practice.

The first one is connected with the works of D. Teece; it is widespread in the United States and Europe. The Western approach to the treatment of management of personnel- knowledge carrier has been developed first of all to solve the practical problems. Due to this interpretation, the knowledge management is based on the concept of intellectual capital (Teece D. J., 2002); there estimated its impact on the efficiency and effectiveness of the company performance.

The approaches of Western researchers towards estimating and accounting the impact of new knowledge and innovations development and adoption in the production process correspond to the attitude of the Western society to the purpose of these processes: development of company resources and capabilities. Resource approach in this sense justifies the analysis of processes for increasing knowledge, intangible assets and employees' competences as important assets, ultimately determining the economic opportunities and the real value of the company.

An alternative approach, appeared in Japan is connected with Nonaka's and Takeuchi's researches (the concept of the "company creating knowledge") (Nonaka, I., 2002). This approach is based on the fundamental heterogeneity of two kinds of knowledge: formal and non-formal (codified and non-codified in other terminology).

Formal (explicit) knowledge is summarized in the scientific literature, descriptions of inventions and discoveries, various instructions and regulatory materials. Non-formal (tacit) knowledge exists in the form of employees' skills transferred from one to another by means of individual communication and learning.

According to this classification, the process of obtaining the knowledge passes a series of sequential steps by the scheme developed by Nonaka:

1) socialization is informal transfer and exchange of non-formal knowledge, in other words skills, competences and approaches used by company employees; new non-formalized knowledge is adopted on this basis;

- Inter-company network organization (networks of firms);
- Alliances;
- Cooperatives and others.

From the standpoint of control and the type of partners interdependence there are four basic types of connections (Ho Park, 1996):

- Vertical three- and multilateral relations (some long-term contracts, subcontracting, etc.).
- Vertical bilateral ties (license agreements, franchise networks, joint ventures, etc.).
- Horizontal bilateral ties (cartels, research consortia, and others.)
- Horizontal three- and multilateral relations (associations, etc.).

The hybrid forms present a number of specific properties:

- there assumed the certain form of explicit coordination due to technological factors, synergy effects, personal relationships of the partners as a way to reduce uncertainty and risk;
- the adaptation mechanism, specific for the hybrid form; it differs from both the price and the hierarchical ones;
- the hybrid forms exist because their members percept this form of organization as an additional source of organizational rent.

These specific characteristics form the basis for the competitiveness of the created network inter-firm organizations.

2) Externalization is a transfer of non-formal knowledge into formalized one;

The combination is obtaining the new knowledge on the basis of existing formalized knowledge (in fact, for many research organizations it is a common way to generalize and to develop the previously acquired knowledge, documented in various sources).

3) Internalization is the process of transformation of formalized knowledge into non-formal one, i.e., in the new knowledge and approaches, used by employees in their practice.

The peculiarity of the approach towards the arrangement of knowledge management, adopted in Japanese corporations, is to focus precisely on non-formal knowledge, promoting teamwork of different company departments and cooperation of various firms. The impressive achievements of Japanese corporations in the high-tech industries contribute to the spread of Nonaka's and Takeuchi's approach outside Japan.

Inter-firm training is crucial for achieving competitiveness. J. X. Dyer and Singh X. note that more than two-thirds of innovations in scientific instrumentation have arisen as a result of considering the wishes and ideas of customers. The suppliers were the source of the majority of innovations in field of the wire connections. Analysis of the dynamics of patenting in the area of Biotechnology also confirms that the majority of innovations are implemented by a variety of individuals working in different organizations (pharmaceutical companies, biotechnology companies, universities). Analysis of the described examples allows making the following conclusions:

- Alliance partners are in many cases the most important source of new ideas and information permitting to create the technologies and innovations for improving the company performance;

- Production network with more efficient routines for the knowledge transfer can organize the innovative activities significantly more efficiently compared to the production networks with less developed routines for the exchange of knowledge. Therefore, the joint efforts of partners can generate rents through the improved routines for the knowledge transfer. Routines for inter-firm knowledge sharing can be determined as a certain set of regular inter-firm interactions, allowing transferring, or recombination or generation of special knowledge (JH Dyer, SinghH);

As it has been previously noted, the transfer of know-how has the special difficulties, since know-how belongs to the group of non-coded knowledge. In the case of long-term relationships between the firms, the implicit, “sticky” knowledge is assimilated better due to the fact that firms demonstrate partner specific absorptive capacity. It is determined as an ability of the company to recognize and assimilate the value knowledge coming from partners.

Partner specific absorptive capacity depends on the following conditions:

1. the extent to which the partners have developed the overlapping knowledge bases;
2. how well there have been developed the routine interaction, providing the maximum frequency and intensity of socio-technical relationships.

The demonstrative example of generating the inter-organizational advantages is auto corporation Toyota; it has developed a number of practices facilitating the transfer of knowledge to/among suppliers. Toyota can pass the knowledge directly to the suppliers through the consulting department in the field of Operation Management, members of which may spend several days or months in the factories of suppliers, watching the staff training and process innovations implementation. There also implemented transfer of the personnel, or “outstaffing”, to the supplier; it can take place either temporary or on continuing basis and it is oriented on increasing the ability of the supplier to absorb the transmitted knowledge. The described forms of cooperation lead to the appearance of close inter-company social networking, which is effective infrastructure for knowledge management and supporting innovative activities.

The emergence of the network inter-firm organization requires the high level of cooperation and coordination between the partners beyond the classic contract frameworks. Consideration of network inter-firm organizations in this perspective involves the use of relational approach. The joint activity involves investments in specific assets usage of which is limited to the scope of the network inter-firm organization.

Specific investments form sustainable competitive advantages if:

- The agents develop mechanisms for control of opportunistic behavior which do not require costly solution;
- Joint production activities are characterized by high interdependence of assets.

Dyer (Dyer, 1997) put forward the hypotheses in his work, and they were confirmed empirically by the econometric models. The hypotheses are as follows:

1. Increased specificity of human capital as an asset (the specialized knowledge, skills and capabilities) significantly improves the quality of output and reduces the time of development of new products.
2. The level of quality is directly dependent on the specific physical assets.
3. Increase of the specificity of all kinds of assets (physical, human capital, assets by location) improves the overall profitability of the production network as a whole. In this case the opportunistic behavior of one of the participants imposes the threat of significant losses, while the guarantee of a return of the investment is based on mutual trust of cooperation participants only. For this reason, a major challenge is to ensure the stability of the established structures and to achieve the profitability of business which is satisfactory to all participants of the network intercompany organization; there also should be provided the adequate mechanism for distribution of rents occurring within the network inter-firm cooperation.

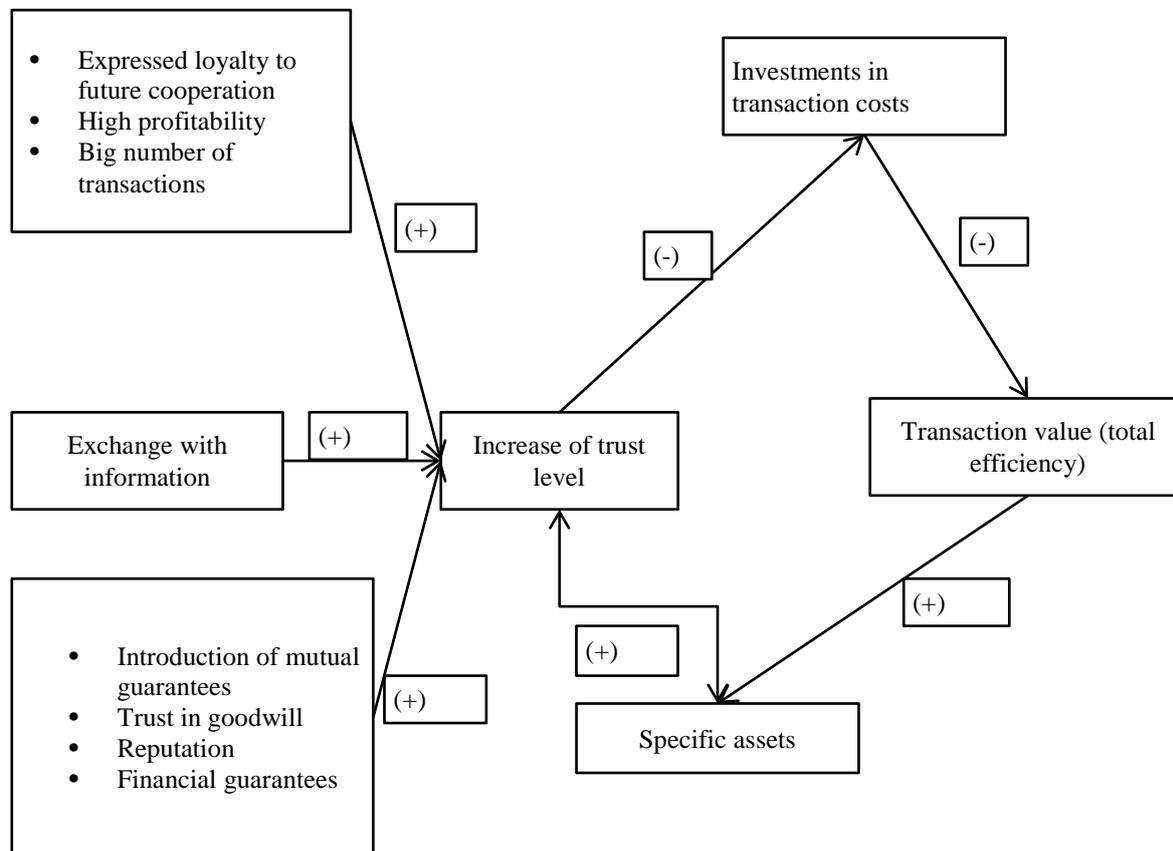
In this aspect, the stability of cooperation, alliances or strategic partnership depends on the fact whether there still kept the benefits from this form of organization in the event of changes in the external environment. Grouping the companies allows establishing the balance of efforts at a certain interval in the following areas:

- Reducing transaction and production costs;
- Time savings for the deployment of advanced manufacturing of new products and occupying the market niche with these products (increase of production capacity);
- Reduction of losses in the presence of decreasing the production within the industries of economy, which do not provide the desired business profitability; the model of inter-firm co-operation formed on the basis of the above described principles (Fig. \) reveals the mechanism of integration of the individual business units in the business groups.

The model assumes that the confidence in the partnership increases due to the impact of the following factors:

- Designation of intent to cooperate on a long-term basis;
- Increase of an intensity and a scope of information exchange;
- Establish of the mechanisms for mutual guarantees.

In turn, each increase in the level of trust allows producing the transactions with lower costs. In that case the agents are more willing to invest in specific assets necessary for the implementation of cooperation. In a further development these investments serve as a guarantee of stability of the arranged structures.



**Figure 1.** Model of inter-firm cooperation

Differences in the models of interaction and organizational structure are based on national peculiarities of the enterprises development trends and dynamics of the external business environment. High competitiveness of enterprises of separate national economies arouses considerable interest of researchers to the analysis of the institutional structures, organizational forms and management technologies implemented by the market leaders. The study of the “best practices” of the leading enterprises allows generalization and transferring the valuable experience and its adapting to the local conditions.

Theoreticians and practitioners of management are again turning to the study of Japanese management experience nowadays, attempting to explain the competitive advantages of Japanese companies by their ability to create the strategic alliances and to manage partner relations in changing environment conditions.

Undoubtedly, one of the factors of high competitiveness of institutional forms of organization of production in Japan according to the opinion of numerous researchers is the occurrence of inter-organizational competitive advantages, allowing achieving a significant increase in the efficiency of individual business units on the basis of close cooperation with the partners (Aoki, 1990). Historically, the above-described “hybrid forms” of production organization emerged in this country. It is possible to state with certainty that the Japanese approach to the arrangement of the production systems and building relationships with partners predominate within the global automobile industry. At the micro level the influence of the mentality and traditions of doing business is expressed mostly in close cooperation with suppliers; this fact allows arrange production more efficiently. An example of such cooperation is the keiretsu (circle of quasi suppliers) of Motor Corporation Toyota (Ahmadjian, Lincoln, 2001).

The evolution of the institutional concept of firm logically leads to the fact that inter-company cooperation is becoming the dominant form of production arrangement. Thus, the theoretical findings of researchers are confirmed in practice. This fact is illustrated by the situation in certain sectors; the automotive industry has been selected as an example for this research basing on the peculiarities of this study.

The invention of the auto car became a catalyst for profound changes in both the industry and society in general, and the later emerged automotive industry turned to be the most dynamically developing and important sector of the global economy. Automobile industry was allocated as a separate branch in the 80-90-ies of the XIX century in France and Germany, at the end of XIX- early XX century in England, Austria-Hungary, Italy, the US, Belgium, Canada and Sweden. In the 1930s the automobile branch for industrial type of motor cars was created in the USSR, and in 1950-60-ies in Japan, Brazil, Argentina, Spain, India, China. Starting from the middle of the XX century the automobile industry belongs to mature industries with a high level of monopolization. The 1980s became the time of intense development of the automobile industry in the Republic of Korea and others Asian countries, especially China. The automobile industry has recently reached the largest production volumes in the world, consuming 15% of the steel, 40% of rubber and 25% of glass produced in the world. The statistics confirms the validity of P. Drucker's words, proclaiming the automobile industry to be the "industry of industries". The presence of such close relationships explains the well-known statement, asserting that the level of development of the automobile industry shows the general state of the national economy as a whole. The target position in the technological chain means quite strong dependence on the technical and technological level of related industries and businesses, belonging to the partners.

Automobile industries are a source of pride for certain countries and the kind of indicator of the country's competitive position in the world market.

The undeniable argument that the automotive industry plays a role of the locomotive of economic development and the overall development of the auto industry complex largely determines the face of the country's industry are quite familiar.

In strategic terms it is also clear that the development of the automobile industry is directly related to the implementation of the key tasks of economic development: modernization and provision of the population employment.

It should be noted that the development of the automobile industry gave impetus not only to technological, but also to administrative and managerial innovations, which subsequently found wide application in other industries. Starting from the mid-1910s the conveyor assembly spreads over the industry; it became the foundation of mass production. Later, the machines with automatic control and automated production lines are widely used. In 1950 the Japanese factories of Toyota began development of a system of flexible organization of production, focused on the elimination of losses and improvement of quality; nowadays it is well-known as "lean manufacturing". Since the mid-1970s

Since mid-1970ies the industrial robot-manipulators are applied at harmful (dyeing) and responsible (welding) segments of production. Development of administrative and managerial technologies in the automobile industry is connected with the names of the classics of management, such as Ford, Taylor, Sloan, Ohno. The organizational and managerial structures in the automobile industry have changed under the influence of the external environment, the situation and structure of the industry; to consider them it is necessary to elaborate the conceptual apparatus. Therefore it is possible to distinguish within the automobile industry the motor car producers and their suppliers.

The typical representative of the world level is Toyota. Toyota's suppliers are grouped around the parent company and form three echelons; the first one consists of 122 the most stable providers, operating on the basis of neoclassical contract; the second one comprises the enterprises, the relations with which can be interrupted in the event of a radical change in the situation on the market (5437 subcontractors) and third one is the level of suppliers operating on the basis of short-term contracts (41703). The process of creating the keiretsu contains not only the considerations on transaction costs on the basis of the reputation of suppliers but also the idea of sharing the risks of investments in assets; the possibility of using them is limited by created alliance of the companies. Thus every type of specific assets contributes to the increase in the overall efficiency of the production chain.

### **Specificity of the assets by location**

The plants of the affiliated providers of Japanese automobile providers are in a zone of 65 km, the distance between the car manufacturer and the plant of the independent provider is about 200 km in average.

The suppliers' plants in the US are located at a greater distance of 665 km and 950 respectively. The territorial proximity allowed the Japanese automobile producers to arrange frequent daily supply according to the technology "just in time"; thereby there were reduced the insurance and buffer stocks of raw materials and production components. The ratio of the stock value to the sales revenue at Toyota is just 2.3%, while for American producers it is from 8.1 to 9.8 % (Dyer, 1996).

### **Specificity of human assets**

Horizontal integration of manufacturing systems in Japan is characterized by cooperation of engineers of car producers and their suppliers. In average, 7 Japanese engineers support the providers in the process of production and implementation of R & D, and the contact with the partners takes, for instance, 3344 man-hours for Nissan Corporation and 7236 for Toyota. For comparison, in the US only one engineer consults the suppliers, while the direct interaction between the partners takes 1025 man-hours (Dyer, 1996).

### **Specificity of the physical assets**

This specificity of suppliers of Japanese manufacturers takes in average about 30%, i.e. up to 1/3 of the equipment used for the production of automobile components, purchased by one supplier. In the US the assets specificity of the components suppliers is 17%; it is mostly presupposed by the short-term contracts and the necessity to establish universal equipment (Dyer, 1996).

### **Conclusion**

The profitability for Japanese automobile corporation Toyota is 13%, while the profitability of the auto components suppliers is 7.1%. In the US these figures for General Motors are respectively 2.8 and 4.8%. High profitability of Japanese manufacturers can be related to the advanced techniques of arranging the production and interaction with suppliers.

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## Risk Management Application in Small and Medium-Sized Business

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### Abstract

The studies of risk management in nowadays have lot of opportunities and challenges, especially in field of entrepreneurship. The research identifies main problems that entrepreneurs have from risk perspective. Authors are building the interactive system with business simulations elements; with ambitious in relatively easy way to educate students, as well to train the entrepreneurs how to identify risks, to understand impact of risks to company goals, achieved results etc. The main focus of research is to small and medium-sized business environment where risk management literacy is on very low level.

*Keywords:* Risk, risk management, education, risk literacy

### Introduction

Major changes of technologies, the data exchange speed up in a several times (Akamai), the development of new type of logistics, humanity has experienced in recent years and continue to experience. "In most of human existence was relatively safe assumption that the world in which you will die will be the same, in which you were born. But it is no longer the current situation - very soon people even will not die": futurist Ray Kurzweil, 2001. Business, which is one of the integral parts of modern life, is also affected by significant changes – appeared products which have not previously been (such as drones, Segway, autopilot vehicles, etc.), new types of services (e.g., data storage services outside the enterprise, online trading, the leading communication channel with customers getting social sites - Facebook, YouTube), the emergence of new monitoring options (e.g., companies can monitor their employees' activities in the distance (GPS system allows you to set the location, movement speed, etc.).

In considering the progress made in the context of the risk, we can see similar changes. Going on a reciprocal effect: on the one hand the development and progress is the cause of certain risk reduction or even termination (e.g., a number of disease has been eliminated preventively through vaccination (World Health Organization), modern vehicles are equipped with more than 20! different types of risk-reducing systems, getting a data on potential business partners demand a couple of seconds using social sites. On the other hand the appearance of new activities causes new, previously non-existent risks, e.g., social sites convenient accessibility and popularity at the same time ensuring the availability of personal data can be used for malicious purposes. Cyber risk potential it is difficult to even aware at the moment. Based on the foregoing, the question arises: do the risks remains more or less today? - Definitely can answer: risks are changing.

Thesis depth problems associated with the management decision-making in a rapidly changing environment. The light side of globalization, which has a direct impact on the increase of competition, those geographical boundaries exists relatively now. In such circumstances an undertaking which is capable of quickly and accurately adapt to market demand, to find the most appropriate resources and successfully realize their products, will be the winner. These capabilities are directly dependent on the most effective management decisions making in the shortest possible time (faster than it does by the competitor).

In turn, competitiveness is closely associated with the ability to be productive, innovative and efficient. Any negative event (risk) in respect of any of these factors reduces the competitiveness of the company. Logically, it can be assumed that the methodology that helps to reduce the probability and/or consequences of the negative event should be considered as integral part of a business management component.

The goal of the thesis is, based on the research of risk management models to evaluate the risk management actuality in nowadays and to develop the risk management tool that could be integrated within the company's management process to ensure effective management decision-making process to achieve the goals established before.

Work tasks:

1. Based on the scientific literature research:
  - a. to evaluate the risk management models and theories;
  - b. to explore possible improvements in the risk management model;
2. To assess the actuality of risk management application in the certain industries.

3. To develop a conceptual model of risk management tool by defining the risk assessment criteria and appropriate solutions for small and medium-sized enterprises.
4. To develop recommendations for improving the integration of risk management in corporate decision-making process.

#### *Limitations of the research*

Risk management related problems are extensive, so the thesis can be viewed to a limited extent.

1. The work is discussed the specific industry sector in which the author's assumptions, risk management is not carried out the required level.
2. By the term "risk" in the context of thesis to understand the conditions which adversely affect to the company's operations. The research is included operational risks, market risks, and political risks. The study does not contain financial risks (such as currency risk, the risk of devaluation, accounts receivable risk, etc.). However, the impact of risks, including possible financial result is analyzed.
3. As regards the practical part of the work the author of research concerning Latvia, Lithuania, the Netherlands.
4. The study is extended to small and medium-sized enterprises.

### **Methodology of Research**

During the research were used in conventional economics and management sciences research qualitative and quantitative methods: literature analysis, the primary data analysis, grouping, comparison, generalization. The potential risk scenario study will be used for modeling. Calculations made using software such as Microsoft Excel, the statistical program IBM SPSS Statistics, IBM SPSS Modeler, Rapid Miner.

### **Findings/Results**

Has been conducted a theoretical study of the most important problems in risk management. The empirical research has provided the data about the 21 Latvian logistics enterprises in the context of risk management application. In collaboration with the Hogeschool STICHTING ROTTERDAM (the Netherlands), the College of Vilnius (Lithuania) and the insurance joint-stock company "Balta" (Poland) is being developed risk management system prototype.

### **Conclusions**

The low level of Risk Management application mainly related with a lack of literacy about the risk management process, and its complex nature by itself. Simplified risk management instrument could reduce these problems in the significant way. The result is reduced potential hazards that increase probability to achieve business goals set before.

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# Measuring Patients' Satisfaction in For-Profit Orthopaedic Hospital

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## Abstract

Patients' satisfaction plays central role in management of private hospitals, while development of appropriate model and its adjustment to the specific needs is necessary. The goal of the paper is to develop a tool for measuring patients' satisfaction level providing credible results.

*Keywords:* patients' satisfaction, private for-profit orthopaedic hospital.

## Introduction

Patients' satisfaction has important place in management of both private and state hospitals, while development of appropriate model and its adjustment to the specific needs, as for example Latvian private orthopaedic hospital, could be challenging. The model should satisfy both capital providers-shareholders needs and wishes as well as medical staff requirements, and lead to valid results appropriate for further implementation.

It is worth mentioning that according to the Institute of Medicine, "health care should be safe, effective, patient-centred, timely, efficient and reasonable", so that mentioned issues should be met in the organization's quality management system. In the context of patient-centred care, patient satisfaction is one of the scopes of health care system.

The introduced question has been discussed on the global level. The necessity for patient-centered care has been addressed for the first time by Institute of Medicine in 2001. In the following years, policy makers and representatives of the medical sector have paid attention to recognizing the patient's-centred view in their approach and working methods.

Moreover, research has shown that patient-centred care rises excellence and efficiency of the organization providing services (Arterburn *et al*, 2012); it may decrease costs associated with treatment (Walsh *et al*, 2014). Additionally, patient-centred care is related to higher patient satisfaction and greater devotion to the process (Chatterjee *et al*, 2015), enhanced familiarity with patient's illness history and rehabilitation (Doyle *et al*, 2013). Last, but not least – as soon as patients have better experiences they are more likely to adhere to treatments and return for follow-up arrangements (Chatterjee *et al*, 2015), that is of particular importance for the private hospital eager to satisfy shareholders ambitions.

As one of the elements in the patient-centered approach is patient's satisfaction and the necessity for its measurement, special attention should be paid to this question. Moreover, it should be considered that the subjective nature of patient's satisfaction causes challenges for both theoretical and practical work – mentioned personal components are hardly to fit into hospital's activities which are willing to improve quality of provided services.

## Methodology of Research

The goal of the paper is to develop and test model for the assessment of patient satisfaction in private for-profit orthopaedic hospital in Latvia that is consistent for results, as it should help determining potential areas for progress. Moreover, satisfied patients are likely to return, to fulfil medical treatment requirements achieving better clinical results as well as to recommend the hospital to others contributing to better overall performance of the organization (Westaway *et al*, 2003).

The model will be based on best-practice approaches in number of Western European countries, adjusted to the requirements of Latvian realities and necessities of private for-profit orthopaedic hospital. Preliminary results will be tested using statistical approach: on the first stage, regression analysis will allow to determine the most relevant criteria for further analysis of satisfaction level; on the second stage, the reliability of satisfaction scale using Cronbach's alpha will be tested.

## Results

The results of the study will show that developed tool could be valid instrument for measuring patient's satisfaction level, allowing improvements to the existing processes inside the organization as well

as benchmarking of different segments in the hospital as far as possible and best-practice approaches development.

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# Latvia in OECD and Baltic Countries' Road to Corporate Governance

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## Abstract

The aim of the research is to investigate Latvian experience in corporate governance. In order to understand the essence of the corporate governance, the companies in the developing countries need to perceive their key elements. It refers to the roles of the companies in the leadership and management best practices. In fact, these key elements of the corporate governance focus on the direction of the companies along with their promotion in the target market. As a result, it has a positive value for both the shareholders and stakeholders. Hence, the implications of the corporate governance refer to the overall directions of the companies with respect to increase the positive outcomes for the business in the emerging markets. At the same time, the proper use of the best practices of corporate governance corresponds to the improvement of the decisions made based on the future concerns of the companies. It is also relevant from the position of the purpose and vision statements, including the motives of the companies regarding their further activities in the emerging markets. Simultaneously, it is important to consider the leadership oversight during the evaluation of the decisions made with respect to improve the overall corporate governance and its challenges for the companies

*Keywords:* Latvian economy, corporate governance, OECD.

## Introduction

Primary, The Organization for Economic Co-operation and Development which was established in 1961 and now consist of 35 members with annual budget over EUR 360 million, was built as a framework to help governments around the world to share experience and seek solutions to most common problems, such as economic, social and environmental. Another important field that OECD covers is the fight against corruption (OECD hp 2, OECD hp 3).

On May 2013 the OECD Council at Ministerial level decided to open accession discussion with Latvia and 3 months later, in October 2013 the Council approved the Roadmap for the Accession of Latvia to the OECD Convention. The Roadmap sets out processes, terms and conditions for OECD accession (OECD hp 1). In next few months Latvia did a lot of homework and on 14 February 2014 submitted an Initial Memorandum which set out the country's position and adaptation on approximately 250 OECD legal instruments in force and included an assessment of the conformity of Latvia's legislation, policies and practices with the instrument (OECD hp 1).

During the visit of Angel Gurría, the OECD Secretary-General, in Riga, mentioned that year 2014 is one of the most important since Latvia became independent. In 2014 Latvia celebrated tenth anniversary of Latvia's accession in European Union and NATO, as also these year was memorable with preparation for Latvia's Presidency in EU in 2015, and of course, the accession to the OECD. OECD Secretary-General mentioned strong co-operation with Baltic countries during last twenty years on the path towards OECD membership (OECD hp 2).

On 2 June 2016 Latvia's Prime-Minister Mr. Māris Kučinskis and the OECD Secretary-General Angel Gurría signed the Agreement on the Terms of Accession of the Republic of Latvia to the OECD Convention. Two weeks later The Latvian Parliament approved in two readings a draft law "On the 14 December 1960 Convention on the Organization for Economic Co-operation and Development and the Agreement on the terms of Accession of the Republic of Latvia to the Organization for Economic Cooperation and Development" (MoFA hp 1).

According to Alsubaie (2012), the OECD principles could be used by the companies and governments in various ways to add more value to the stock exchanges, partners, corporations, and investors. The widely used description is one offered by OECD that states corporate governance is a system where business corporation are controlled and directed. The corporate governance structures identify the distribution of responsibilities and rights among various members of the organization such as managers, shareholders, stakeholders, board, and shareholders. It spells out the procedures and rules for making choices on corporate affairs. More importantly, it will offer the structure through which the firm objectives are set and the ways through which those goals and monitoring performance are attained.

It is vital important to mention that Latvia is on NASDAQ OMX platform since 2008, but since 2006, while Latvia was on Riga Stock Exchange, introduced the Corporate Governance principles (NASDAQ OMX, 2008) Principles of corporate governance and recommendation on their implementation.

NASDAQ Corporate Governance principles are based on OECD Principles, but has some other regulations as well, such as “Rules on Listing and Trading of Financial Instruments on the Markets Regulated by the Exchange” (OECD hp 3). Despite the chronology of official Latvia’s accession to OECD, Latvia and our neighbors Lithuania and Estonia started this long road fairly long time ago.

### **Methodology of Research**

In this research, by laying focus on the Latvian economy, it is important to analyse the efficiency of using the GAMMA score methodology in the evaluation of corporate governance across the country. It is arguable that this approach is preferable to the OECD and NASDAQ methodologies (Swann, 2011; Shvyrkov & Pastoukhova, 2010).

### **Findings/Results**

The findings and results section should summarise the data collected and the statistical or data analysis treatment used.

Many banks are engaged in the monitoring activities that also help in the restructuring of the companies in the target emerging markets. Such a state of affairs in the banking sector of Latvia perceived a negative position in terms of offering loans, which is not a positive performance in the emerging economy. Besides, there is no proper involvement of the corporate ownership in the county towards the control of the business activities in the developing sectors of the economy. Nevertheless, most of the companies take advantage of the support offered by the FDI in terms of the financing investments that have beneficial perspective over others in Latvia. Hence, there is a correlation between the relationships that involve both political organizations and business owners with respect to the environmental initiatives that were established in the former Soviet Union period since its independence (KPMG 2013).

The research into company performance in the Eastern European countries, including Latvia, as related to corporate governance quality ratings, has shown that, “the companies with the highest CG quality (top 25%) outperformed companies with the worst CG quality (bottom 25%) by 0.98% on a monthly basis during the period of 2008 - 2010” (Bistrova n.d.). This risk of expropriation of minority shareholders appears to be a primary concern of regulators in the transition economies. Bebchuk, Kraakman, and Triantis (2000) have emphasized the extent of the problem and its potential consequences under the concept of ‘expropriation costs’. With shareholding structures that permit the maintenance of strong control rights that are not in line with ownership rights, some owners and managers are increasingly capable of diverting the cash flows to private benefits. These problems have been recognized under the Legal Indicator Survey reports (Legal Indicator Survey) conducted by the European Bank of Restructuring and Development in 2005 (Black & Khanna 2007).

It also makes sense to understand the influences that the corporate governance had on Latvia’s economy. The emerging market of Latvia is in the process of the transitional recession, which operates in relatively stable economic conditions. Nevertheless, recently, Latvia has experienced a number of macro shocks. It could take place as a result of the deterioration in terms of the public finances and their utilization with respect to corporate governance. The corporate governance environment is created based on the process of privatization that focuses on the strategic interests of the investors in the vast majority of the small businesses in the emerging markets (Bebchuk, Kraakman & Triantis 2000).

### **Conclusions**

An implementing of the privatization process, targeted at changing the owners of the state-owned and municipal property, creating a favourable environment for the private capital development in the interests of Latvian national economy and reduction the activities carried on by the state and local governments as an entrepreneur was the new government national objective. That process included a package of extensive measures associated with the investing of financial assets gained from the property privatization into the development activities, elaboration of conditions for individuals in the management of the acquired property or its application in entrepreneurship, as well as in investment promotion

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# Creditor Protection under Commercial Law of Latvia – Issues and Possible Solutions

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## Abstract

In respect of limited liability companies, the European Union has adopted Directive 2012/30/EC on the measures aimed at ensuring capital adequacy and creditor protection. The way these norms are presented in the Commercial Law of Latvia are quite ambiguous. For this reason, there exists a possibility to bypass the bans contained in the law, which is often taken advantage of. As a result, assets are frequently withdrawn from financially unstable companies. This article deals with the ways of resolving this issue.

*Keywords:* share capital, own capital, distribution to shareholders, payment.

## Introduction

The aim of this research is to work out the suggestions on ridding the text of Commercial Law of Latvia of its cobwebs. This will raise the effectiveness of the articles which ban asset withdrawal of loss-making companies. Besides, it will mitigate entrepreneurs' tax risk related to dividend distribution, decrease of share capital or increase of share capital out of reserves or profit. The object of this analysis are Latvian limited liability companies, while its subject are regulatory acts aimed at ensuring that such companies have adequate capital and that their creditors are protected.

## Methodology of Research

Methods applied for this research are comparative analysis and simulation modelling.

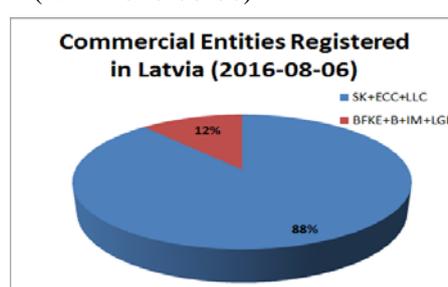
## Results

The results of this research are essentially as follows.

1. The share of legal entities with limited liability is 88% of the total number of merchants in Latvia. (Komercreģistrā reģistrētie komersanti, 2016).

**Table 1.** Commercial Entities Registered in Latvia (as of 2016-08-06).

Business Activity	Registered
Stock company	569
Branch of a foreign commercial entity	748
European commercial company	4
Branch	485
Individual merchant	18788
Limited and General partnership	908
Limited liability company	157527
<b>TOTAL</b>	<b>179029</b>



Financial stability of these companies is vital for the protection of their creditors. As is clear from consolidated accounts of Latvian joint stock companies (table №2), the overall debt ratio (creditors' share in the amount of balance) of such companies in Latvia is 0.65, the standard ratio being 0.3 – 0.5 (UFG01). Financial risk of the creditors working with such companies can be described as high.

**Table 2.** UFG01. Basic indicators of financial activity of commercial companies (milj. euro), 2014

LIABILITIES - TOTAL	56 506.9
Own capital	19 560.4
Provisions	474.3
Creditors	36 472.1

2. Directive 2012/30/EC (DIRECTIVE 2012/30, part 1 of Article 17) contains the norm which bans distribution to shareholders if the situation with the company's balance is as follows :

$$N_A < S_h C + R_{law} + R_{st}, \quad (1)$$

where  $N_A$  is net assets of the company (equivalent of  $O_w C$  - own capital),  $S_h C$  – share capital,  $R_{law}$  - reserves which are non-transferable to  $S_h C$  in accordance with the law, such as revaluation reserve,  $R_{st}$  - reserves which are non-transferable to  $S_h C$  in accordance with the charter of the joint stock a company, such as own shares reserve.

3. This norm, as it is written in the Commercial Law of Latvia (LR Komerclikums, part 4 of Article 161, and part 3 of Article 182) contains a similar formula:  $O_w C < S_h C$ . However, it does not include reserves. As a result, in order to withdraw assets from a loss-making company, businesses turn to a) revaluation and b) share capital contributions with the aim of increasing it in the future. In this way, companies are able to remove the ban and make asset withdrawal legal.
4. Directive 2012/30/EC contains a ban on “distribution” to shareholders (DIRECTIVE 2012/30, Article 17, parts 1 and 4). The notion of “distribution” involves at least 3 steps, namely: a) the decision to transfer a benefit to a shareholder; b) calculation of the value of such benefit and associated tax, as well as entering this amount into accounting records; c) actual PAYMENT, which causes the assets of the joint-stock company to decrease and the above mentioned creditor debts to be eliminated. It is this kind of “broad” interpretation of “payment” that Aigars Strupišs, a co-author of the Commercial Law of Latvia (LR Komerclikums, p.109) speaks about. However, the official Latvian translation of the Directive uses the term “payment” instead of the term “distribution” used in the original text. This discrepancy has been used in the Commercial Law of Latvia.

### Findings

In Latvia, measures on the protection of limited liability company creditors have not been implemented to the full extent. Commercial Law of LR should be amended, in so far as it concerns the ban on asset withdrawal by shareholders. It will enable a proper implementation of EU recommendations on creditor protection. It will also provide an opportunity to clarify tax legislation of Latvia in so far as tax on capital is concerned. The necessity of such clarification has been discussed by Latvian specialists involved in taxation issues (Ketners, 2016).

### Conclusions

The term “payment” used in Articles 161 and 182 of the Commercial Law of LR, as well as in the official translation of Directive 2012/30/EC, Article 17, should be replaced with the term “distribution to shareholders”. Besides, a provision should be added to the effect that any distribution of parts of own capital among the shareholders is subject to taxation.

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# A Survey on Competence and Administration of Supervisory Board Activities in German Stock-listed Companies

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## Abstract

According to the agency theory (Jensen & Meckling 1976), a positive relationship between corporate governance and company performance is expected to exist which is also assumed in general by recent research (Dignam & Galanis 2016). This relationship is investigated in a study performed by the author of this paper. Two different approaches were chosen in parallel: (1) a quantitative data analysis, based on financial figures and corporate governance variables, and (2) a survey of supervisory board members of listed German companies. This paper is about the results of structured interviews with 30 supervisory board members. The survey confirms that corporate governance regulations have an important influence on the administration of supervisory board activities and on board competence. Many supervisory board members stated that the German Corporate Governance Codex leads to extended meeting time to fulfill regulatory requirements, more data requirements to identify and estimate risk issues and to rising risk awareness. The interview results converge with the result from the multivariate analysis.

*Keywords:* corporate governance, firm performance, corporate performance, business performance, board structure, board competence,

## Introduction

Firm performance is, in the framework of the theory of the firm, not simply a result of strategies and managerial activities but a result of a complex interplay between different institutions whose relationships are regulated in corporate governance regimes and are shaped by the supervisory board competence and its institutionalized influence in terms of the corporate governance. However, previous theories of the firm such as the market-based or the resource-based view observed and explained the firm on the management level and examine the degree of managerial impact which is, depending on the perspective, more or less restricted by the market or firm resources. Yet, the restrictions of management inflicted by the institutional governance framework were only partially examined. The new institutional economics approach develops first propositions for a governance theory of the firm, but focuses more on transaction cost problems from the perspective of the owner, but do not confer its findings into the theory of the firm. Corporate governance defines the regulatory framework for the management and supervision of companies whereas the corporate governance framework is largely determined by legislators and owners (Spira 2002). However, there is still no common understanding of a single definition of what 'good' corporate governance exactly means (Stiglbauer 2010). Thus, 'good' corporate governance is a very complex concept and includes compulsory and voluntary actions, regulations, and requirements such as the adherence to laws and regulations (compliance), the following of accepted standards and recommendations as well as the developing and following of own corporate guidelines. In the context of the theoretical discussion corporate governance refers to the specific problems occurring from the separation between the direction of the company and its ownership (Ampenberger et al. 2009). The overall objective of the author's research is to find out whether good corporate governance and board competence explain firm performance differences. Two different approaches are chosen in parallel: (1) a quantitative data analysis, based on financial figures and corporate governance variables, and (2) a survey of supervisory board members out of this sample. The subject of this paper is related to the survey. The aim is to learn about competence scope and administration of supervisory board activities.

## Design of Survey

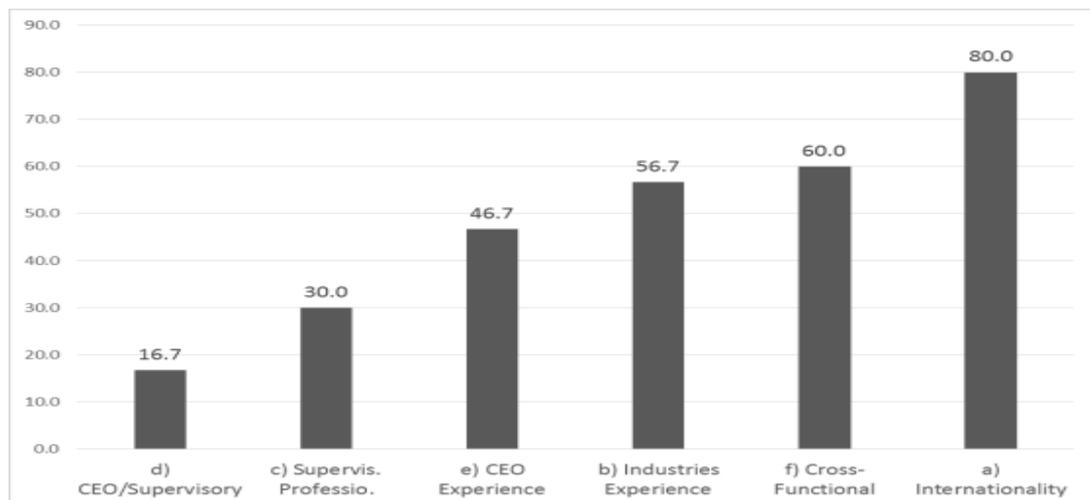
The survey is conducted by questionnaire-based interviews with 30 supervisory board members active in supervisory boards of the total investigated sample of 128 companies. The questionnaire contains questions with set answers (multiple choice) and without set answers. Questions without set answers are summarized through sorting the answers by topics and the evaluation of statements respectively by interpretation or citation of statements. The main characteristics of this sample are:

- 5 respondents out of the 30 respondents serve as supervisory board chairman.

- 5 respondents are female, 25 respondents are male.
- The average age is 61.6 years
- The average period of service as supervisory board member accounts for 14.4 years
- 97% of the respondents have served as CEO in the course of their professional life.

### Findings/Results

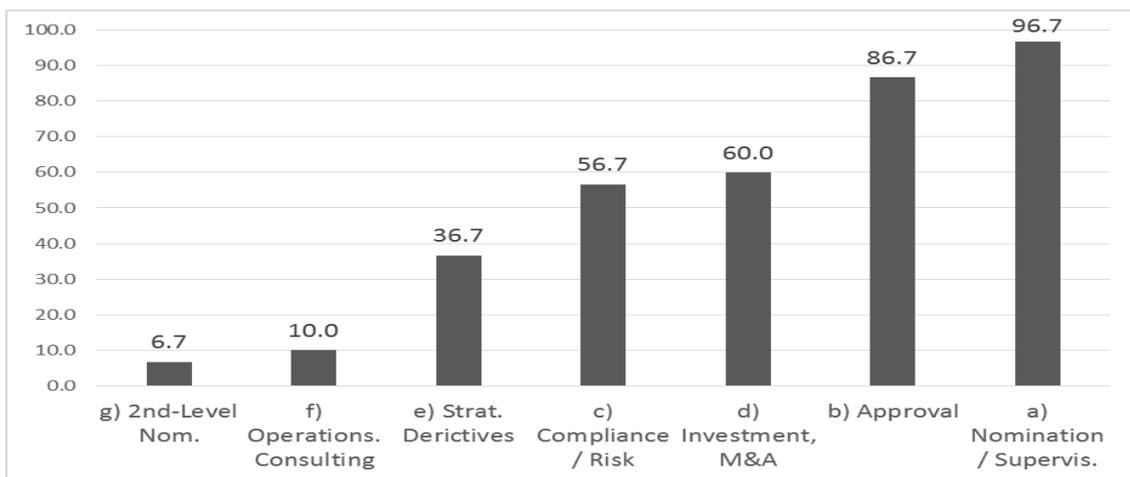
The sample's supervisory board members see their main purpose of existence in cooperation with the executive board as required by the German Corporate Governance Codex. Items concerning the internal organization of board work are valued less important and the supervisory board member nomination process is even of minor importance. Results also show that formal competencies are less relevant instead of engagement and abilities such as special competencies and strategic view. It can be stated, that the majority of the respondents tend to prefer a mix of formal and informal characteristics regarding individual qualification while in the context of 'daily operations' of the supervisory board informal values are preferred. The item "cross-functional experience" refers to experience in different corporate areas such as marketing, R&D, finance, etc. Interdisciplinary experience with an international background is the requirement with the highest frequency (see Figure 1). Instead, formal experience as a supervisory board member (item (c) and (d)) are not often required. Thus, the requirement ranking looks more than a CEO profile so that it could be assumed that the interviewed supervisory board members have a self-image, which resembles more to a CEO self-image. This is not really surprising, because all supervisory board members have long-term CEO experience.



**Figure 1.** Competence Requirements for Board Members (in %) (Author's calculation and presentation)

The supervisory board member's self-understanding of their role shows high formalism. While all other questions indicate a preference for informal items, the supervisory board members see their role as strictly formal with 96% approval rate concerning formal activities for nomination and supervision of the executive board (see Figure 2). Instead, strategic and operational issues were not seen as priority activities. Thus, it can be concluded, that tendency to informal abilities and processes does not mean, that the interviewed supervisory board members reject formalism. Rather, they distinguish clearly between necessary formalization and the regulatory framework requirements.

The answers regarding positive changes refer astonishingly often to a rising degree of formalization. Thus, one board member explains, that the supervisory board practice is more and more determined by standardized workflows due to the German Corporate Governance Codex, which applies, in particular, concerning risk and compliance issues. Here, the regulatory necessities lead to, on the one hand, more periodical reports and thus to a higher density of company data and information. On the other hand, these increasing corporate governance regulatory requirements lead to an information and formalization overload and to elevation of "approval barriers" along increasing personal liability risks. Thus, these statements reflect an ambivalence which exists also concerning the regulatory pressure regarding committee formation.



**Figure 2.** Activity Priorities of the Supervisory Board (in %) (The author' s calculation and presentation).

One respondent mentions that the rising number of committees and the rising intensity of committee work leads to better preparations of supervisory board decisions. Several respondents pronounce as an another effect of this excessive information circulation that the 'average' board member is much more informed and the discussion are based on more facts than before. One respondent mentions that, several years ago, most of the board meetings were about gathering information from executives than on discussing essential issues. Furthermore, one member states, that the board independency rules have led to the selection of new members based on their expertise and not based on their membership in a social network. Skills and experience are more sought-after. This leads to a higher diversity of knowledge and skills in the boardroom. Additionally, the nomination processes are much more transparent than years ago.

## Conclusions

The survey reconfirmed that corporate governance regulations lead to more supervisory board process quality. While the members who are active in committees are increasingly better informed, supervisory board members without a membership in committees receive less information leading to a 'two-classes society'. This can lead, in the worst case, to a disproportionate communication effort. Increasingly, informal personal skills of supervisory board members are becoming relevant. Members are nominated more and more due to their complementary experience and knowledge. On the other hand, this search for special skills and knowledge takes much more time to find appropriate candidates than years ago. Several interviewed supervisory board members remarked explicitly that the increasing liability risks strongly influence board work, in particular concerning the direction of discussions, where more and more personal liability risks are discussed resulting in sometimes slowed decision-making processes.

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# Assessment of Credit Risk in the Latvian Banking System: Implication for Lending Rates

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## Abstract

In the paper, assessment of credit risk in the Latvian banking system is done based on statistical analysis of the relevant data in line with the selected credit risk models. Then, the most appropriate credit risk measure is included in the error correction model describing the dynamics of lending rates in the Latvian banking sector. The study concludes that credit risk has significant implications for the dynamics of lending rates in the Latvian banking sector, especially, after the global financial crisis; and, therefore, it should be considered as an explanatory factor when setting or analysing lending rates in Latvia.

*Keywords:* banking, credit risk, non-performing loans, lending rates, error correction model.

## Introduction

Lending margins in Latvia have increased substantially after the collapse of the lending bubble prevailing before the end of 2007 and beginning of 2008; and they remained high afterwards. As compared to other euro area countries, the lending rates in Latvia periodically occur in the group of highest rates. The differences of lending rates in euro area countries and changes in lending margins over time there suggest that the dynamics of lending rates in euro area countries, including Latvia, cannot be explained solely by changes in the monetary policy and closely related bank funding costs. To conduct appropriate analysis of the observed lending rates, other factors such as credit risk of banks' borrowers should be considered as well.

Credit risk is an essential concept in bank management and surveillance as it determines the level of capital banks should hold for fulfilment of regulatory requirements and size of provisions for losses from borrowers' failure to meet their obligations. Large provisions lower bank's profit (increase bank's loss) recorded in the income statement, reduce bank's capital position in the balance sheet and, thereby, could negatively affect its solvency. Nevertheless, measurement of credit risk is not obvious. Several statistical indicators characterizing credit risk could be calculated using data on non-performing loans and financial statements of banks (see Agresti et al, 2008). Besides that, researchers (Avesani et al, 2006, Musa et al, 2015) often assess it on a basis of statistical analysis applying simple models with well-defined conceptual basis.

Taking in account this argumentation, the aim for the paper is to evaluate the impact of credit risk on the lending rates in the Latvian banking sector for the time period from 2004 to 2015. This implies threefold purpose of this paper: firstly, to provide an overview of the main measures of credit risk applied in the relevant empirical research, secondly, to assess credit risk for the Latvian banking system using the selected risk measures, and, finally, to investigate the impact of credit risk on lending rates in the banking system of Latvia.

The paper combines the main ideas from the research on assessment of credit risk and from research on modelling the dynamics of lending rates. Before the global financial crisis, the most relevant of papers assumed that the dynamics of lending rates depends barely on central bank policy rate, money market rate or any other measure of bank's funding costs and interest rate margins are constant over the time. Many scientific papers (for example, Sander & Kleimeier, 2004; DeGreave et al., 2007) show that lending rates adjust to the changes in funding costs of banks with a time lag; the level of pass-through from money market rates to lending rates and the speed of their adjustment differ across countries, financial institutions, and various types of loans. Most recent research papers (Arnold & van Eivijk, 2014; Paries et al., 2014, von Borstel et al, 2015) show that after the 2008 global financial crisis and successive European debt crisis, the dynamics of lending rates is affected not only by the policy or money market rate but also by risk factors.

The dynamics of lending rates is analysed also in the Baltic countries (see, for example, the paper by Männasoo, 2013, Estonia, Lapinskas, 2011, Lithuania). In the newest research paper about the dynamics of lending rates in the Baltic countries (Mičūne, 2016), the analysis for the first time shows that credit risk of borrowers is statistically highly significant as an explanatory factor of lending rates in the most specifications of the applied model across different lending segments and across all three Baltic states. In the mentioned paper, creditworthiness of borrowers is characterized by a proxy of economic sentiment index. This paper

would contribute to the existing research on the dynamics of lending rates by evaluating other available credit risk assessment options for the Latvian banking sector relating them to modelling lending rates there.

### Methodology of Research

To reach the first purpose of the paper, literature review describing different measures of credit risk is conducted. For the second purpose, credit risk of banking system of Latvia is assessed using statistical analysis of relevant data in line with the selected credit risk measurement concepts and models. Finally, the dynamics of lending rates in the Latvian banking sector is analysed within the framework of the error correction model taking in consideration credit risk factor.

The error correction model is estimated in two steps. In the first step, the long-run relationship between lending rates, funding costs of banks and credit risk is evaluated. The second step of analysis based on the error correction model involves estimation of short run equation, which specifies the short-run dynamics of lending rates in Latvia. In the short-run equation, the changes in lending rates are explained by the residuals calculated from the long-run equation and first differences of the relevant variables.

### Findings/Results

In the paper, the main credit risk indicators were quantified; and they show that credit risk in Latvian banking sector has been gradually decreasing after the peak in 2010. Given the accumulated provisions and changes in the regulatory requirements, banks now are more prepared for disturbances caused by deterioration of borrowers' creditworthiness now than they were before the crisis. Finally, the error correction model is applied enabling the analysis on how credit risk and funding costs of banks affects the long-term levels and short-term dynamics of lending rates in the Latvian banking sector. The analysis shows that, in the long-term, credit risk and funding costs of banks risk have statistically significant influence on lending rates in different lending segments in Latvian credit market.

### Conclusions

The findings of the research would contribute to the understanding about how credit risk could be measured for the banking system of Latvia and about how lending interest rates are set in commercial banks. Given the significance of credit risk in determination of lending rates in the Latvian banking sector, it should be taken in account when modelling lending rates. Lending rates in Latvia could be lower if credit risk of borrowers would decrease or Latvian banks would become less risk averse.

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## Process Management in the Owner-managed Small and Medium Enterprises

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### Abstract

Process management approach is a way to plan and monitor performance of the company in a systematic way. Small and Medium enterprises face challenge of application of the process management approach with the limited resources and competences. Owner-managed companies are also impacted by management style and preferences of the founder or owner personality.

Article describes and discuss situations, which owner-managed SME enterprises are facing when introducing and applying process approach to company management.

*Keywords:* Process management, Owner-manager, SME.

## IT and non-IT Related Aspects of Process Management in Small Business

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### Abstract

Process management is a recognised for systematic way for planning and monitoring performance of the company. Often process management is associated also with the automation of the business and use of IT solutions. Both are called Process management approaches, however tools to document processes, ways to illustrate activities and level of detail differs very much.

Article describes common situations, which are relevant to the specifics of the small and medium enterprises, which are facing challenges of the process management and IT often with a limited financial resources and also with the limited knowledge and competence.

*Keywords:* Process management, IT, Small and Medium Enterprises.

# Client Relationships and Competitiveness of Advertising Agency. The Case of Latvian Advertising Agencies

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## Abstract

The purpose of this research is to perform analysis of client relationships and competitiveness of advertising agencies. Understanding relationships may help to develop long-lasting relationships and competitiveness. The characteristics that describe relationships between advertising agencies and their clients in this research were chosen based on Resource-Based View theory. The analytic part of the paper explored Latvian advertising agency-client relationships.

*Keywords:* advertising agencies, competitiveness, client relationships.

## Introduction

Companies cannot choose not to have relationships. All kind relationships with clients are often interconnected with each other. Despite the big amount of material that has been published about relationships between companies, this topic still continues to be an area of interest for many researchers.

The focus of this research is the advertising agencies. The characterization of a business relationship is an important issue for both - advertising agencies and clients in their attempts to be competitive. In order to manage the relationships, advertising agencies and clients need to have an understanding of the current business relationships.

## Methodology of Research

In order to map the main issues in the relationships between agencies and clients, the introductory interviews were conducted in September - December 2015.

## Findings/Results

Results showed that agencies satisfaction level could be considered good, taking into consideration that there are always clients who are more cooperative than others. Clients level of satisfaction is more surprising, since clients have freedom to choose among several agencies in order to ensure themselves a satisfying and good relationship. The recommendation for clients would be therefore to review their relationship with agencies, focus on the areas that are problematic and develop a relationship that is satisfying to both partners.

## Conclusions

The summary of results can be only viewed as opinions of some agencies and the implications made based on results should be taken as starting point for further discussion and research. The research give an insight into the relationships and some guidelines on how to develop long-term agency-client relationship. Further analysis with a larger sample would help to validate the results obtained.

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# Mussel Farming and its Economic Potential in the Baltic Sea

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## Abstract

The paper covers research findings on mussel farming and analysis of current situation on producing mussel farming in the Baltic Sea. The industry of mussel farming has potential to evolve in the Baltic Sea region. Some developers have chosen progressive activities to achieve the aim. For example, in Sweden the mussel farming is suggested to use as one of the instruments to reduce eutrophication. In the Baltic Sea region several countries are in the beginning phase to develop mariculture. The following research methods were used in the research: scientific publications studies, case studies and document studies on some important factors impeding development of mussel farming in the Baltic Sea.

*Keywords:* mussel farming, aquaculture potential.

## Introduction

Blue mussel shells have been found in kitchen middens dated at 6000 B.C. Until the 19th century, blue mussels were harvested from wild beds in most European countries for food, fish bait and as a fertilizer (Gouletquer, 2014).

Latin name of blue mussel is *Mytilus edulis*. This species has occupied the North Atlantic and the North Pacific coasts, and this species lives also in the Baltic Sea. Size of mussels various up to 10 cm, the largest specimens may reach up to 20 cm (Tyler-Walters, Seed, 2006).

Agriculture has significant influence on people's life, and this sector is responsible for food provision in the world. Still, today a number of people lead their live suffering from hunger (**Food and Agriculture organization of the United Nations, 2011**). Due to this reason the importance of agriculture increases.

Notwithstanding, the agriculture sector doesn't include such areas as fishery, forestry, these sectors are highly important in overall food providing industries.

According to the information from the Food and Agriculture organization of the United Nations (hereinafter-FAO) in developing countries the livelihood of over 500 million people directly or indirectly depends on fisheries and aquaculture. Due to several reasons, such as the willingness to increase one's own welfare, it increases the overfishing and reduces fish stocks (FAO, 2012).

Consumption of fishery and aquaculture products has increased. During last 20 years the amount of aquaculture increased yearly by 7% in the world (FAO, 2016).

In 2009 an average consumption of fish food was 18.5kg per year per capita in the world, and in 2011 it reached 18.9 kg per year per capita (The World Bank, 2016; FAO, 2014). Within the last 10 years the consumption yearly increased by 2% (The World Bank, 2016; FAO, 2014) and this increase has linear regression tendency.

Based on the historical data the prognosis of mussel fishery was set using probabilistic projection methods.

Blue mussel is one of the common species, which provides ecosystem services. Increasing the number of the blue mussel in the Baltic Sea will decrease nitrogen and phosphorus concentrations (Lindahl, Hart, Hernroth, Kollberg, Loo, Olrog, Rehnstam-Holm, Svensson, Svensson, Syversen, 2005).

In the Baltic Sea Region several countries are in the beginning phase to develop sea aquaculture - mariculture.

The development of mussel farming industry is affected by following factors:

- Salinity is one of the main factors, which has influence on mussel size and weight. For example, mussel size and weight is several times smaller if it is grown in Aland comparing to mussel grown in Kattegat.
- Analysis of the research amount of mussel in territory of Latvia has been carried out in several projects in Baltic Sea Region (Baltic Sea Region Programme **2007-2013**, 2013) and Central Baltic Programs (**Central Baltic INTERREG IV A Programme 2007-2013**, 2013). It was found that amount of mussel in Latvian waters is about 200 thousand EUR, and it is at least ten times smaller than in Sweden or Norway.
- In Latvia it is necessary to supplement the legislation to start business in the Baltic Sea (Lancmane, 2013). There is a legal basis for economic activities in aquaculture in inland water but regulation for

mariculture activities is only at general level.

It is suggested to arrange licensing process for potential developer. There is the different opinions from different institutions about necessary permissions to potential developer.

- Evaluating terminology, it is constituted that mussel farming and harvesting can be interpret differently, e.g. is mussel a wild or aquaculture animal (Lancmane, 2013). Also after farming there is a different viewpoint about its usage possibilities.
- Mussel farming reduces eutrophication in water (Lindahl, Hart, Hernroth, Kollberg, Loo, Olrog, Rehnstam-Holm, Svensson, Svensson, Syversen, 2005). This factor can bring up the possibility that in the future countries will sell pollution quotas each other. Thus it is important to understand Latvia's starting position and instruments which might help to reduce pollution in the Baltic Sea, and factors which could prevent pollution.
- Expansion of new sales opportunities, e.g. selling mussel for biotech companies, may increase mussel production volumes, as well, it can change the market price. New outlets can occur if government institutions will promote researching project to discover new options. Sometimes, based on current legislation, the industry might not develop because there are restrictions to distribute product in that country. Thus, it is important to determine outlets and to evaluate current legislation to avoid from restrictions.
- There is a possibility that the national authorities can control what kind of method is used for mussel farming, e.g. dredging method is not allowed to use in some countries. This method is cost-effective compared to others, however in harvesting process it is possible to exhaust whole mussel bed, thereby potentially reducing the amount of mussels in the Baltic Sea. At the same time, in Denmark (International Council for the Exploration of the Sea, 2009; Madina, 2014), this method is not prohibited, and a number of companies obtained mussel by dredging from the seabed. These companies have also received Marine Stewardship Council certification.
- Although visually mussel farm on the surface can be visible and tourists don't like the mussel farms, but the mussel farm makes the environment cleaner. To promote public awareness of the new sector, there should be organised public information activities, thereby decreasing the public scepticism and doubt. At the same time, as stated by some fishermen and mussel farmers, sometimes tourists can be pro-active and they make their own check to look what is it in the nets, ropes. However, not always their actions are good, as a result sometimes their action may damage farms, for example, they become entangled in ropes and nets, despite that the place is marked by buoys, or they may use sharp objects and cut nets.

### **Methodology of Research**

The scientific publications analysis, quantitative and qualitative methods, logical constructive and statistical methods of data analysis and display of results are used in the paper.

Statistics data were collected in the FAO, Eurostat, World Bank, to analyse market situation and to analyse economic potential of aquaculture and mussel farming.

The time period selected was chosen to obtain wide information and historical changes of main sectors (aquaculture and capture).

The method used to analyse research amount in mussel farming was content analysis of published research. Relevant research was published during 2011-2013.

### **Findings/Results**

In future the consumption of fishery and aquaculture products will continue to increase due to growth of population, habits of people etc.

In 2009 an average consumption of fish food was 18.5kg per year per capita in the world based on FAO data, and in 2011 it reached 18.9 kg per year per capita (FAO 2014). Within the last 10 years the consumption yearly increased by 2% and this increase has linear regression tendency.

The volumes of captured mussels were set according to the levels of the volumes in 2010 and corrected taking into consider data in 2011-2014 (FAO 2014), and the increase foreseen 0.01% per year, but the fishery volume of aquaculture mussels should increase as follows:

- Fishery of other mussels will increase by 1-3% per year;
- Fishery volume of blue mussels will increase by 0.5-1.5% per year.

Volumes of blue mussel productions depend on further researching results about end-use market.

In order to develop and enhance regional competitiveness and income levels, mussel farming can act as additional source of income for coastal living. When starting usage of mariculture, it's possible to develop production and processing in regional level, thus mussel farming will increase the number of jobs and tax revenue contribution in region, and increase income from tourism in seaside areas.

### Conclusions

The mussel farming industry is new in the Baltic Sea countries, and due to this reason the new terminology need to be developed.

The consumption of fish food is continuously increasing. One of the reasons is growth of population. Fishery volume of aquaculture mussels is going to increase by 1-3% per year in the world. Demand of mussels depends on price, habits of people, costs to achieve requirements of government institutions, outlets and marketing activities.

In Latvia there is no clear specific legal regulation for mariculture activities. This factor is serious obstacle for potential stakeholders to start the mussel farming business.

Mussel farming industry has potential to develop, e.g. Sweden has included this industry as one of the instruments to reduce eutrophication (Gren, Lindahl, Lindqvist, 2009).

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# Real Options and Discounted Cash Flow Analysis to Assess Strategic Investment Projects

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## Abstract

In today's uncertain and highly competitive business environment, the difficulty to make strategic investment decisions is growing. The dominant discounted cash flow analysis requires the assumption of perfect certainty of project cash flows. However, under uncertainty traditional DCF approach falls short of providing adequate strategic decision support, and this situation demands new methods for investment evaluation. Real options approach has shown potential for valuation of strategic corporate investment decisions and managerial flexibility in situations of high uncertainty. Under ROA, projects are viewed as real options that can be valued using financial option pricing techniques. This framework allows their owner to keep investment options open and to benefit from the upside potential of an opportunity while controlling the downside risk. The main aim of this paper is to investigate the feasibility of real options approach and traditional DCF analysis for assessment of strategic investment projects under environmental uncertainty.

*Keywords:* real options, discounted cash flow analysis, strategic investment projects, uncertainty.

## Introduction

Strategic investment projects are essential to corporate survival and long-term success. These projects help to mould company's future opportunities and develop competitive advantage by influencing, among other things, its technology, its processes, its working practices and its profitability. However, because of changing nature of global markets, in order to make correct investment choices and reach effective strategic capital investment decisions, there is a need for reliable investment evaluation tools.

DCF approach for project investment decision making is commonly used to determine whether to undertake or not an investment project. Yet, it is rational to use DCF analysis when the decision involves a relatively simple business structure, uncomplicated projects, and a stable environment that enables reliable forecasts. When uncertainty is present strategic projects violate the underlying assumptions of DCF, causing this analysis to be of limited value at best, or misleading at worst. Therefore there is growing interest in real options approach theoretical perspectives to guide strategic investment decisions in dynamic environments.

Real options originated from financial options and are options on real assets that can be defined as opportunities to respond to the changing circumstances of an investment project. These opportunities to change consist of rights but not obligations to take some action in the future and are valuable because they provide managers with the flexibility to take advantage of opportunities in order to increase profits or to decrease losses relative to management's initial expectations given a passive management.

This paper aims to investigate the feasibility of real options approach and traditional DCF analysis to assess strategic investment projects under environmental uncertainty.

## Methodology of Research

In order to achieve the main aim of this paper, the methodology used was the following: after systematization and generalization of the scientific literature for the analysis of the peculiarities of strategic investment projects valuation techniques, specifically discounted cash flow analysis and real options approach, the traditional DCF method was carried out to analyze the strategic project value without options and the real option valuation approach was calculated for the option to expand.

## Findings/Results

As a result of uncertainty many assumptions of DCF analysis becomes inadequate for strategic investment project valuation. When using ROA it isn't necessary to forecast the future and expected results, but it is important to analyze factors and forces that form the future. By adding a dimension of flexibility, this valuation methodology allows for a superior connection of strategic intuition and analytical correctness, and the impact of misleading assumptions is eliminated. Therefore a much clearer view of the strategic investment decision environment can be obtained by supplementing DCF analysis with ROA.

The analysis of Lithuanian company's two-phased strategic solar module production investment program revealed that because of uncertainty inherent in renewable energy sector and necessity to react flexibly to emerging opportunities, the real options approach performs better than the conventional DCF methods such as the net present value (NPV) and the internal rate of return (IRR).

Under NPV, the expected value of investment project is negative (-0.004 million EUR), and the IRR is lower than a firm's weighted average cost of capital. So the company should not undertake the project. However, the proposed investment and modernization program has a considerable real option value. Phase 1 refers to the initial investment and the associated cash flows. It can be valued using NPV approach. Phase 2 refers to the opportunity to expand, which may or may not be exploited in year three. The value of the whole strategic investment project (2.28 million EUR) is calculated as the sum of the NPV (Phase 1) 0.85 million EUR and the call option – Phase 2 – value 1.43 million EUR. The results obtained indicate that the investment program is very attractive and it should be implemented.

## Conclusions

The results of this study suggest that although ROA is difficult and uncommon decision making framework for companies, it is the most suitable method to apply to strategic investment projects related to uncertainty. DCF analysis does not consider managerial flexibility, underestimating the project value. Therefore, if the analysis includes real options in the project, the capital budgeting process will be more realistic and lead to improved investment decisions and business results.

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# E-Trust and Trust Understanding Comparison in the Online and Offline Dimensions

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## Abstract

In everyday lives, we are using more and more different technology products to make our lives easier and faster. Often we are not realising, but we switch our lifestyles to the online platform – we do mostly everything online – meet and communicate with others, watch videos and listen to favourite songs, choose and buy different things. The main question is – can we trust to everything what we see on the screen? Is the explanation of “trust” in the real life and in the online sphere the same or not? Authors of the paper compare “trust” conception in the offline trade market with the online trade market.

*Keywords:* online trading, e-trust, customer behaviour, loyalty, satisfaction

## Introduction

The aim of the study is to compare the understanding of “trust” in the offline and online trade markets.

Purchasing process in the online store provides us with new dimensions of traditional understanding of trust, loyalty, satisfaction, etc. The main problem is that most online traders try to use those understandings as in the offline store, without integrating them online. Authors come out with the idea to divide the traditional understanding of well-known things in different markets.

In this paper, the authors analyse and compare different customer’s behaviour models from the “trust” view in the traditional market and in the online dimension. After the analysis, the authors offered comparison of the mentioned understandings of “trust” and “satisfaction”. This topic is becoming more and more popular every year because of the growing number of online trading users in the whole world, including the Baltic State countries.

## Methodology of Research

The following methods were used – literature study and analysis, respondents survey and statistical analysis were conducted. Consumer survey is already in the process and is planned to be continued during the next 2 years with the purpose to compare changes through years. Participants of the survey were various people from Latvia – of different age groups, locations, professions, and etc. The authors have continued the survey to make it more completed and to find out the new tendencies.

## Findings/Results

The research results can be used theoretically and practically in respect of choosing an effective communication with consumers, in creating a long-term relationship with them, and in regards of increasing the customer loyalty level and level of “trust”.

## Conclusions

Consumer “satisfaction” and “trust” in the internet trade market affects the quality, which can be divided into four dimensions, such as quality of information, service quality, product quality, and delivery quality. Professional skills, interaction with consumers, and consumer stimulation can be used to increase consumer loyalty in the internet environment, which also means the increase of the level of “trust”. The other conclusions will be provided in the paper.

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# Participation in the Study of the Higher Education Institutions as a Significant Factor Facilitating the Ratings of the Higher Education Institutions

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## Abstract

Within the framework of the research the role of the study of higher education institutions in the facilitating of their place in the international ratings is analysed. There are evaluated and compared the success of leading universities of Baltic states in the more popular international ratings of higher education institutions - *QS World University Rankings (QS)*, *The Times Higher World University Ranking (THES)*, *Academic Ranking of World Universities*. Particular attention has been drawn to the assessment of the research activity of universities.

There are concluded, that different methodologies are used in the international ratings of higher education institutions, however the evaluation of the research activity has significant proportion in all of them. Acquired findings indicate, that the results of research activity of universities have important role in the international ratings of higher education institutions and the improvement of these results facilitates the place of higher education institution in the ratings, thus fortifying, to which aspects of the strengthening of research activity must be drawn special role and attention in the missions and strategies of higher education institutions.

*Keywords:* higher education institutions, indicators, ratings, research activity

## Introduction

Demand of the information about the quality and efficiency of higher education institutions grows, when the market of the higher education becomes more open and competitive, when the number of students and the state funding to the higher education decreases and in the influence of other factors (Coates H., 2006). The role of the measuring of the institutional quality of the higher education grows due to interaction of many factors (Stella A., Woodhouse D., 2006). Affordable way is the strengthening of the research aspect of the higher education institutions: both international and state financed research, and the participation in the research with local government and industry. Up to now there are not conducted enough such research. There are many academic investigations with practically available suggestions for the facilitating of the research (Padilla-Meléndez A., Garrido-Moreno A., 2012) and for the deeper study of the specific aspect (Chivers G., 2006).

The formation of the ratings of the higher education institutions is the way how to compare organizations for their parameters of activity. The role of the ratings is to offer the information about the quality of services in the form of the measurable distinctions for the sponsors, clients and policy makers (Quality Research International, 2016). Admittedly, that ratings are influential. They foster the flow of doctoral students, elite scientists and money of philanthropists to the top institutions in ratings. Ratings determine the reputation of the universities. They attract the interest of the society and change the behaviour of the universities and policy makers (Marginson S., 2007).

In the mean time ratings decrease the expression of innovations in the strategies of universities, in study programmes, in process of study and research, stimulating the leadership of universities to concentrate their energy to the raising of the performance and reputation (especially as for results of research and selection of students) within the framework of the parameters of ratings (Higher Education and Research Standing Committee, 2006). There are approved that results of ratings sidetrack attention of the leadership of higher education institutions from students and true mission and objectives of the higher education creating the undesirable competition between institutions.

The quality of universities could not be measured promptly only with numbers therefore any rating is controversial and is not absolutely objective (Liu N.C., Cheng Y., 2005). It is not impossible to range the universities worldwide because they are very various in different countries. There are technical problems with the obtaining of the internationally comparable data, with the description of organization names, with the arising and dividing of institutions, with the searching of publications and definition of authors.

There are methodological problems too. The methodology of rankings is relatively new and important field of the study of higher education. The attention must be drawn to the context of the policy of ranking, the character and choice of indicators is very important (Clarke M., 2002).

Taking into account the above mentioned and that, how essential role ratings have in the forming of the reputation of higher education institutions, the aim of the research is to foster the place of higher education institutions in the international ratings with the studies of higher education institutions and

especially with analysis of the research indicators. The performance of the leading universities of Baltic states in different international ratings of higher education institutions is compared in the paper analyzing the role of the parameters of the activity of higher education institutions in the forming of the place in ratings.

### Methodology of Research

In paper theoretical findings of scientific publications are analysed. For empirical part there are analysed results in different international higher education institution rating systems of leading universities in Baltic states including *QS World University Rankings (QS)*, *The Times Higher World University Ranking (THES)*, *Academic Ranking of World Universities (ARWU or Shanghai Ranking)*. The methodologies of ratings and used indicators of the evaluation of research of universities are compared.

### Findings/Results

Analyzing the publicly available data of more popular international ratings of higher education institutions, there were revealed, that leading universities of Baltic states are represented both in *QS*, *THES* and *ARWU*. However, their representation and taken places show relevant distinctions in the performance of these universities.

Eight universities of Baltic states are represented in *QS* rating and the University of Tartu (Estonia) is in the highest place (No. 400), achieving this by very highly assessed research activity (close to 3,000 research articles published annually and 100 doctoral degrees conferred each year. According to the ISI Web of Science, University of Tartu belongs to the top 1% of the world's most-cited universities and research institutions in 10 fields). Vilnius University (Lithuania) follows with place No. 501-550 and highly assessed research activity. Other Baltic universities take places above position No. 701 in this rating.

Only four Baltic universities are represented in *THES* rating and the highest position again takes University of Tartu. Tallinn University of Technology (Estonia) is in the position No. 501-600, University of Latvia and Vilnius University follows in position No. 601-800.

While in the *ARWU* rating from Baltic states is represented only University of Tartu which takes position No. 401-500 in the prestige rating.

### Conclusions

The results of study reveal that different methodologies are used in the international ratings of higher education institutions, however the evaluation of the research activity has significant proportion in all of them. Different indicators of research activity are used, but more significant are the number of publications, index of citations, number of publications per academic staff, number of doctoral degrees conferred. Similarly, the reputation of the higher education institution in the international research area has great sense and the results are obtained from the questionnaires of leading academics. Different international awards for important contribution in research play significant role in ratings.

Acquired findings indicate, that the results of research activity of universities have important role in the international ratings of higher education institutions and the improvement of these results facilitates the place of higher education institution in the ratings, thus fortifying, to which aspects of the strengthening of research activity must be drawn special role and attention in the missions and strategies of higher education institutions.

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## Development of FinTech in Latvia

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### Abstract

The aim of the research is to determine the FinTech's level of development in Europe and Latvia, as well as to evaluate how prepared consumers are for the FinTech services. While doing the research, authors highlighted tasks to clarify how well informed consumers in Latvia are about services FinTech provide, their convenience, speed and the degree of safety, as well as the consumers' current satisfaction with bank services. Growing rivalry between banks and Fintech is determining the topicality of this research. It is yet to be observed as defined as it is in Western European countries and USA.

*Keywords:* FinTech, competition, innovation in financial services.

### Introduction

Many scientific researches (for example, Harrison et al. (2014)) prove that innovative business stimulates development of economy and its improvement both on micro and macro levels. Technology of finances is a field with great potential for innovations; therefore both enterprises and investors are highly interested in it.

This field is topical for several reasons – global crisis left a great impression on the financial world, undermining the image of bank industry in the eyes of society and promoting new innovations in all traditional bank services. Lower technology costs help to execute new ideas, additionally, society's habits are changed. Many people perform daily financial operations on the Internet, and mobile devices are easily available - this promotes demand for more convenient financial services. Therefore FinTech are considered to be some of the most perspective start-up enterprises as they use innovative technology for such services as mobile payment (paying via mobile phone), money transfers, crediting, attracting investment. Some professionals also claim an inimitable key characteristic of all FinTech start-up enterprises to be the improvement of financial system's efficiency.

According to a report by *Accenture* (*Accenture* is a global management consulting, technology services and outsourcing company), *FinTech* is one of the fastest growing fields, proven by a fact that in 2014, the performed investments in such enterprises were 12,2 billion dollars, but in 2008, it was only 930 million dollars. The highest rise was observed in Europe where this parameter rose by 215% in 2014 up to 1,48million dollars. (*Accenture*, 2015)

Webster and Pizalla (2015) point out the rivalry that gets more intense every year due to continuing development of information technology. Simultaneously, FinTech creates unchangeably high interest in modern financial service market from progressive banks that aim to maintain and strengthen their leading role in the field and provide modern services of high quality in convenient and effective form for their clients anywhere, anytime. Recently the collaboration between traditional financial institutions and FinTech branch is growing as both parties see the perspective for development.

There are few *FinTech* enterprises in Latvia, but those several enterprises that do work and develop in Latvia, introduced specific upgrades in Latvia's financial market and changed the consumers' opinion about financial services, their quality and speed of provision of the service. The most popular *FinTech start-up* enterprises are *Dacta*, *Swipe.lv*, *Monea*, *Mintos*, *Twino* and several others.

The aim of the research is to determine the *FinTech's* level of development in Europe and Latvia, as well as to evaluate how prepared consumers are for the *FinTech* services. While doing the research, authors highlighted tasks to clarify how well informed consumers in Latvia are about services *FinTech* provide, their convenience, speed and the degree of safety, as well as the consumers' current satisfaction with bank services. Growing rivalry between banks and *Fintech* is determining the topicality of this research. It is yet to be observed as defined as it is in Western European countries and USA.

### Methodology of research

The research was carried out by summarizing scientists' estimation about this new and almost not researched topic both from theoretical and historical aspects. To reach the aim of the research and verify the

hypothesis, data was processed and gathered with the help of consumer survey. The hypothesis of the research is: Latvia's society is not ready to use services provided by FinTech, yet prefers bank servers instead.

### Findings/Results

The development of *FinTech* was established by worldwide financial globalization that gives a chance to small and technologically powerful enterprises to develop financial services without the help of banks, accordingly, combining finances with great knowledge in the field of IT, offering consumers to do the same processes they did in banks but much faster.

Risk capital funds in Latvia rarely invest in small enterprises, *FinTech* in that count, because the risk of loss is higher than from enterprises with stable profit and money flow.

The said hypothesis was justified in the answer summary of survey. 378 people have responded to the survey by now but the process is still continued in order to increase the number of respondents. However, these survey responses do not represent a statistically significant sample size, and should be used only as an indicative guide.

### Conclusions

Suggestions of the research are addressed to managers of *FinTech* enterprises, association of start-up enterprises and risk capital funds: the too strict permission regulation system in Latvia is one of the main drawbacks. Multi-leveled regulation basis is currently creating difficulties for projects working in the field of financial technology. Worldwide experience testifies that reinforcing lobbying and collaboration with State institutions has helped *FinTech* start-up enterprises to enter the market, to gain consumers and control institutions' trust, to attract investors. Authors regard this experience to be useful for using in Latvia;

Association of start-up enterprises require to promote society's (both individual and legal persons) informing about *FinTech* services that are already available to use and try;

Risk capital funds need to support new businessmen that work in this field as such enterprises have big potential to develop and grow not only in Latvia's but also Baltic and European international markets; *FinTech* enterprises have to create influential marketing campaign that would increase level of recognition in society.

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# Improvement of Management System in the Woodworking Company with LEAN 5S Method

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## Abstract

The research is aimed on literature analysis on LEAN 5S method and its practical implementation in woodworking company's management system in order to improve business efficiency and workplace safety. The research describes the management system organisation in the woodworking industry as well as explains 5S method – 1S sort, 2S set in order, 3S shine, 4S standardize, 5S sustain and practical application strategies for each step to effectively integrate the method in the company's management system. The aim of the research is to carry out theoretical and practical application of LEAN 5S method in the woodworking company and improve its management system.

*Keywords:* LEAN, 5S method, woodworking, management, system

## Introduction

The LEAN approach has been widely used worldwide in various type of organisations in order to improve business effectiveness (Ohno & Bodek, 1988). LEAN has become effective culture how to eliminate various type of waste in the management or production system that in general means encouraging and making constructive use of the creativity and ingenuity of the people actually doing work as well as assuring that the workers are adding value to the final product (Byrne & Womack, 2012). Such approach helps organisations to save expenses and improve business indicators. The most important element in the lean system is the people who make up the LEAN culture and hence one of the LEAN methods 5S can significantly improve workplace organisation (Kalkis, H., 2014). Today's effective business starts with involvement of the employees in the change and continuous improvement culture (Miller et al., 2013; Heizer J., Render B., 2001). Employees have to understand more innovations in technological processes and perform work in safe conditions. It requires continuous education on effective business management and work environment risks (Kalkis V., 2008). Hence managers have to develop effective management system that is beneficial for organisation financial results and employee's individual goals and wellbeing at the workplace (Kalkis, H., 2014).

The aim of the research is to carry out theoretical and practical application of LEAN 5S method in the woodworking company and improve its management system.

## Methodology of Research

The monographic and comparison research method were used to analyze theoretical application of the LEAN 5S method in the business management system. 5S is the LEAN method and helps to organize the workplace and it uses five Japanese words starting with S: *seiri*, *seiton*, *seiso*, *seiketsu*, and *shitsuke* that in translation means "sort", "set in order", "shine", "standardize", and "sustain" (Hirano, 1995). LEAN 5S organizes a work space for efficiency and effectiveness by changing decision making process, identifying and storing the production items, and other principles (Gapp et al., 2008). Medium size woodworking company was chosen for the practical research and the survey of business management efficiency indicators was carried out before and after 5S introduction.

## Findings/Results

The theoretical part of research describes the LEAN approach and its use for improving the business management system, it summarizes the main aspects of LEAN 5S method, describes the effective management system requirements and regulations in the woodworking industry, work environment risk management and its impact on the wellbeing of employees, as well as 5S method's steps (1S sort, 2S set in order, 3S shine, 4S standardize, 5S sustain) in detail and practical application strategies for each step to effectively integrate the method at the company management level.

Taking into account the statistical data, the analytical part of the research reviews the importance of woodworking industry in the national economy and describes and characterizes the effective management system of the woodworking organisation. The simulation of existing production process flow has been analysed by applying 5S strategy. The empirical part of research analyzes the practical implementation process of 5S method with 5S steps. The planned process flow optimization in the production has been executed. The research includes the analysis of 5S method influence on the business work environment and the company's efficiency. Moreover, research introduces the benefits and problems implementing 5S method, and authors developed SWOT analysis of 5S method introduction.

### Conclusions

LEAN approach 5S method has derived from manufacturing and now is being applied to a wide variety of economic branches. As research shows, the method is effective not only for improving manufacturing operations, but also for employee's education and training, knowledge-economy work and improvement of decision making and information exchange. As conducted survey results shows, it can be concluded that main challenge for introducing the 5S method is the resistance of employees to take the part change management process. Hence 5S method can significantly improve management system to reach higher business efficiency levels and enhance working environment and occupational health and safety at the workplaces.

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# Competence-Based Approach Implementation Tool for Project Team Members Selection

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## Abstract

Some large organisations have a project team creation challenge. One of the approaches that might be used for the employees' selection for a project team creation is competence-based. Even applying this approach, practitioners might have challenge to implement it as they might not find a rational tool for it. The aim of the research is to develop a rational tool that will be suitable for any organisation's project team members' selection based on the employees' competences. The author review scientific literature devoted to competence-based approach and develops a process and mathematical model as a tool for project team members' selection in organisation implementing a competence-based approach. The developed model is flexible and adaptable for different circumstances. The tool developed is more suitable for large organisations with matrix organisational structure as well as for those organisations that have employees' performance assessment system based on the competence approach.

*Keywords:* Human Resource Selection, Project Team, Competence-Based approach.

## Introduction

Competence-based approach is often used for human resources selection. Selecting team members for a project, organisations might choose random employees that are available to work on the project within the certain time framework and have the certain experience to be able to take a team role. Previous research by the author and a co-author (Starīņeca & Voronchuk, 2015) helped to identify advantages of the competence-based approach selecting project team members comparing to other approaches. However, there is lack of tools that might be applied to implement this approach (Spenser & Spenser, 1993; Cheetham & Chivers, 1996, 1998; Delamare Le Deist & Winterton, 2005). Therefore, the aim of this research is to develop a tool for the approach implementation selecting project team members. The author does not purely use the competences as the criteria for selection, also potential team members' personal preferences (rational, experimental, practical and feeling) are considered as it might increase the efficiency of project team (Hermann, 1996).

Besides the relevant literature review, the author applies the process model development technique and use mathematical approach for optimisation to develop the proposed tool. The proposed tool is more applicable for large organisations (preferably with matrix organisational structure). A tool assumes that an organisation has a database with the employees' competences and their levels and the competences levels are periodically assessed.

## Methodology of Research

The study is based on literature review. The international scientific articles on competence-based approach has been selected for the review. Afterwards the author used a *Bizagi process modeller* to create a process model of the proposed tool and integrated a mathematical model that is massed on the mathematical approach to optimisation problem as the optimisation problem is based on the creation of a team that should consist of the most competent team members that would have as much diverse personal preferences as possible.

## Results

The tool developed presumes its application for each team role separately as well as for a team with certain profile i.e. a set of general competences. The data that is needed to be able to use the tool is a profile of the employees that contain information on the employees' competences and their levels of development, personal preferences as well as other criteria relevant to make decision on employees' selection as the project team members. There should be information on the project team members' profiles i.e. a list of needed

competences and their levels (numerical) as well as other relevant criteria should be defined. The tool also presumes a possible necessity of the human resources outsourcing.

The tool consists of the process model that includes up to eight steps:

1. Definition of a number of employees ( $E$ ,  $1 \leq E \leq r$ ,  $E = 1, 2, \dots, r$ ) needed and can be allocated by the organisation departments for the project implementation.
2. Define a list of necessary competences and their level as well as other selection criteria (e.g. level of the certain language knowledge etc.); all criteria levels needed should be evaluated using the same numerical evaluation scale
3. Compare all competences and criteria by importance level necessary for the project implementation. The level of importance needs to be split between all criteria and competences proportionally. A pair-wise comparison can be implemented to fulfil this
4. Make calculation i.e. sum up the multiplication of each criterion level and proportional coefficient of all necessary criteria for each employee
5. Sort the employees/ candidates by the score got based on the calculations fulfilled and create a rating of the employees/ candidates with the highest score
6. If a number of the preselected employees is greater than needed for the project ( $E$ ): select the number of the employees needed ( $E$ ) with the highest rating score having at least one representative from each personal preference group present (using a mathematical model developed). Split employees/ candidates to four groups by the personal preference before
7. Check of the selected employees/ candidates by the personal preferences ( $z$  – a numerical code - number of preference)
8. If  $1 \leq z < 4$ , - define possible risks and challenges that might appear because of the lack of team members with the certain professional preference(s) to be ready to overcome these challenges.

Finally, the project team managers could have a profile of the team members having a picture of strong sides and weaknesses of the team.

### Conclusions

1. The proposed tool is more suitable for large organisation that may afford to assign different departments members for the work on the certain internal projects ongoing.
2. Each company needs to evaluate, if it can afford to apply human resource outsourcing in case of lack of competent employees allocated for work on a project.
3. The proposed tool helps to increase efficiency of a project team by selecting the most competent employees from the pool and creating a balanced team by the personal preferences as much as possible.
4. The proposed tool can be a base for a software or a function integrated in the existed software that connects organisation's human resource management system. The system should have information on employees' professional profile i.e. a database with a list of competences and personal preferences of each employee. The level of the competences need to be periodically assessed (performance appraisal) and updated in the database.

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## Risk Culture: Main Aspects

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### Abstract

The specific role in any organisation's processes plays risk culture thus it should be linked to a business strategy and gives the overview to organisation's management of a company's risk positions that can be used to steer the business. Risk culture can be defined as main principles for behaviour for employees within an organisation that provides the common ability to identify, understand, discuss, maintain and eliminate the organisation's current and future risks. Particularly crucial role risk culture plays in insurance due to the Solvency II Directive's requirements that are in force from 1<sup>st</sup> January 2017 in the European Union. New regime main aim is to ensure economic risk-based solvency requirements for every insurance company. During the research, is investigated the role of culture theoretical and practical aspects in an organisation and possible its role in an insurance company under the Solvency II regime.

*Keywords:* risk culture, risk, business strategy.

### Introduction

Risk culture plays crucial role in every organisation processes since is the heart of proper risk strategy to ensure its solvency and stable financial health. According the Institute of Risk Management (2015), risk culture framework should include:

- organisational culture;
- behaviours;
- personal ethics;
- personal predisposition to risk.

Risk culture framework introduced by the Institute of Risk Management fully corresponds to mechanism that allows to understand the relationship of organizational behaviour and culture similar to Hofstede (2000) et al. research. Furthermore, the Institute of Risk Management points out that risk culture remains a developing area and we do not consider what we have produced to be the last word on the subject. Instead, we envisage our guidance to evolve with new models and tools emerging in the future (Institute of Risk Management, 2015).

The author can state that all definitions of risk culture are very similar and risk culture is mainly defined as norms and traditions of employees' behaviour within an organisation. The goal of the research is to define the role of risk culture in an organisation's business processes. The object of the research is risk culture; therefore the subject is definition of risk culture role in an organisation business processes.

### Methodology of Research

The Institute of Risk Management (2012) has developed the model of risk culture aspect that identifies eight aspect of risk culture grouped into four themes aligned to an organisation's business model that fully corresponds to the author's identified three risk culture dimensions:

- tone at the top aspect includes risk leadership and how the organisation responds to bad news that corresponds to the authors' identified dimension of risk strategy;
- governance aspect comprises the clarity of accountability for managing risk the transparency and timeliness of risk information that matches to the authors' identified dimension of risk profile;
- competency aspect encompasses the status, resources and empowerment of risk function and risk skills that corresponds to the author's identified dimension of risk nature;
- decision making aspect comprises well informed risk decisions, appropriate risk taking rewarded and performance management linked to risk taking that corresponds to the authors' identified dimension of risk strategy.

The model introduced by the Institute of Risk Management is based on simple questionnaire or structured interview techniques. The authors point out that the model developed by the Institute of Risk Management should ensure a continuous improvement of risk culture through the enhancement of transparency of actions, governance, and competency. However, weakness of the developed model is the

requirement of risk leadership and strong organisational culture that could be challenging to ensure for many companies.

Goffee and Jones (1998) introduced the “Double S” model that categorised culture in four types:

- corporate culture with high focus on people and high focus on tasks;
- fragmented culture with low focus on people and low focus on tasks;
- networked culture with high focus on people and low focus on tasks;
- mercenary culture with low focus on people and high focus on tasks.

However, in the model the organisational culture is based on two dimensions: sociability and solidarity (Goffee & Jones, 1998). The Institute of Risk Management (2012) states that “Double S” model is good at predicting the success with which structured approaches to managing risk are implemented in organisations. The authors agree with the Institute of Risk management that it is possible to include core principles of the model developed by Goffee and Jones in testing of selected risk strategy (one of the identified risk strategy’s dimensions) since the base of risk culture’s successful implementation in an insurance company’s processes is structured approaches to ensure a sense of cohesion and the same standards of working principles.

E. Sheedy and B. Griffin have developed the conceptual model based on the idea that the governance and other structures should be potential drivers of risk culture and at the same time should be distinct from risk culture (Sheedy & Griffin, 2014). The authors highlight that introduced conceptual model corresponds to risk profile that is plays significant role in any insurance company’s risk underwriting process. The authors fully agree with the proposed concept since strong governance’s main aim is to support establishment of proper risk management through strengthening risk culture.

Different approaches have been developed to risk culture assessment and improvement through its strategy setting in an insurance company. G. Trickey introduces the cascade model for risk culture based on exploration of group dynamics, where propensity for risk begins at the board level and is cascaded down through the organisation (Trickey & Business Psychologists at PCL, 2013). Thus could be concluded that risk strategy is one of the most important components in successful activity of any organisation and insurance company.

## Findings/Results

The authors have made the research based various definitions of risk culture analysis and have discovered 3 (three) main dimensions of risk culture in insurance: understanding of risk nature, establishment of risk strategy and agreement of risk profile. Since the Baltic insurance market, which is similar to the Latvian insurance market, is rather young and still developing, the author is concentrated on risk culture development.

## Conclusions

In fact, the authors recognise risk culture of every insurance company’s as the heart of own risk and solvency assessment (ORSA). The ORSA builds on pre-existing concepts from an enterprise risk management framework, such as risk appetite and the need to link to a business strategy, and translates them into specific process that presents management with a picture of their own company’s risk positions that can be used to steer the business.

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# The Ontological Analysis of the Project Risk Management Term „Risk“

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## Abstract

The aim of the current research series is to examine real project risk registers to find correlations between the project management theory, especially project risk management, and practical results of real project risk management – the risk registers publicly available in the Internet.

In the research the author analysed concept “event” who define the term “risk” content. The use of the notion “event” was analysed in 8 different sources to find how to use concept “event”. Ontological analysis of project risk registers is used to answer question what the risk in project management is, analyse project risk definitions and concepts used in the definitions.

In the previous research’s the author concluded that the analysis of the notion definitions is insufficient because the theoretical risk registers do not coincide with the risk registers of real projects. However, we can conclude that the risk registers of real projects are not sufficiently substantiated theoretically if we assume that the risk registers of real projects comply with the documents governing project management.

*Keywords:* project, risk, event, ontological analysis, project risk register.

## Introduction

Project management is a relatively new science characterized by dynamic development. The first editions of the most popular project management guidelines – *A Guide to the Project Body of Knowledge* or *Tasmanian Government Project Management Guidelines* were launched in 1996. The latest version of *A Guide to the Project Body of Knowledge* – the fifth one – was issued in 2013.

The genus notions of the risk definitions are different. The most common is notions “event” and “uncertainty”. The “event” notion is widely used in different areas, in philosophy, mathematics, and physics or away from the scientific definition. Same is in the case with “uncertainty” concept. Content of the “event” and “uncertainty” notions is very different and maybe “event” and “uncertainty” definitions ontological, epistemological and methodological and real projects risk register analysis provide analysis, which reveals relationships, which could not be identified using methods, that are used in recent studies.

## Methodology of Research

The research comprised analysis how to use concept “event” in 8 different sources, 2 project management guidelines of international project management institutions, 4 guidelines of government institutions, and 2 author books. It was analysed all cases of concept “event” uses to fixed the related terms and notions. Qualitative research methods are used.

## Findings/Results

The genus concepts of the risk definitions are different. The most common is concepts “event” and “uncertainty”. The “event” notion is widely used in different areas, in philosophy, mathematics, and physics or away from the scientific definition. Content of the “event” is very different and “event” definitions ontological analysis, which reveals relationships, which could not be identified using methods, that are used in previous studies.

Although the terms are used differently, it can be recognize a number of regularities. Concept “event” is used according concept “event” definition in the probability theory as subset of the possible results or outcomes of an experiment or definition in relativity theory as occurrence that is localized in space and instant of time. “Risk event” is used as an analogue of the concept “event” or with other terms – condition or situation. Concept “event” volume restrictions terms are used, for example, future, past, positive, uncertain, or specific.

## Conclusions

Project management, including project risk management, theory originating from the management experience, not for identification of the problem, definition of the hypothesis, research and conclusions based on the research results. For experience analysis qualitative methods is more useful than quantitative methods.

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# Can Differences in Characteristics Explain Ethnic Wage Gap in Latvia?

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## Abstract

We used anonymised micro data from Labour Force Survey to estimate the ethnic wage gap in Latvia and find the factors that explain it. We found that notable ethnic wage gap still exists in Latvia with Non-Latvians earning 10% less than Latvians in 2015. Results of Oaxaca-Ransom decomposition show that two thirds of the ethnic wage gap are explained by differences in characteristics with the most important effects in favour Latvians coming from segregation in better paying occupational groups, presence of Latvian citizenship and better education (higher education levels and more favourable segregation by education fields). This was partly offset by favourable segregation in sectors for Non-Latvians. Quantile regressions show that ethnic wage gap is statistically significant in all deciles of wage distribution.

*Keywords:* Ethnic wage gap, Oaxaca-Ransom decomposition, quantile regression

## Introduction

There is evidence that Latvians and Non-Latvians are treated differently in the labour market which might raise the question whether substantial ethnic wage gap exists in Latvia. To best of our knowledge there are no up-to-date estimates of ethnic wage gap in Latvia, therefore we fill this gap in literature. Furthermore we look at factors that cause it.

There are many reasons why wages can differ between two population groups. One reason is the differences in endowments (characteristics) like the education attainment and/or experience in the labour market. Other reasons include, but are not limited to direct discrimination and segregation in different occupations and sectors. It can be argued of course that segregation in different sectors and occupations is a form of discrimination (restricted access).

Analysis of the ethnic (or racial) wage gap has been a popular topic in international (see for example Leping & Toomet, 2008), however in case of Latvia the available literature is rather limited and confined to the period before the economic crisis (see Hazans, 2007). We filled this gap in literature by using anonymised micro data from Labour Force Survey (LFS) for period 2007 – 2015. Extended research period provided the possibility to estimate if (and how) ethnic wage gap changed during the period of economic crisis and what happened afterwards. Understanding the underlying factors of the ethnic wage gap is necessary precondition to introduce policies aimed at labour market equality. Therefore, the aim of the research is to recognize the factors that are behind the ethnic wage gap in Latvia.

## Methodology of Research

In literature wage gaps are analysed using Oaxaca-Blinder methodology that stems from fundamental papers of Oaxaca (1973) and Blinder (1973). In subsequent decades theory brought about by Oaxaca and Blinder has been refined and multiple extensions have been proposed.

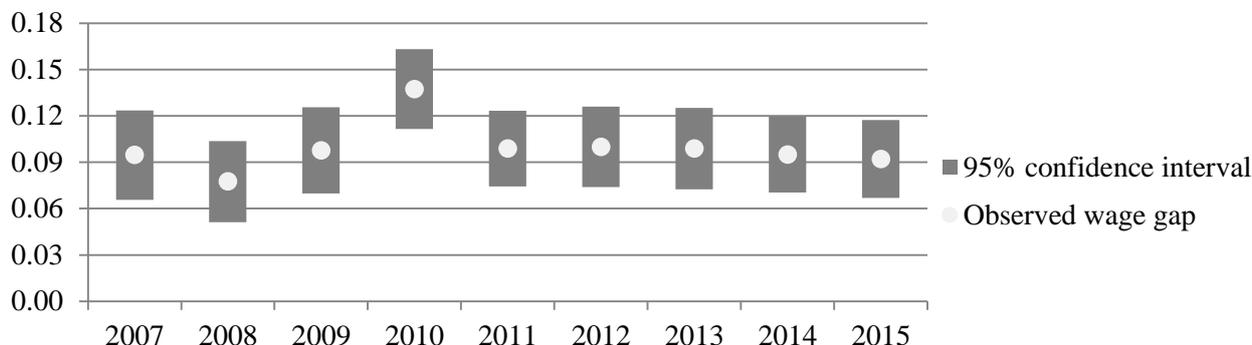
In order to analyse ethnic wage gap in Latvia we first employ Oaxaca-Ransom (Oaxaca & Ransom, 1994) decomposition method and show how much of the ethnic wage gap is explained by the differences in observed characteristics and how much remains unexplained (Eq. 1).

$$\ln(\bar{Y}_L) - \ln(\bar{Y}_N) = \bar{X}_{Nj}(\beta_{pj} - \beta_{Nj}) + \bar{X}_{Lj}(\beta_{Lj} - \beta_{pj}) + \beta_{pj}(\bar{X}_{Lj} - \bar{X}_{Nj}), \quad (1)$$

where difference in average wage for Latvians and Non-Latvians ( $\ln(\bar{Y}_L) - \ln(\bar{Y}_N)$ ) is divided into (a) part caused by observed characteristics,  $\beta_{pj}(\bar{X}_{Lj} - \bar{X}_{Nj})$ , which reflects differences in factors such as level of education, job experience, job tenure as well as differences in employment sectors and occupations, and (b) the unexplained part which consists of discrimination against Non-Latvians and the favouritism towards Latvians ( $\bar{X}_{Nj}(\beta_{pj} - \beta_{Nj}) + \bar{X}_{Lj}(\beta_{Lj} - \beta_{pj})$ ) as well as differences in unobservable factors. Furthermore, we also use quantile decomposition (see Melly, 2005) allowing ethnic wage gap and its' components to differ at different points of wage distribution. Quantile decomposition provides information on how ethnic wage gap varies amongst people with different level of earnings.

## Findings/Results

Ethnic wage gap has been statistically significant in all years from 2007 to 2015. From 2007 to 2009 Latvians received on average 9% higher wage than Non-Latvians. The difference rose to approximately 15% in 2010 and then dropped back to 10% in subsequent years (see Fig. 1).



**Figure 1.** Ethnic wage gap in Latvia (log points; 2007-2015)

Decomposition results show that differences in endowments explain around two thirds of the observed ethnic wage gap. Therefore the unexplained part of the wage gap was rather small, however statistically significant in almost every year. These results imply that if Non-Latvian employees shared the same characteristics as Latvian employees, the wage gap would be only 4%. Education characteristics as well as segregation in better paying occupational groups are the main factors in favour of Latvians while segregation in better paying sectors is the main factor in favour of Non-Latvians. Citizenship is another factor that worked in favour of Latvians as vast majority of non-citizens are Non-Latvians. In order to obtain the Latvian citizenship, knowledge of Latvian language is required; therefore citizenship variable might be capturing the effect caused by differences in Latvian language skills. Latvians are more likely than Non-Latvians to work in small companies where wages tend to be lower than average. This plays a significant, but small role in favour of Non-Latvians.

## Conclusions

We use anonymised LFS micro data to measure the ethnic wage gap in Latvia during 2007-2015 and identify the factors behind it. We found that notable ethnic wage gap still exists in Latvia with ethnic minorities earning 10% less than Latvians in 2015. Ethnic wage gap has been statistically significant in all years from 2007 to 2015 indicating somewhat pro-cyclical behaviour. Results of Oaxaca-Ransom decomposition reveals that two thirds of the wage gap can be explained by differences in characteristics with Latvians benefiting from more favourable segregation in better paying occupational groups, presence of Latvian citizenship (which can proxy state language proficiency), and better education (higher education levels and more favourable segregation by education fields). Meanwhile Non-Latvians benefited from more favourable segregation by sectors.

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# Prerequisite implementation of Process-Oriented Management in Medical Institutions of Kazakhstan and Continuous Improvement

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## Abstract

This paper presents the main issues concerning the process-oriented management and its tools, such as Continuous Improvement, Total Quality Management and Business-process Reengineering. The main problems of this issue are discussed. The paper shows the problems in management processes in medical institutions. Hence, it aims to help to improve the system by applying the process-oriented system effectively. The methodology consists of primary and secondary data. It includes a survey and document study. The data is statistically processed and it was combined with the obtained secondary data. The main findings are shown and the overall conclusion is made.

*Keywords:* Continuous Improvement (CI), health care system, Kazakhstan, medical institutions, Process-Oriented Management.

## Introduction

At the present, the problem of modernization of the health economy with the basis of process management technologies is a major problem that requires in-depth scientific study. The urgency of developing a business process management system in Kazakhstan's health care system is due to the fact that the business process is considered as a fundamental component of functioning of medical institutions. Hence, There is an objective need for the study of the evolution of the methodology of business process reengineering in the context of quality management of medical services (Kamal, 1995).

Business processes of medical organization can be understood as a set of actions that are performed in the health care organization to obtain a desired result (of medical services). The competitiveness, cost-effectiveness and strengthen of a leading position in the market of medical services depend on effectiveness of business processes (Ermakova, 2009).

Existing business processes of medical institutions determine the real need for effective management and make the actual formation of the medical institutions management system based on process-oriented management (Kobayashi, 1995). Nowadays, this problem is particularly innovative for the Republic of Kazakhstan and it is an essential component of Kazakhstan's healthcare strategic management. It is capable to induce an increase of the quality of health care, efficiency and effectiveness of medical institutions by ensuring the modernization of the health care system. Modern medical organizations should be focused on constant change and rapid adaptation to the changing conditions of external and internal environment (Imai, 1986). Thus, the health care institutions should move away from a strict organizational hierarchy and principles of functional management in order to form key factors for success. It is can be done through the use of corporate rules, implementation of Business Process Reengineering (BPR), Continuous Improvement (CI) and Total Quality Management (TQM) (Sallis, 2005). However, it is very difficult to implement any innovative projects to the health care system. This is due to the fact that human element plays a major role and the safety and the effectiveness of medical care are more important than the profit and efficiency (Ermakova, 2009).

The main aim of this paper is to understand the public health care system in Kazakhstan and find out the ways to switch to the process-oriented management. For this purpose, the first step is shown in this paper. The research includes a detection of problems in consumer satisfaction by the medical services in public and private sector. According to the findings, the recommendations for the process-oriented management implementation are made. The following questions should be answered: Does the public health care services lack the quality? If yes, how they can improve the quality of services through process-oriented management tools?

For this purpose, the appropriate literature should be chosen in order to analyse this issue. The process-oriented management in the health care system is the core issue for choosing literature. This issue is discussed by Ermakova S.E. "Management of Business Processes in Medical Institutions" and by Karnal

C.A. "Managing Change in Organizations. The other authors, such as Imai M., Sallis E. and Kobayashi give the insights to the tools of the process-management.

### **Methodology of Research**

The study includes primary and secondary data; qualitative and quantitative methods in order to get reliable data. The methodological basis of the research is served as dialectical and systematic approaches that involve the study of phenomena. The methods of structural analysis, synthesis, economic and statistical methods and modelling techniques, such as TQM, CI and BPR are used for the study. The research was conducted at Medical Centre of Karaganda State Medical University in Karaganda, Kazakhstan. The survey was conducted among the patients of medical centre. The survey consists of questions about the preference between the public and private medical services.

### **Findings/Results**

Thus, the system of business process reengineering is the tool assisting in solving the existing problems and decision-making distribution; automation for the cost reduction and duration of the processing of applications; implementation of the top down leadership by the management; carrying out a survey; integrated approach for planning. The key assessment of the success of process management in the health care system is not a profitability of the organization, but the level of patient satisfaction and the image of a medical institution.

The research includes survey results conducted at medical centre of Karaganda State Medical University in Karaganda city, Kazakhstan. The target group includes patients of this medical centre. The results show that the patients prefer private hospitals because of the higher quality of service delivered than in public institutions (85%). Moreover, 75% of respondents rely on the level of service in commercial organizations. More than 50% of respondents are ready to pay for medical services because of the high speed of services delivered (57%) and due to the fact that they do not have an opportunity to receive the necessary free medical care (54%).

### **Conclusions**

The overall conclusion is based on the results of findings. The majority of consumers of paid services still do not select public health facilities, but the proportion of the population using commercial medical services is growing steadily. Moreover, the formation of paid medical service competitive market produces high rate of inflation, legislation problems, lack of a number of qualified staff, high level of morbidity and mortality of the population. In order to solve the problems, the BPR is highly recommended. It, primarily, includes methods of process mapping, computer-based simulation modelling for creating the business process models, etc. It is possible to provide an effective management and good quality of medical care only with comprehensive integration of these principles. It includes systematic approach, process approach, functional approach, and system of CI, TQM and balances scorecards.

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# Social and Economic Values and Identify Priority Areas of Economic Development

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## Abstract

The paper presents scientific justification priority sectors of economic development of society by the example of Ukraine, which is based on the analysis of socio-economic values and current challenges of society. Priority values in Ukrainian's society today are people safety, information, health, food and environment. It is shown that morality through film development concessions in people is an economic category. With information-energy concept of the economic system proposed indicators performance evaluation of the state GDP (manufacturing resource potential), entropy and index of human development.

*Keywords:* economics, economic values, entropy, resource, sustainable.

## Introduction

Optimizing the use of public resources to meet the public interest and welfare of the population has always been an important economic problem. Formulation and implementation tasks without considering community needs and without appropriate distribution of resources not only ensure its economic growth, but also can lead to bankruptcy of even critical of his form – socio-political explosion. The need for a combination of commercial (economic) and social development needs of society has shown in the last century as a method of P. Drucker program target (PTM) budgeting and resource management.

*The main problem of budgeting and management not only businesses, but the state is no scientific definition support economically and socially significant goals and comprehensive indicators to assess their achievements.*

## Findings/Results

Values of society (or individual enterprise) – a determining factor in the development at all levels of management: operational, tactical and strategic. The “philosophy of values” the most consistently and systematically set out I. Kant. Most values can be relative and absolute. According to Kant the things that exist independently of human will and have no reason *are relative values, or value for us*. “Man and generally every rational being exists as an objective in itself”, and “this goal can not be replaced by any other purpose” is “objective purpose” or “*absolute value*”. “Man, however, is not such a holiday, but humanity in her face should be her holy”. Under the social values of economic development must comply with *the natural law of morality* “behave as if the maxim of your action using your liberty was to be a universal law of nature”.

Values are determined by the type of society. The first Pan Europeans research values of different nations of Europe showed that Soviet society has formed in Ukraine man fixated on material values, unable to enjoy life. Autonomy, hedonism and risk assessed novelty lowest. Ukrainians have shown such negative qualities as failure, lack of willingness to make decisions, creative knowledge, indifference to their prestige and enjoyment of life. Own of sociological research based on international monitoring studies – World Values Survey (WVS) and the European Social Survey (ESS) – set values the importance of Ukrainian society in 2015. The most important value to the Ukrainian public and Europeans are security, prosperity and lower estimated environment. In Ukraine in 2015 negatively evaluated conformity (intention to hurt others ..), achievement (the success of their abilities), power-wealth (own prestige, ability status), hedonism (own enjoyment of life), risk Novelty (sharpness feelings of life), indicating that the Ukrainian passivity in life. In recent years the importance of the value of self “samostijnict” (independence) diminishes until its rejection. With these qualities impossible Ukrainian economic growth, and therefore economic development requires the formation of modern values of European society. The difficult economic and political situation, the military conflict created extremely complex symbiosis of outstanding value to choice of priorities for economic development in Ukraine. The need for security relates to the priority needs of social communities. This value is universal and is part of the value of “*man*”.

Current conditions are unstable and unsatisfactory operation of predicting the dynamics of both individual companies and the economy as a whole Ukraine could lead to imbalance in general economic

condition of the entire socio-economic system. The main threats to the socio-economic situation in Ukraine began to challenges: problems with capital, energy and financial resources, poverty, food shortages, environmental and agro-climatic. Analysis of the major threats to the state of Ukraine and experience did possible to determine priority values and priorities of the respective industries. The absolute value of Ukrainian society is *man and security* that is set by the Constitution of Ukraine. Priority relative value, as the experience of modern Ukraine, is security. Security is a basic need of people, and therefore holds the highest place in the hierarchy of values of Ukrainian society. In countries burdened military operations with stable economic value of the security attributable to the lower position in the hierarchy of values. Ukraine's experience has shown that in modern wars hybrid security (society) and information values are identical priorities. Therefore, development of military-industrial complex, information and scientific and educational areas should be a priority Ukrainian society.

Achieve safety in consideration of possible challenges Ukrainian society based on values-means toward reducing their priorities: health, nutrition and ecology (ahroklimatolohiya). In line with the priorities recommended values allocate production resources potential for economic sectors that can guarantee the satisfaction of human life on the specified values: Society – the military-industrial complex, Information – Research and Academic industry and information technology, Health – medicine, Food – agricultural production, Ecology – science and education and information industry, chemical and manufacturing production.

A comprehensive economic development of Ukrainian society based on the implementation of established values is the epitome of a balanced (deterrent) or sustainable development. The indicators of the economic system according to information-energy of the concept for set values adopted are GDP (or manufacturing resource potential), entropy (or the stability of the system) and the index of human development.

The importance of private big, small and medium business to a modern economy and the need of socialization requires scientifically-based management. It is implemented on the basis of defined values: Socio-economic values of Ukrainian society – taxes in the budget, Income – economic activity of the enterprise, Quality of life of workers – wages and social costs, Ecology – the cost of the environment.

The absolute value of enterprises is *man and security*, which is implemented by the state on the basis of production resources – taxes to the state budget. The main relative values of enterprises can be considered (in the direction of decreasing precedence) are: *income, quality of life for workers and the environment*. The economic value an *income* is the base without which in principle is not possible own economic development. Social situation of workers of private business consisting of state social support (resources – taxes to the budget), wages and social investment own businesses. In this case, the indicators for the implementation of such values defined GDP (or resource potential production) company, entropy (or the stability of the system) and the index of socialization of workers as economic indicators directly to the company.

## Conclusions

Value orientation of Ukrainian society to forecasting, optimal decision making in the management of economic development and ensure social peace and political society requires an understanding of: In the current political and economic environment to identify key social values and their priorities in order to identify priority areas of economic development, Morality through action in people is economic category, To focus economic development to new global values of society – environment and ahroklimatolohiya, adopt economic, social and environmental emphasis in economic development as a priority, or balanced (sustainable) the development of society (business) should be the top priority of its activities.

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# Assessing the Real Effects of the Asset Purchase Programme: Empirical Evidence

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## Abstract

The European Central Bank (ECB) announced the Asset Purchase Programme (APP) on January 22, 2015 in order to prevent the Eurozone economy from entering a deflationary spiral and to achieve its main goal – maintain price stability. The aim of this paper is to evaluate macroeconomic effects of the APP on the Eurozone's output and inflation in the first nine months of implementation. The results from the Bayesian VAR model suggest that the APP has had a positive impact both on output and inflation after the first nine months of implementation. The analysis also indicates that quantitative easing is an effective policy option to boost output and price level in times of low financial stress as the results do not significantly differ from studies which evaluate the effects of quantitative easing in other countries during the financial crisis.

*Keywords:* Asset Purchase Programme, quantitative easing, Eurozone, Eurosystem, Bayesian VAR.

## Introduction

Following the Great Recession, central banks in advanced economies implemented unconventional monetary policy measures such as quantitative easing. The aim of these measures was to safeguard financial stability and ultimately stimulate output and increase inflation sufficiently to meet the inflation target (Stone, Fujita, Ishi (2011) and Bridges, Thomas (2012)). Conventional monetary policy instruments were no longer effective because advanced economies became constrained by the Zero Lower Bound.

In order to prevent the Eurozone economy from entering a deflationary spiral and to achieve its main goal – maintain price stability, the ECB announced the APP on January 22, 2015. The purchases of public and private securities started in March 2015 and are intended to be carried out until March 2017 or until inflation path is consistent with inflation target.

The aim of this paper is to evaluate macroeconomic effects of the APP on the Eurozone's output and inflation in the first nine months of implementation. The evidence currently available focuses on the APP impact on financial markets (see Altavilla, Carboni, Motto (2015)). Contrary to the US and the UK quantitative easing policies which were carried out in times of financial crisis, the APP is implemented in times of low financial stress (Altavilla et al. (2015)). As they point out, the existing literature shows that asset purchases exert larger effects on the asset prices when financial stress is high. Thus, the literature which focuses on macroeconomic effects of the US and the UK quantitative easing policies only provide evidence for effectiveness of such policies in times of financial crisis. But it is also crucial to understand whether quantitative easing can be used to stimulate output and inflation when stable conditions prevail in financial markets.

## Methodology of Research

In order to assess the macroeconomic effects of the APP, the author estimates a Bayesian vector autoregression (VAR) with Minnesota – Litterman prior. Bayesian VAR is appropriate model for analysis of quantitative easing shock because it captures complex relationships in a large macroeconomic dataset while imposing minimum amount of theoretical structure. The model is then used to conduct counterfactual analysis. The counterfactual scenario is based on empirical evidence from Altavilla et al. (2015) which suggests that, on average, the APP lowered the euro area long – term bond yields by about 40 basis points at 10 – year maturity. The author implements this impact on long – term interest rates by constructing a counterfactual path for the long – term interest rate spread, assuming that it would be 40 basis points higher from March 2015 to December 2015 without the APP. This approach allows to estimate the effects of the APP on the output and price level through the portfolio balance channel. As Kapetanios, Mumtaz, Stevens and Theodoridis (2012) notes, this is the key transmission channel of quantitative easing, at least in times of financial crisis. This paper extends the literature on macroeconomic effects of the quantitative easing by assessing the effects of asset purchases passed through the portfolio balance channel on the real economy in times of low financial stress.

## Findings/Results

The results show that the APP has had a significant positive impact on the Eurozone's output in the first nine months of implementation. The maximum effect occurs in August 2015 when the APP boosted output by 98 basis points. On average, the APP increased output by 55 basis points in the first nine months of execution, which is a sizeable effect considering the stable conditions in the euro area financial markets.

The main reason for launching the APP was to counter the fall in price level and maintain price stability in the Eurozone. Thus, the main object of interest for the monetary policy makers in the euro area is the effect of the programme on price level. The counterfactual results from the Bayesian VAR demonstrate that the APP has been effective in increasing the euro area price level after the first nine months of execution. The peak impact on price level occurs in November 2015 when the APP increased price level by 58 basis points. On average, the programme raised price level by 31 basis points. While the effects on price level are undoubtedly smaller than on output, they are still significant. Furthermore, the literature concerned with macroeconomic effects of quantitative easing also suggests that quantitative easing has a less pronounced effect on price level than on output.

ECB President Mario Draghi in his December 4, 2015 speech argues that the Eurozone's inflation in 2015 would be negative without the Asset Purchase Programme. To bring evidence to this argument, the author has calculated the inflation rate in no policy scenario by taking actual data for HICP and subtracting the estimated APP effect on price level. The results show that without the APP it is indeed likely that the euro area would be in deflation for much of 2015 and the annual rate of inflation in 2015 would be -0.2%.

## Conclusions

The counterfactual simulations from the Bayesian VAR demonstrate that the Asset Purchase Programme has been an effective measure to boost output and counter deflation in the euro area from March 2015 to December 2015. The analysis indicates that quantitative easing is an effective policy option to boost output and price level in times of low financial stress as the results do not significantly differ from studies which evaluate the effects of quantitative easing in other countries during the financial crisis. The results confirm that also in times of low financial distress, portfolio balance channel is effective transmission channel of asset purchases made by the central bank.

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**SUBSECTION**

**“COMPETITIVENESS OF LATVIAN ENTERPRISES IN  
FOREIGN MARKETS (EKOSOC-LV 5.2.1) “**

# Assessment of Business Environment Factors Influencing the External Competitiveness of Health Care Industry in Latvia

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## Abstract

PEST analysis in application to healthcare markets performance, in particular in the common European market, reveals important first-order macro-environmental determinants of industry evaluation. The environmental scanning delivers basis grid for strategy evaluation, in particular for Baltic region case in strongly overlapping areas. The study starts with regional valuation in PEST matrix, and then extends as pilot towards inclusion of diverse PEST-scanned economies. Competition pressure after Brexit will be used as a role model of PEST-based optimisation.

*Keywords:* Health system performance, health care industry, external factors, protection of core industries

## Introduction

Latvian health care system's internal performance regarding population health level, mortality and morbidity rates, as well as regarding equity in access and efficiency in resource allocation, substantially lacks behind EU member states' average performance; main causal factor being the underfunding of services. At the same time, technological capacity of health care industry is on the average EU level, in some areas of radiology and diagnostic the overabundance of equipment exists. Therefore an allocation gap opens possibilities for export, mainly by provision of high value-added services to foreign populations against full economic payment. Export strategies are affected by the internal technological progress, but inside of the EU increasingly by country's efficiency of public administration, economic and social factors, business environment and political agenda. The recent European Commission decision in case on "Transfer pricing arrangements on corporate taxation", in particular tax politics in Ireland, clearly demonstrates the enormous importance of sectoral role on political agendas and power of environmental factors in business establishment and success.

## Methodology of Research

The ranking of PEST components was done by expert methods. 12 experts in specific areas and also cross-sectional experts ranked the PEST criteria according to the factors of optimally reflecting the external competitiveness dimensions. In the first stage benchmarking analysis was performed where the benchmarking profile is the envelope of Baltic-German regional performance.

Relevant data from published data bases, reviews and publications (WHO, WB, OECD, Eurostat, WEF, doingbusiness.org) were collected and analysed.

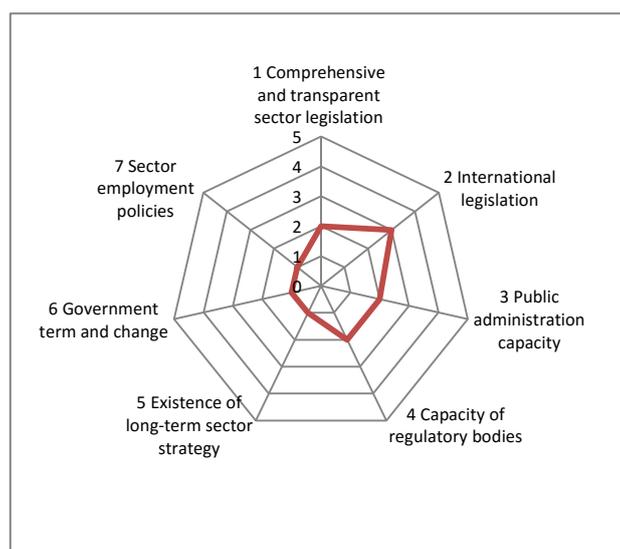
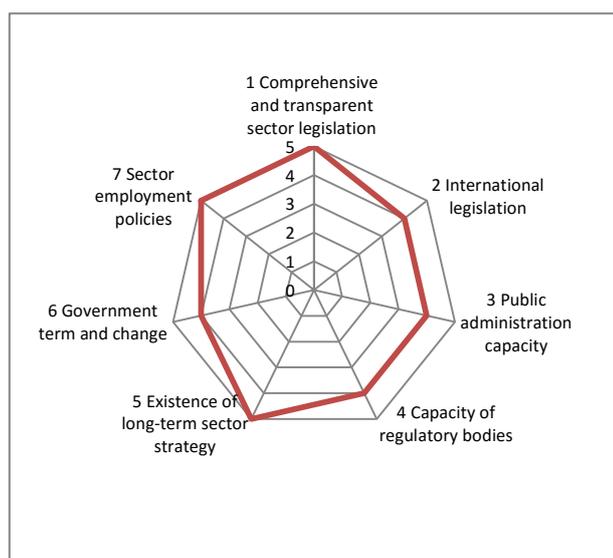
## Findings/Results

The qualitative analysis reveals substantial asymmetric imbalance for Latvian situation. It also indicates the areas where the highest returns can be expected. Complex problem is the path dependence: improvements in the worst criteria vs. balanced approach. Catch-up economies usually have symmetric improvements, whereas the balancing occurs in a longer adaptation process. The health care sector is specific, but also very relevant for internationalisation because of permanently increasing of demand in the course of societal ageing and cross-border health service provision.

**Table 1.** PEST factors used for the assessment of external environment of Latvian health care system

<p><b>Political</b></p> <ol style="list-style-type: none"> <li>1. Comprehensive and transparent sector legislation</li> <li>2. International legislation</li> <li>3. Public administration capacity</li> <li>4. Capacity of regulatory bodies</li> <li>5. Existence of long-term sector strategy</li> <li>6. Government term and change</li> <li>7. Sector employment policies</li> </ol>	<p><b>Economical</b></p> <ol style="list-style-type: none"> <li>1. Stable home economy trends</li> <li>2. Competition between service providers</li> <li>3. Encouraging state investment policy</li> <li>4. Supportive tax policy</li> <li>5. Consumer purchasing power</li> <li>6. Sustainable financing mechanism</li> <li>7. Labor productivity, supply and costs</li> </ol>
<p><b>Social</b></p> <ol style="list-style-type: none"> <li>1. Lifestyle trends</li> <li>2. Demographics (age, growth)</li> <li>3. Population adherence to health system</li> <li>4. Informed and demanding customers</li> <li>5. Accountable advertising and publicity</li> <li>6. Consumer buying patterns</li> <li>7. Employment patterns, attitude to work</li> </ol>	<p><b>Technological</b></p> <ol style="list-style-type: none"> <li>1. Impact of technological progress</li> <li>2. Threats from competing technology</li> <li>3. Innovation in service provision</li> <li>4. Research funding by government</li> <li>5. Available ICT support and data exchange systems</li> <li>6. High standards for protected health information</li> <li>7. Global communications, international knowledge transfers</li> </ol>

Source: developed by authors



**Figure 1.** Expert-assigned values (Political factors) for the benchmarking profile (importance / performance ranking) of the factor (developed by authors)

## Conclusions

PEST analysis is extremely valuable for industries where strong spillovers from the public sector servicing exists. In case of healthcare sector the knowledge, competences and other immaterial transfers from public to private sector play the leading role. Sustainability of PEST-defined environment is crucial for investment decisions. The particular importance components have been weighted by experts. The composite index for PEST score has been elaborated, and the regional competition mapping produced. Piloting of the mapping towards Scandinavian countries is ongoing. Simpler external analyses as RBV do not disclose the situation in partially restricted common service markets as in the case of EC. Whereas SWOT can be too extensive to use as a control instrument, and its use would be rather restricted initially to living lab models.

PEST is the low-cost, easy to use and demonstrate alternative among the competitiveness assessment approaches in homogeneous industries.

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# Challenges of Nation-Branding for Stimulation of Latvian Exports

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## Abstract

The present research investigates three areas challenging the branding of Latvia due to inconsistencies observed in the actual and potential construct of the brand of Latvia with a reference to the national export development. The investigated challenges are the barriers and opportunities for green branding of Latvia, lack of a generally accepted indication of the geographical identity of the Baltic region and the popular image of Latvia as a cheap country and the contradiction to it expressed by the actual and aspired circumstances. The applied research methods are a theoretical analysis of scientific literature and an empirical analysis of the representation of Latvia on the official website of *Latvijas Institūts* (Latvian Institute) and its comparison with the official websites of respective institutions in Lithuania and Estonia. The research observes the interconnection between the defined challenges and offers a perspective for a possible transformation of the challenges into nation-branding opportunities. In addition, the research identifies extra challenges the nation-branding of Latvia is currently facing for further discussion.

*Keywords:* nation-branding, export promotion, challenges of nation-branding, Latvia

## Introduction

The export sector of Latvia was pronounced to be a focal point of the development strategy of the Latvian economy (Ministry of Economics, Republic of Latvia, 2015). Nation-branding alongside with its associated terms like ‘made-in’ campaigns is deemed to be a powerful tool for the stimulation of national export growth (Dinnie, 2008). This observation has been confirmed by academic researchers worldwide having made a solid research on the use of nation-branding tools to promote export advancement (Che-Ha, *et al*, 2016; Mugobo, 2014). More than a decade ago, a conclusion that Latvia has neither a clearly defined brand nor a branding strategy of the country was reached (Endziņa, Luņeva, 2004). Disregarding a fair amount of research and advice on the issue that has been obtained thus far (e.g. Simon Anholt at request of Latvian Institute), the country still lacks a unified approach for positioning of the country-brand and the enhancement of its presence on the global scene (Vira et al, 2012). This, however, does not mean that no efforts are being made to brand the country. For instance, Latvian Institute maintains a web portal *Latvia.eu* aimed at the promotion of ‘Latvia’s positive international recognition’ offering a reader-friendly and comprehensive representation of the country in four languages (Latvian Institute, 2016). In addition, with regard to the area of exports, *Investment and Development Agency of Latvia* facilitates foreign investment and competitiveness of Latvian entrepreneurs as well as publishes an all-embracing material useful for the potential international trade partners of the country (Investment and Development Agency of Latvia, 2016). On the academic level, several researches have been conducted on nation-branding of Latvia with a focus on diverse aspects of the issue, e.g. place marketing in the context of regional development (Vožņuka, 2010), destination marketing (van der Steina, 2012) and municipality marketing (Brencis, 2015), place based research (Balčiņa, 2014). In turn, the topic of national-branding in the context of stimulation of national export performance in Latvia remains an underexplored concern.

In order to forward the definition of a sound and consolidated nation-branding strategy, which would positively affect the export performance of Latvia, it is reasonable first to assume that the elucidation of the challenges of nation-branding of Latvia is of direct importance for the formulation of the efficient and sustainable nation-branding strategy. The aim of the present research is to investigate the challenges associated with nation-branding of Latvia. The research is based on three observed and hypothetically formulated inconsistencies related to the aspects influencing the brand of the country as well as its exports. The observed inconsistencies include 1) a considerable potential to brand Latvia as a green country based on its ecosystem and stunted development and maintenance of policies to support the green brand of Latvia, 2) a controversial geographical identity of the country varying across sources of opinion and 3) an established image of the country as cheap (in terms of the working force, services and production) and the actual and aspired state of the matter. Within the framework of the current research, the mentioned inconsistencies are investigated by evaluating the current situation related to the issue and the reasons and consequences of it. In addition, the research estimates a possible solution to the issues. The research serves the general purpose of facilitation of conceptualisation of the nation-branding strategy for Latvia.

## Methodology of Research

To achieve the research aim, first, a theoretical analysis of scientific literature in the area of export management and nation-branding is performed. Furthermore, secondary data, i.e. case studies of nation-branding practiced by other countries, are analysed. Then the research paper undertakes an empirical analysis of the information representing Latvia on the official website of *Latvijas Institūts* (Latvian Institute). In addition, within the empirical analysis, the content of the website of Latvian Institute is compared to the official websites of the respective institutions of Lithuania and Estonia.

The research is divided into three sections according to the formulated inconsistencies related to the potential definition of the nation-brand of Latvia. The first section examines the scientific publications, information and advisory sources (e.g. Ministry of Agriculture Industry Portal, 2016; Ianuzzi, 2009; Environmental Performance Index, 2016; Cull, 2013; Vilcina. *et al.* 2016, etc.) on the possibility and its restrictions to form the brand of Latvia on the idea of sustainable development and the green brand, particularly in reference to exports. Several aspects are covered including green production being oftentimes of increasing interest for importers and a vital facet of sustainable development. The second section is devoted to the discussion on the issue of the geographical identity of the Baltic Region by analysing scientific, governmental and informational-educational sources (Vira *et al.*, 2012; Dzenovska, 2005; Charles, 2009; Szondi, 2007, etc.). The third section studies the challenge of nation-branding of Latvia expressed by the inconsistency of the country image and the actual state of economic development expressed by the tokens 'cheap/expensive'. The section is based on public discussions and forums as well as scientific and informative literature on the topic (Life in Riga 2016; Dinnie, 2008; Montier, 2007; Rough Guides UK, 2016; Martin, 2015, etc).

The three sections have an identical structure and a differing focus according to the issue discussed. Thus, in each section, first, a theoretical analysis of scientific literature is performed. Then, secondary data, i.e. case studies of nation-branding practiced by other countries, are analysed. Then the research paper undertakes an empirical analysis of the information representing Latvia on the official website of *Latvijas Institūts* (Latvian Institute). In addition, within the empirical analysis, the content of the website of Latvian Institute is compared to the official websites of the respective institutions of Lithuania and Estonia.

The research is concluded by outlining further challenges of nation-branding of Latvia, specifically affecting the export sector development.

## Findings/Results

The research results into a threefold groundwork for identification and examination of three challenges of nation-branding of Latvia affecting the present and prospective export performance of the country. The findings assert that branding Latvia as a green country has a considerable potential, the fulfilment of which is a matter of time, for much advancement in the direction of sustainable development is being made in the country. The research adds that the cultural factor plays a vital role in the dynamics and direction of the formulation of the green brand of Latvia. Next, the research findings confirm that there is a remarkable degree of uncertainty around the issue of geographical identity of the Baltics (mainly Eastern or Northern Europe), which has its negative consequences on the brands of the three countries and their export potential. Further, the research illustrates and interprets the brand of Latvia as a cheap country and its contradiction to the desired, desirable image and the factual economic state. The research gives consideration to the reasons, consequences and possible solutions for the situation. Finally, the research outlines further challenges for the formulation of the branding strategy of Latvia for a continued research and discussion.

## Conclusions

The research concludes that the provisionally defined challenges expressed in the inconsistency of the tokens of Latvia's image affecting its brand are proven to be factual and have an effect on the export performance of Latvia. Nevertheless, within the present research it is assumed and argued that the current challenges of nation-branding of Latvia might be used as an opportunity with a big potential for the development of a strong brand of the country rather than an impediment to it.

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# Strategies and Sources of Competitive Advantage for Latvia

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## Abstract

The paper deals with the theoretical aspects of international trade and its manifestations in real life processes, basically on the example of Latvia. Most of the arguments of the international trading benefits one way or another are based on Ricardian model of comparative advantage. But Ricardian model has strict limitations. A necessary condition for comparative advantage is the borders for the flow of resources. In global world with free movement of capital and labour there is no comparative advantage. This one can observe in real life processes in modern world. Millions of people are leaving their native countries, seeking for absolute advantage, as with free capital flows they do not have comparative advantage any more. Politicians and mainstream economists still are speaking about benefits of comparative advantage that really does not exist. One of arguments in favour of international trade is competitive advantage model, developed by M.Porter. Unlike absolute advantage and comparative advantage models, Porter's model does not consider trading benefits for both sides. Therefore competitive advantage usually is defined as advantage that allows an organization to outperform its competitors in a certain market. For such countries as Latvia the basic way to compete is to do things in a different way.

*Keywords:* foreign trade, exports, competitive advantage, differentiation strategy

## Introduction

A widespread conventional wisdom declares that export is one of the main driving forces of economy, and the larger is the share of exports in GDP, the better it is for the national economy. Economic policy of Latvia, at least in words, during the time period after 2008 has been best on this conventional wisdom. But foreign trade is a two-way road. It is impossible that all the countries or the World have positive trade balance. The benefits of exports in Latvia have been declared without deeper analysis of the process, which may present different conclusions. The first part of the paper deals with the analysis of Latvian exports. The second part considers the theoretical aspects of international trade. It shows that the global processes of the present, which clearly indicates that things happen not the best way, largely depends from the present economic paradigm, and misinterpretation of Ricardo's comparative advantage model may be on the basis of the present misfortunes.

Still if one is in favour of globalization and increasing international trade, the theoretical basis of it is the competitive advantage model, first developed by M.Porter. Nevertheless, looking at the origins, it becomes rather obvious, that M.Porter's original explanations of competitive advantage significantly differ from its common explanation in Latvia. The third and the main part of the paper deals with the competitive advantage model trying to keep possibly close to M.Porter's ideas. It considers the strategies and possible sources of competitive advantage for Latvia. The goal of the paper is to show, that keeping close to M.Porter's ideas, the basic strategy should be differentiation, and not only in the last stage of the value chain, if one keeps close to the broad target approach in the spirit of the conventional wisdom, or even to change the paradigm and prefer the narrow target approach.

## Methodology of Research

The methodology of the paper is based on statistical data analysis in the first part of the paper. The second and the third parts of the paper are mainly library based studies, containing possibly deep investigation of the original texts of the authors, in combination with the explanation and interpretation of real life processes both in a local and global level.

## Findings/Results

The analysis of Latvian foreign trade shows a very strong correlation between economic growth and the foreign trade deficit – the higher is the foreign trade deficit, the higher is economic growth and vice

versa. This is not a general trend, but rather specific feature of economy of Latvia. It means that economic growth in several countries significantly differs.



**Figure 1.** The correlation between economic growth and foreign trade deficit in Latvia

Source: Author's calculations based on information of Central Statistical Bureau of Latvia, [www.csb.gov.lv](http://www.csb.gov.lv)

After entering the European Union the vector of exports of Latvia turned from the West to the East. The main export markets of Latvia before 2004 were Germany, Great Britain and Sweden; after entering EU they were substituted by Lithuania, Estonia, Russia and Poland. Participation in some kind of economic union does not necessarily mean closer trade contacts between the countries. An investigation of foreign trade tendencies clearly indicates that trade relations in a lesser degree depend from belonging to one or another union, but in a larger degree may be explained by the theoretical international trade models.

## Conclusions

The three generic strategies of competitive advantage may be described the following way: 1) "Do it better", 2) "If you can't do it better, do it different way", or 3) "Do it where you can do it better".

The way, the strategy and the source for competitive advantage for Latvia lies in the following. First focus strategy, alongside with differentiation strategy in some industries, if one considers that a country can not do without international trade, and then in 10-15 year period obtaining cost leadership in the focus strategy industries.

National identity, virtues, institutions, culture, religion certainly is the surest foundation for competitive advantage through differentiation strategy. It seems that a large part of Europeans more and more recognize this.

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# Key Performance Indicators for Customer Service at Riga International Airport

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## Abstract

Riga International airport (RIX) is a point of entry or transfer for millions of passengers annually. In the year 2011, it has reached its capacity limits and presently develops under the new plan “2012-2036.” Basic quality standards for serving passengers are set by the industry’s supervising or uniting organizations, like ministries or ICAO. The standards are mostly set for security and technical matters. For instance, IATA and other organizations specify how operations should be performed, but nothing is said about customer service and its measurement. Airports Council International (ACI) is the only organization to represent airports globally. It stresses significant value of customer service and suggests methodology for measuring it. The only known method measuring customer service, which is recognized by scientific society, is Airport Service Quality (ASQ). Further quantification is done by methods of descriptive statistics, indicators of variability and multivariate statistics analysis. Important that customer base for the airports is extended beyond travelling passengers, to include aviation organizations, airlines, non-travelling public and staff, as well as non-aviation services, like parking and logistics operators, hotels and post.

*Keywords:* Airport Service Quality (ASQ), customer service, Key Performance Indicators (KPI), Riga airport development.

## Introduction

Globalization, higher standards of living and emergence of low-cost airlines are not only made air travel possible for 5 billion passengers, but drive the expected quality of it to a much higher level. Nowadays, it is not enough to simply offer a passenger a variety of flights or shops or eateries, but reach subjectively comprehended by him or her top quality of those. This article is to make a step toward creating a standard for customer service for airports and make it a part of its KPI. The aim of this paper is to propose a set of airport’s KPI for customer service. While reaching the goal, it is important to better understand the concept of KPI itself. In the first part, this work provides a review of different approaches for exploring KPI. Special attention is made to attempts of quantification of KPI measurement.

The authors made a considerable effort to outline findings available in the reviewed literature and sources on the topic. Among the rest, monitoring KPI is recognized to be a driver for improving performance. Aghahowa Enoma and Stephen Allen (2007) mention other three drivers: risk management, benchmarking and performance measurement. In his part, Mohammed Badawy et al. (2016) has described four types of performance measurement – Key Result Indicators (KRI) or achievements in a perspective of critical success factor, Result Indicators (RI) or what one have done, Performance Indicators (PI) or what one must do, and KPI or what to do to highly increase performance.

Accordingly to ACI, 1700 airports globally serve about 77 million flights annually. Riga airport only served 5 million passengers in 2016. There may be a temptation to concentrate on quantity indicators of airport performance more than on quality ones. One may short-sightedly stress that, like any other business, airport administrations should primarily concentrate their efforts on creation of added value. However, the true way of reaching quantitative results lay through better customer service, which is qualitative indicator. The article presented by Airports Council International (ACI) in 2011 called customer service “core value for airports.” Meeting desperate needs of customers is the only most important goal for any administration running airport business. Customer base for any airport is built out of passengers, accompanying or simply visitors, airlines and their staff, non-aviation services providers and international organizations. Plus, customer service may become a part of the brand conceptualization or even its core.

## Methodology of Research

The greatest challenge for the researchers comes from the need to quantify customer service evaluation. The needs of clients of airports are often qualitative, like better service expectations. Quantifying passengers’ satisfaction of their needs is difficult due to limited number of measurement tools. Presently, there is only one tool is recognized and tested – ASQ. The core of the method is scaling, as a part of the

passengers' survey. For instance, passengers would be asked to measure their experience on scales from one to ten. There is no single set of scales developed and adopted for any research. Then, each author decides on a set of scales individually. However, once the scaling is done, quantitative measurement of the results becomes possible. For example, by methods of (1) descriptive statistics – mean values (mode, median, arithmetical mean); (2) indicators of variability - range, variance, standard deviation, standard error of mean, dispersion coefficient; and (3) multivariate statistics analysis – factor, regression and correlation analyses.

### **Findings/Results**

Besides serving as a strategic point, airports seek to maximize their potential revenues. Reviewed literature gives examples of thought through elements for KPI concepts. For instance, in the UK “multi-agency threat and risk assessments” or a system to boost security measures performance was developed jointly by the Department for Transport and the Home Office.

On the ground of ACI suggested approach to customer service and its measurement (ASQ), the authors have created a passengers satisfaction survey. The know-how of the approach is that the one is adjustable to different scale airports. Several questions or scales, or even blocks of scales are removed if there is no specific service offered. For studying a smaller airport, one will simply use a shorter version of the same survey/scales that is prepared for the major transportation hub.

### **Conclusions**

By the year 2025, the number of served flights globally will double, but the number of airports not. In the context of the demand for the better customer service, monitoring performance may become crucial for survival or development of the business. Key Performance Indicators (KPIs) allow gathering knowledge and exploring the best way to achieve organizational goals. KPI are the core of the performance measurement. Inclusion of indicators reflecting on the quality of customer service is inevitable. For instance, the indicators may help to better understand a situation, when Tallinn International Airport has received “The Best Airport” award in its category in 2015. With indicating much lower on quantitative measures, it has outperformed many on qualitative scales. The authors are on the way to propose an approach to the customer service quantification in aviation industry. Further research is to follow.

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# Assessment of State Support for Marketing in Foreign Markets: Case of Latvia

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## Abstract

This study assesses the implementation of state supported marketing in foreign markets. Latvian experts from different export sectors such as timber, ICT, textile, design, medicine, tourism, education etc. were interviewed within the framework of a qualitative research. The research summarises the opinions of experts on the weaknesses in the state support programme for marketing at the macro and the enterprise level. On the whole experts positively assessed the current state support for marketing for attracting foreign markets. The main weak points are that the majority of support is oriented towards supporting enterprise's marketing activities and there is a lack of support for marketing at the macro level. The range of marketing tools used is limited as well and only oriented towards finding cooperation partners and promotion. It is necessary to review the range of support mechanisms with respect to the specifics of the various sectors including innovative and effective tools.

*Keywords:* export, marketing international marketing, competitiveness.

## Introduction

Focus on export at the national level is considered to be significant. Although academics and practitioners have extensively discussed the significance of macro and micro level marketing in promoting exports there are still some discussions on how big a role marketing plays, what are the most effective tools and what is the significance of state support in implementing such activities.

It is practically impossible to clearly assess and compare the marketing support for exports provided by various nations as the added value of the export product, the export volumes and the minimum requirements for receiving support differ. Analysing the support programme for exports marketing available in Latvia the authors conclude that enterprises have access to a wide range of activities. However whether the state takes into account the different needs of the various sectors and the wishes of the entrepreneurs in providing support for export marketing activities is a topical question. The present study was carried out to answer the question and assess the state support for marketing in the various export sectors.

## Literature review

A lot of impact factors enhancing and hindering exports in various economic sectors have been reviewed in scientific literature. The first research works were carried out in the 1980's and several assumptions correspond to practice even nowadays. Genturk and Kotabe (2001) pointed out state support as one of the export success factors. Barne et al. (2006) stated that the nation's marketing policy, enterprise's specific factors and external environment factors significantly impact the conquering of foreign markets. On the other hand growth in exports is limited by insufficient or lack of support for export in overcoming the difficulties caused by inefficient export promotion programmes (Kasikeas and Morgan, 1994). Leonidou (2004) altogether identified 39 internal and external export barriers and has highlighted seven – information, functional, marketing, procedural, government, objectives, environmental – barriers as the most problematic ones.

The main aim of the export promotion programme is to raise the export capacity of enterprises by enhancing the enterprise's resources, opportunities, strategies and competitiveness (Diamantapoulus et al. 1993). The most commonly mentioned marketing tools for exports support are programmes for attracting distributors/intermediaries/cooperation partners, information on markets and market research, support for overcoming language and cultural barriers, product development and adaption (innovation), design (packing) and image building, attending exhibitions/trade fairs, journalist visits, visiting foreign markets, etc.

## Methodology of Research

The research is a single case study based on qualitative research. Semi-structured in depth interviews with 12 experts from different economy sectors representing exports sectors such as food, timber, textile, ICT, creative industries, education, medicine, tourism were used to gather primary data.

## Findings

The assessment of experts on state support for marketing in foreign markets differs but is on the whole positive. Experts also mention various weak points in the support programmes. There is a lack of state/sectoral export strategy at the macro level that does not allow planning activities in a coordinated manner and in the long term. The differing needs of the various sectors are also not taken into account. The fact that support is oriented towards supporting enterprises and not organisations representing the interests of the sector is also critically assessed. Among the weak points identified are: (1) only market visits are supported and other activities related to conquering export markets such as brand creation, creating and maintaining internet websites, market research, product development are not supported; (2) although the majority of export is generated by large enterprises, support is mainly available to small and medium sized enterprises; (3) giving priority to enterprises just starting such activities poses a threat that enterprises already successfully entering new export markets may not be able to continue doing so effectively (4) as the support is related to EU funding there is no guarantee of its continuity and due initiation. According to the experts insufficient support is being provided to the sectors at the macro level. There is a lack of sector lobbying in export markets at the state level, cooperation with/between ministries in promoting the sector and lack of communication of an unified national image.

Assessing the macro level support mechanisms experts point out the lack of activities aimed at national brand recognition and brand building as one of the main weaknesses.

However assessing support mechanisms for enterprises, the lack of support for enterprises in adapting their internet websites to foreign markets has been negatively evaluated especially taking into account the significance of e-environment in the distribution of goods and services. There is also no support for the use of sector specific marketing tools such as inclusion in electronic databases (design) and electronic e-catalogues (food). Another important support instrument that should be included in the state support programme as pointed out by experts is support for new product development – support in drafting project applications for attracting EU funding, support for organising and attending sectoral conferences and support for joint market research in the sectors.

## Conclusions

Macro and micro level marketing is a significant competitiveness factor for economic sectors and enterprises in foreign markets. There are several weaknesses in the state support. The majority of support is oriented towards marketing activities of individual enterprises and not at macro level marketing such as national brand recognition and brand building, and support is focused on small and medium sized enterprises. There is a limited range of support mechanisms and they that are mainly oriented towards finding business partners and promotion.

It is necessary to review the range of support mechanisms in the future including innovative, significant and effective instruments. However the effectiveness of current support mechanisms and the enterprise needs should be first identified taking into account the export experience of enterprises and their export volumes.

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## **SUBSECTION**

**“NATIONAL RESEARCH PROGRAM EKOSOC-LV:  
«THE DEVELOPMENT OF INNOVATION AND  
ENTREPRENEURSHIP IN LATVIA IN COMPLIANCE  
WITH THE SMART SPECIALIZATION STRATEGY»**

**&**

**«INVOLVEMENT OF THE SOCIETY IN SOCIAL  
INNOVATION FOR PROVIDING SUSTAINABLE  
DEVELOPMENT OF LATVIA» “**

# Latvian Consumers' Knowledge and Acceptance of Genetically Modified Organisms

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## Abstract

Genetically modified organisms or GMO are on research question also on aspects of inhabitants' knowledge about GMO and acceptance and willingness to consume them. Such consumers' attitudes were examined in many countries of the world – also wide in academic research. In the current paper there are analysed aspects of inhabitants if they would consume GMO, if several aspects of environment, economy and food value. In empirical part of the research the attitude of respondents was reflected by help of the survey. There are included results of 1396 respondent views. Main results indicate that consumers in Latvia have negative opinion and their opinion is more negative than in many other countries of the EU.

*Keywords:* acceptance, consumer, knowledge, genetically modified organisms, public survey.

## Introduction

The aim of the current research is to analyse Latvian inhabitants' willingness to use GMO. To reach stated aim it was analysed theoretical findings and conducted survey of inhabitants in Latvia to find views of the inhabitants by help of mechanical sampling.

## Theoretical Findings

Consumers' attitude towards genetically modified organisms (GMO) are on research agenda worldwide where many researchers of different fields examine consumers' objective and subjective knowledge on GMO (Brucks, 1985; Aleksejeva, 2014). Psychological and marketing aspects on the effect of knowledge types on consumers was made in research performed by Deon Klereck from South Africa and Jillian C.Sweeney from University of Western Australia on consumer – perceived risk and adoption of GM food (Klerck, Sweeney, 2007).

## Methodology of Research

The survey of Latvian inhabitants was conducted from September 2014 to June 2015, number of respondents 1396. The database of potential respondents was purchased from the telemarketing company. The telemarketing company was contracted to make phone calls to the respondents included in the sample. To guarantee random sampling, the mechanical sampling was applied – every twentieth respondent was approached by phone call and was invited to participate in the survey. For those respondents, who did not answer the questionnaire questions within two weeks, a reminder was made; total respondents who had not made the evaluations were called three times. After third unsuccessful trial it was approached next respondent from the reserve list. Daily it was monitored responses of the respondents. For deeper analyse of the attitude, knowledge of the respondents, for most of the questions evaluation scale 1 – 10 was used. The methods used for survey data analysis: descriptive statistic – indicators of central tendency or location (arithmetic mean, mode, median) and indicators of variability (range, standard deviation, standard error of mean); cross – tabulations; non-parametric statistical tests (Kruskal-Wallis test, Mann-Whitney test, Kolmogorov-Smirnov test).

## Findings/Results

The survey results showed that knowledge of Latvian inhabitants on GMO issues was moderate – average evaluations (arithmetic mean, mode and median) were around 5 points (in evaluation scale 1 – 10), the evaluations were quite heterogeneous (standard deviation). About 5,5% of the respondents gave evaluation 1 point, about 2.7% – 10 points. The main statistical indicators of evaluations on knowledge of GMO are presented in table 1.

**Table 1.** Main statistical indicators of Latvia's inhabitant's knowledge on GMO

Statistical indicators	Values of statistical indicators
Arithmetic Mean	4.99
Standard Error of Mean	0.061
Median	5
Mode	5
Standard Deviation	2.199
Variance	4.837
Range	9
Minimum	1
Maximum	10

Source: Author's calculations based on Inese Aleksejeva conducted inhabitants of Latvia survey in 2014 and 2015 (n=1396), evaluation scale 1 – 10, where 1 – no knowledge; 10 – excellent knowledge

On question if respondent would choose GM products in respect of several analysed aspects: if it would be support for development on national economy; if it would be support for poor countries where those products are produced; if it would have well recognised brand; if it would have higher food value; if it would stay fresh for longer time; if it would cost less than other products; if it could contain less remains of pesticides and if it would be more environment friendly main statistical indicators of responses in the survey are reflected in table 2.

**Table 2.** Main statistic indicators on evaluations to the question “Would you choose GM products if...”

	Mean	Standard Error of Mean	Median	Mode	Standard Deviation	Minimum	Maximum
It would be support for development of national economy	2.73	0.070	1	1	2.533	1	10
It would be support for poor countries where those products are produced	2.83	0.073	1	1	2.643	1	10
It would have well recognised brand	2.26	0.062	1	1	2.236	1	10
It would have higher food value	2.78	0.073	1	1	2.652	1	10
It would stay fresh for longer time	2.49	0.068	1	1	2.483	1	10
It would cost less than other products	2.72	0.072	1	1	2.622	1	10
It would contain less remains of pesticides	3.35	0.082	2	1	2.948	1	10
It would be more environment friendly	3.44	0.085	2	1	3.071	1	10

Source: Author's calculations based on Inese Aleksejeva conducted inhabitants of Latvia survey in 2014 and 2015 (n=1396), evaluation scale 1 – 10, where 1 – certainly do not choose; 10 – certainly choose

The results of the survey clearly indicated that there were no reasons to consume GM food for most of inhabitants in Latvia – it is characterised by main statistical indicators where the most chosen value was the lowest for all analysed options (mode), for most of the analysed options half of inhabitants gave the lowest possible evaluation (median) although the arithmetic means were between 2,26 and 3,44 and the whole scale of evaluations (1-10) was covered by the respondents. The higher average evaluation (3,44) but also biggest differences in evaluations of respondents were for statement that respondent would choose GM products if they would be more environment friendly. The overall opinions of the respondents towards GM products were very negative, more negative than in many other countries of the EU.

## Conclusions

The results of the survey clearly indicated that there were no reasons to consume GM food for most of inhabitants in Latvia – it was characterised by main statistical indicators.

The overall opinions of the respondents towards GM products were very negative, more negative than in many other countries of the EU.

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# Usage of Online Collaboration Tools for Building Up the Collaboration Skills

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## Abstract

Digital competences and online collaboration skills nowadays is a compulsory component of the education system, since these are the skills that are necessary for 21<sup>st</sup> century labour market coinciding the fact that the information and communication technology is an integral part of our everyday life. One of the ways to build up these skills is by means of the digitally skilled teachers who integrate online collaboration tools (OCT) in the learning process at schools by passing their knowledge over to their pupils – future participants of 21st century labour market. The aim of this research was to assess the outcomes of the teachers' training project Online4EDU by analysing the data of the project's surveys, participant's feedback and the training results.

*Keywords:* Digital skills, Labour market, Online collaboration tools, Teachers,

## Introduction

Digital competences and online collaboration skills nowadays is a compulsory component of the education system, since these are the skills that are necessary for 21<sup>st</sup> century labour market coinciding the fact that the information and communication technology (ICT) is an integral part of our everyday life. The communication and collaboration skills are also defined in the Framework for 21st Century Learning as one of the necessary proficiency that should be ensured by a learning process in the 21st century (Framework for 21st Century Learning, 2011).

The World Economic Forum in year 2014 raised the issue that skills taught at school should be relevant for the working world (Global Agenda Council on Employment, 2014).

There could be no better way how to prepare youth for labour market as at school. Thus, the digitally skilled teachers are the first step in educating young people to be ready for job and life-long education.

Taking all these considerations into account there was a pilot project Online4EDU carried out in Latvia, Germany, Estonia, and Lithuania from January till April, 2016. The objectives of the project were to support teachers in applying more digital media in everyday school life, to design and test blended learning concept that facilitates the usage of online collaboration tools for school teachers, and to extend the use of intergenerational learning and digital competences training (<http://www.online4edu.eu/>).

Thus the project dealt with the issue that teachers not only need to have digital skills and skills for using ICT in communication and collaboration, but also that they need to be educated in applying them in their lessons by enriching the teaching and learning and by passing their knowledge forward to pupils.

It coincides with the results of J. Swaak and T. de Jong (Swaak, Jong, 2001) research, that states that the best possible results of learning are achieved if learning involves three types of getting knowledge – individual learning, learning by collaboration, and learning in a real world environment.

The process of acquiring skills and knowledge can also be facilitated by providing the real world cases and communication and collaboration for mutual learning, thus making the learning process more dynamic. (Steiner, Posch, 2005) The blended learning provides the conditions for ICT usage, and is a suitable way for integrating face-to-face experience into online learning (Garrison, Kanuka, 2004) and benefiting the mutual interaction between students and tutors (Donnelly, 2010).

This perception was used in organising the project's Online 4EDU training as a blended learning with face-to-face meetings and both individual and group works in Moodle environment.

The aim of the research was to assess the outcomes of the project by analysing the data of the project's Online4EDU surveys, participant's feedback and the training results. The scope of this research is 33 project's participants – teachers of various subjects at schools in Latvia.

## Methodology of Research

The participants of the project Online4EDU were asked to fill-in the pre-course survey that helped to understand the characteristics, experience, expectations and background of potential learners. The survey was carried out 1 month before the first face-to-face meeting. The pre-course survey showed that 50% of potential learners have previous experience with e-learning activities. Survey also indicated that almost half

of the participants have never used file sharing, social media, online calendars, and other tools for online collaboration.

After completing the pre-course survey, the participants were asked also to take the online test for assessing their knowledge about online collaboration tools (OCT). The questions were focused on 3 areas: general knowledge on OCT, mobile collaboration, and webinars. The results showed that the participants' knowledge was on very different levels – from very good (9% of the teachers) to only basic level knowledge (49%). The most correct answers were provided about the usage of mobile collaboration (78% of all answers); very similar situation was about the general knowledge about online collaboration tools” (73%), while only 60% of correct answers were received about the webinars. These results helped project's supervisors to group participants in mixed knowledge level groups.

After the training the participants were asked to evaluate the training process and usefulness by filling in the post-course survey.

### Findings/Results

According to the post-course survey, 79% of the participants gave the positive feedback that they would fully recommend this training for other people and that training support was appropriate. 86% of participants fully agreed that the acquired skills will be fully useful in their further work.

The teachers considered that the most useful knowledge gained during the project was about the file storage and collaboration. The most popular tool used for communication was Skype but there were also groups that used WhatsApp mobile application. Teachers learned and used Padlet walls and Popplet mind maps with great enthusiasm as well. Teachers also learned how to create presentations with Sway and used it for their project presentations at the final face-to-face meeting. The most challenging and complicated topic for teachers was the organisation of webinars since there were limited options for almost all of free of charge webinar software.

### Conclusions

Although information and communication technology (ICT) is widely used for the communication and collaboration in businesses, the teaching process at schools is still behind the meaningful usage of online collaboration and these tools are even regarded as suspicious. Thus pupils are not sufficiently prepared for their work life where OCT are used daily for professional reasons. This shortage is strongly linked with the lack of using OCT in the learning process and the lack of teachers' knowledge about the online communication and collaboration opportunities and benefits. The research showed that one of the solutions to this problem is teachers who are skilled to use and incorporate OCT in the teaching process. Educational institutions have to support the OCT training for teachers who build up the collaboration skills for pupils – future participants of 21<sup>st</sup> century labour market.

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# What Optional Choices Are Delegated to Pillar II Pension Plans Unit Holders in the Baltic States?

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## Abstract

The author analyses the options offered to the pillar II participants in three Baltic countries. Although there are many similarities in how mandatory funded pillar is designed, their participants have different variety of options: Estonian and Lithuanian legislation allows more risky investment strategies than Latvian one (4 investment strategies in Estonia and Lithuania vs 3 in Latvia); Estonia allows the participants to have their funds units in several pension plans simultaneously (in Latvia and Lithuania one has to keep all units in one pension plan); Estonia and Lithuania allow more frequent change of pension plan and offer more options at the pay-out stage; during the crisis years Estonia offered several options of contribution rates to participants; etc. In Latvia individuals have the narrowest space for making their own choices compared to the two neighbouring countries.

*Keywords:* public pensions, Baltic States, funded pensions.

## Introduction

Pension reforms in the second half of 1990s in Estonia, Latvia and Lithuania to a large extent were inspired by the World Bank path-breaking publication "Averting the Old Age Crisis" (The World Bank, 1994), that introduced the concept of multi-pillar pension system and actively propagated the substantial shift to privatisation of mandatory pensions. It was anticipated that this shift would bring along higher rate of return under individual accounts and better labour market incentives. Mandatory funded pillars (II pillars in the World Bank terminology) have been introduced in many countries, including Latvia (since 2001), Estonia (2002) and Lithuania (2004).

However, the scholars had warned that "individual funded accounts leave the individual facing most of the risk, in particular from differences in pension fund performance" (Barr, 2002:31) and that the majority of individuals are not fully aware of the risks, as they "can be myopic and/or imperfectly informed, giving a justification for compulsion" (Barr, 2006 ; 65).

The author analyses the options offered to the pillar II participants in three Baltic countries. These three countries are a very fruitful object for comparative analysis: they had practically identical starting conditions before starting modernising their pension systems in 1990s, and the overall design of their reformed old-age pension systems is structurally very similar (especially regarding the funded pillars), at the same time they have similar population structure in terms of age, education level and employment patterns. Mandatory pension funds are in operation for 12-15 years in the study countries.

## Methodology of Research

The method of the research - comparative analysis of national normative acts (laws and regulations) on mandatory II pillar pension schemes: the norms regulating participants' variety of choices within the given framework.

## Findings/Results

The pillar II pension schemes in Latvia, Estonia and Lithuania have more similarities than differences, all the more reason for inspecting those differences more closely. Although the very participation is mandatory for certain age groups in Latvia and Estonia it is anticipated that individuals would take their own responsibility and choose:

- investment strategy (conservative, balanced, active or aggressive – the latter not available in Latvia);
- pension plan manager and possibility to change the chosen manager for another (and how often this can be done);
- to keep all II pillar capital in one pension plan only or in more than one pension plan (in Estonia only);

- the ways of withdrawal the pension upon reaching the retirement age (lumpsum, down-payment, annuity, pillar I pension raise);
- at specific time points pillar II participants in Estonia and Lithuania also had an option to stop making contributions or to continue participation on a different conditions.

### **Conclusions**

Pillar II participants in Estonia have the widest range of options regarding their way of participation. Lithuanian normative rules on the variety of individual choices are quite close to Estonian regulation. Meanwhile, in Latvia individuals have the narrowest space for making their own choices compared to the two neighbouring countries.

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# Demographic Determinants of Creativity: the Analysis of Creative Potential Development and Forecast for the Baltic States

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## Abstract

Changes of modern economy determine the future leading role of the human capital, and especially its creative dimension in the development of modern, sustainable competitive advantages of countries and regions. The aim of this paper is to analyse and forecast the development of creative potential in Lithuania, Latvia and Estonia. Our methodology is based on the estimation of a regression model describing relations between Global Creativity Index (GCI) and its components with the available demographic data in 28 European Union Countries and Baltic States. Using the estimated model parameters, we elaborate a simple forecast for the three Baltic States using the current demographic projections.

*Keywords:* creativity, global competitiveness, human capital, demographic development.

## Introduction

Three Baltic States, which have at the same time become part of the EU in 2004, nowadays hold different positions in innovative development. According to the 2015 EU innovation scoreboard, positions of the Baltic States are still lower than the EU average. Mentioned tendencies in the field of innovative development and relatively high positions of the Baltic States in the human capital index, developed by the World Economic Forum, indicates existing problems connected with human capital stagnation, underinvestment in education and training, depopulation, population aging and other social and demographic problems. Considering the core role of the creative potential of the human capital in development of new competitive advantages and innovations, it is necessary to identify the links and relationships between the human capital, creative potential and demography. Using the mix of aforementioned factors is also possible to forecast the future economic landscape. Considering the information stated above, the aim of this paper is to analyse and forecast the development of the human capital creative dimension in Lithuania, Latvia and Estonia for the period until year 2050. In order to achieve the aim of the paper we have set the following tasks:

1. to analyse the theory and concepts of human capital creative dimension;
2. to analyse the impact of the demographic factors on the creative potential of the EU;
3. to forecast the creative potential development of the Baltic States until year 2050;

As the information sources for our research we use a wide range of scientific literature, EUROSTAT and Martin Prosperity Institute (Canada) statistical data.

## Methodology of Research

Our methodology is based on the estimation of a simple regression model describing relations between Global Creativity Index (GCI) and its components with the available demographic data in 28 European Union Countries. At first we estimate the model for the GCI itself:

$$GCI_i = \alpha + \beta_j X_{ij} + \beta_k Z_{ik} + \beta_c C_i + \varepsilon \quad (1),$$

where  $X_{ij}$  is a share of population in the specific age group  $j$  (groups of under 15, 15-24, 25-34, 34-44, 45-54, 55-64 and 65-75 years respectively) in country  $i$ ,  $Z_{ik}$  stands for the rate of education attainment to the level  $k$ , (secondary education, and tertiary education respectively, in accordance with the ISCED 2011 system in country  $i$  within the population aged between 15 and 64).  $C_i$  represents the total rate of population change in the country  $i$ .  $\beta_j$  and  $\beta_k$  denote the estimated regression parameters for the age group  $j$  and education attainment level  $k$ . Parameter  $\beta_c$  stands for the regression coefficient of the total rate of population change  $C$ . Then we proceed with the follow-up estimations for the global rank of each GCI component (Talent, Tolerance and Technology) in each particular country using the same model and independent variables. Using the model estimation results (particularly – the  $\beta$  coefficients of the various age groups) and relying upon the available population forecasts produced by Eurostat we transform the model (see Eq.1) in form of a complete equation, with the GCI index value or the respective rank of the country playing the role of an unknown variable. This way we produce the desired predicted value of the dependant variable.

## Findings/Results

Using the main estimation results for the models described in the previous sections we identify the impact of the demographic factors on the creative potential of the EU and build projections of the GCI levels and the change in global rankings of the GCI components for three Baltic countries in years 2013 and 2050.

**Table 1.** Forecast of the GCI and its component rankings of the Baltic States, based on the estimated parameters and Eurostat demographic projections (2030, 2050 main scenario)

Country	Year	GCI	Talent rank	Technology rank	Tolerance rank
Estonia	2015	0,625	16	33	87
	2030	<b>0,946</b>	↑22 (-6) <sup>1</sup>	↑50 (-17)	↑27 (60)
	2050	<b>0,727</b>	↓15 (21)	↑9 (-26)	↓73 (133)
Latvia	2015	0,563	22	54	77
	2030	<b>0,914</b>	↑29 (-7)	↑59 (-5)	↑15 (62)
	2050	<b>0,512</b>	↓44 (37)	0 (-5)	↓105 (167)
Lithuania	2015	0,49	12	65	105
	2030	<b>0,949</b>	↑36 (-22)	↑67 (-2)	↑42 (63)
	2050	<b>0,320</b>	↓75 (53)	↓4 (2)	↓153 (216)

When analysing the predictions made in Table 2, it is crucial to remember, that the presented scenario is only valid for the three Baltic countries under the conditions that all other countries participating in the ranking remain at their 2011 levels without change. Therefore, these results should only be addressed as an analytical tool showing the potential dynamics of the GCI and its components under the influence of the future population change.

## Conclusions

Model estimation results allow to assume, that by affecting the demographic development of the country or region, one may indirectly change various aspects of its creative potential and global competitiveness, which is crucial for the long-term economic and regional development planning. The forecast of GCI and its components development for the three Baltic States shows, that by 2030, all three countries are going to benefit from the cohort of “baby-boomers” (born in late 1980’s and 1990’s) reaching the “creative class” age group of “45-64”. However, by the year 2050, when the same cohort will move on into the “over 65” age group, the significant reduction in the creative potential is to be expected, with Talent remaining as the only high ranking component in all three countries. Until the year 2050 Latvia and Lithuania will face serious risk of returning to the 2015 levels of GCI, while Estonia might retain a higher creativity level owing to its higher Technology rank, all of the Baltic States will be characterized with extremely low level of Tolerance by that time.

## Acknowledgements

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# The Shortage of ICT Specialists as the Industry's Challenge

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## Abstract

Information and communication technology (ICT) sector can be described as a high value added industry, whose growth requires qualified workforce, well-developed infrastructure, public institution support, understanding of sectoral growth scenario and its challenges. One of the industry's essential challenges is a shortage of high-skilled ICT professionals in job market that can be considered as impediment of industry's further development. Without changes in the education process in primary and secondary schools as well as without changes in higher education of ICT specialists, ICT industry in Latvia will not have potentialities to ensure its further development, create the interests of global companies to come to here, and will not be able to facilitate the growth of other industries' productivity.

*Keywords:* Forecasting, ICT industry, ICT specialists

## Introduction

Technological progress is a driving force behind the economic growth, citizen engagement and creation of new jobs and workplaces. Information and communication technology (ICT) goods and services are important drivers of productivity, growth, and economic performance. ICT, in particular, is reshaping many aspects of the world's economies, governments, and societies. Computers and connectivity more and more have become means for leveraging the technology in business, public administration and society at large. Information and communication technology sector can be described as a high value added industry, whose growth requires qualified workforce, well-developed infrastructure, public institution support, understanding of sectoral growth scenario and its challenges. Innovations from the ICT sector contribute to changes and developments in other sectors and boost the growth of globalization.

One of the industry's essential challenges is a shortage of high-skilled ICT professionals in job market that can be considered as impediment of the industry's further development. The Europe Commission researchers estimate that by year 2020 there could be up to 825,000 unfilled vacancies for ICT professionals (European Commission, 2016). Moreover, there is a need for digital skills for nearly all jobs where digital technology complements existing tasks. In the near future 90% of jobs - in such careers as engineering, accountancy, nursing, medicine, art, architecture, and many more - will require digital skills (European Commission, 2016).

The digital readiness in Latvia is at a lower level than on average in EU. According to the Europe's Digital Progress Report (European Commission, 2016), the basic digital skills for people in Latvia in age group between 16 and 74 years is below EU average. Latvia has also one of the lowest share of ICT specialists in labor force (2% versus 3.7% in the EU) and number of science and technology graduates (13/1000 versus 18/1000 in the EU). All these characteristics can potentially hold back companies in Latvia regarding the digitalization of their businesses and public sector's modernization and public processes digitalization.

## Methodology of Research

In Latvia 17.9 thousand ICT specialists form 2.02% of all labor force in the country (Eurostat, 2014). This level is not only behind the average EU level, but also the number of ICT specialists is the lowest in the Baltic states: in Estonia there are 30 thousand ICT specialists, which form 4.9% from labor force; in Lithuania there are 26 thousand specialists forming only 1.9% of labor force. Such shortage of ICT specialists in Latvia will not only delay the further development of industry but also will not satisfactory provide demand for ICT specialists to other industries. In year 2015/2016 ICT specialists were taught in 67 different studies program in 17 higher education institutions in Latvia (Ministry of Education and Science, 2016). For the last years there has been increase of the number of students learning in IT programs. Since overall number of students decreases, the share of IT students from total number of students has almost doubled (from 3% in study year 2009/2010 to 5.9% in study year 2015/2016). It shows very favorable tendency for ICT industry, but there is a need to identify also necessary specialties.

The aim of the research is to model the possible development scenarios how to increase the number of ICT specialists in Latvia by means of education.

The model is built in several steps:

1. The modeling of the needed number of graduated ICT specialists in order to reach the predefined share of ICT specialists as the total number of labor force (analyzing two scenarios – reach average EU level 3,7% and catch up with leader countries reaching 5% level).
2. The analyses of the feasibility of the scenarios that were modeled in Step 1 by forecasting the capacity of the projected population.
3. Providing the recommendations and obstacles for fulfilment of the created scenarios.

### Findings/Results

In order to reach the average EU level of ICT specialists as a share of labor force (3,7%) in 10 years, the number of ICT specialists have to be reached up to 31.4 thousand by year 2026. In order to reach the 5% level in 10 years, the number of ICT specialists have to be reached up to 42.4 thousand by year 2026 (in that case the ICT specialists' graduation rate annually has to grow up to 25%). The higher education institutions need to increase the capacity that could be achieved only by significant state's support, for example by changing the content of education in primary and secondary schools, scaling up knowledges in science, technology, engineering and mathematics (STEM).

### Conclusions

The growth of the number of employees with ICT skills have not only positive influence to productivity of companies but also generate surplus to GDP (Hagsten E., Sabadash A., 2014). Furthermore, the sufficient number of skilled ICT specialists make the region more attractive to global companies who are interested in outsourcing of ICT services. The young people could be attracted to ICT industry because they are interested in digital technologies and there is every day involvement in the newest technologies. On the other side the attraction is high level of average salary in ICT sector – the average salary in ICT is 60% higher than on average in Latvia (CSB, 2015). Since there is a high demand in labour market for ICT specialists, the potential students can be sure that they will have job in future.

Education institutions have to be aware to increase their capacity to ensure the growing demand for ICT specialists. It could not be done without the significant state's support, for example by changing the content of education in primary and secondary schools, scaling up knowledges in STEM subjects. The other side of ICT industry's challenge is a lack of the sufficient number of young people to be thought in the specialty. As one of the solutions to ensure the forecasted number of graduated ICT specialists is to build up the higher education in such a way that attracts foreign students as potential specialists in Latvia.

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**SUBSECTION**

**“INNOVATION AND QUALITY TECHNOLOGIES“**

## Life Cycle Assessment of selected Rubber Product

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### Abstract

The introduction of regulatory measures in the field of chemical substances by means of REACH (abbr. for Registration, Evaluation and Authorisation of Chemicals) legislation has also influenced the rubber industry. This process brought many important changes, not only to the legislation itself, but also to the manufacturing sphere. The manufacturers had to change input materials for their production, sometimes even the whole manufacturing process, and, as a result, also the final product. Within the implemented research, the product life cycle is presented, which is influenced in particular stages by different types of regulation. The description of some regulatory measures is also part of this article. The impact of each particular regulatory measure's introduction and its influence on the final product price is presented in the experimental part of the research. The regulatory process is an integral part of many industrial branches and also influences the rubber industry. The manufacture of rubber products is subject to several regulatory measures. The first problem is that many substances or materials suitable for the rubber industry are not suitable for human health; some of them even have harmful effects on human health. Thus, it is necessary to reduce usage of such substances or materials to a minimum and replace them with more suitable materials. The other limitation of producers concerns air pollution, especially the emission of carbon dioxide. There is certain tolerance in the amount of these emissions: the producers are allowed to buy permission for higher carbon dioxide emissions than they were initially prescribed. This fact has, of course, some negative effects. First of all, it means higher expenses which can be reflected in higher final prices of products. That is why a change in the materials used is very often accepted – and, in some cases, even a change in the technology used – which has a great influence on the expenses. This was the topic of the experimental part of the research. One of the options is the change of the technology used with one of the input material suppliers and not with the final rubber product manufacturer. As a result, the expenses of final product were also influenced – the manufacturer must solve the problem of higher expenses and their influence on the final price. The increase of product prices concerns especially the tyres manufactured in the EU, where the price increase of imported tyres is in question.

*Keywords* - Costs, environment, Life Cycle Assessment, measures, product, regulatory, rubber, tires.

### Introduction

LCA, "Life Cycle Assessment" presents a new methodology, which has an informative character. It can be a life-cycle of a product, service or activity. LCA is only informative tool of environmental policy of the company. Using this method in practice is entirely voluntary. The main aim of the LCA is to assess how the use of materials and energy, the impact of the technology used on the environment and human health. Another goal of using this method is also introducing sustainable development. (Košinec 2014). Term life cycle includes all stages of life of the chosen product, activity or service, starting with the delivery of materials and energy for production through processing, distribution and ending with subsequent disposal of the resulting waste. (LCA. [Http://lca.cz/cs/domov/](http://lca.cz/cs/domov/) Accessed March 15, 2016) The aim of the LCA is in various stages of the life cycle to find bottlenecks negatively affecting the environment. Found impacts can then be identified and subsequently at least limit but preferably eliminate entirely. In using the method and other products it is then possible to find more suitable replacement for the original product, detrimental to the environment. LCA is an objective tool. LCA does not take into account the financial and social aspects of a problem. Another distinguishing feature of this method is dependent on the input data on their accuracy. If the data used inaccurate or incomplete, or LCA may not provide accurate results.

### Methodology of Research

When processing research, we used the following methods: analysis, synthesis, deduction, induction, comparison, observation and Life Cycle Assessment – LCA.

## Findings/Results

The present research was focused on the identification and description of the regulatory measures the EU chemical products. Description was made Life Cycle Assessment with the following interpretation of the agricultural tires. Furthermore, comparison was made with car tire and a detailed description of each step LCA.

## Conclusions

One of the manufacturer's possibilities for being competitive on the market is a lower product price. The company can, of course, increase the product price to retain the profit, but this can mean the risk of losing customers. The other option is to give up part of the company's profit and maintaining the previous price, while at the same time, keeping the customer. However, this option can mean lower efficiency of the production.

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# European Institutions on Social Media. Constructing Notion of the European Citizenship Among Youth in Latvia

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## Abstract

The study supports topical discussion about possibilities to use social media as a tool for citizen's involvement into democratic processes. In the research content of four European Parliament's social media accounts in Latvian is analysed during the period from July 1, 2015 to December 31, 2015. The conclusions give a strong notion on the frequency of European citizenship topics in the corresponding social media accounts, as well as on the amount of feedback and the share of youth involvement in this communication. Results of the study suggest that for now European Parliament's social media publications in Latvian have small potential to develop notion of the European Citizenship and there is a need for a well-considered use of social media to assure that opportunity of two-way communication is fruitfully used.

*Keywords:* European Parliament, social media, European citizenship, youth, democratic participation

## Introduction

Latvia is part of the European Union (EU) since 2004 but even nowadays there is lack of knowledge about EU issues and society have low interest about them in general. Youth is a part of society who can gain the most from EU, but also their knowledge about EU is quite poor as there is no separate subject in high school curriculum that is devoted to EU history and current issues. At the same time youth is active on social media and internet is widely available in Latvia, thus it might be the right place where EU institutions can reach youth and improve their knowledge and interest about EU.

The study analyses how the European Parliament (EP) is using social media, how much attention they are giving to youth and what amount of feedback they are receiving. The aim of the study is to identify the potential of information published on EP social media accounts to affect the shaping of the European citizenship notion among youth in Latvia. For the purpose of the study European citizenship is seen from three aspects: sense of belonging, rights of citizens and citizen's participation. Those three aspects were proposed by Richard Bellamy as pillars that altogether are making European citizenship (Bellamy, 2008) and study is following his suggestions on values that are connected to each of those aspects.

Study, conducted by the author, is the first time when such a method is used for analysing content that European institution has published on social media in Latvian language. Furthermore, the scope of the study is focusing on European citizenship issues and youth which both are not much covered topics in the context of European institutions and Latvia. Though, on the EU level there are several studies about institutions and social media, for example, in article about social media impact on democracy Lucia Vesnic-Alujevic defends a position that social media can be used to increase youth political participation (Vesnic-Alujevic, 2013). Demos think-tank has published a study on the use of Facebook and Twitter for political purposes with the conclusion that social media is an important arena for political activism (Bartlett, Bennett, Birnie, & Wibberley, 2013). In the recent study of parliaments and their communication on social media authors observed that use of social media by parliaments is still in its infancy (Leston-Bandeira & Bender, 2013), however, suggesting that there are signs for better situation in the future.

## Methodology of Research

In the study latest publications and literature is analysed to summarize the current academic views on the topics about European citizenship, democratic participation and use of social media. In the research social media content published by EP is analysed. For the purpose of the study, focus is only on those accounts where content is published in Latvian language. There are four such accounts: two on Twitter.com (twitter.com/EP\_Riga and twitter.com/Europarl\_LV), one on Facebook.com (Facebook.com/Eiroparlaments) and one on Latvian national social network Draugiem.lv (draugiem.lv/europarl). The period of the analysis is six months – from beginning of July 2015 until the end of December 2015. In this period 1348 entries were analysed: 261 from *Facebook1*; 206 from *Draugiem1*; 401 from *Twitter1*; and 480 from *Twitter2*. Social

media content is analysed according to more than 70 different indicators and sub-indicators which are divided into three large groups:

- 1) content indicators (use of visual materials; links to external materials; use of tagging);
- 2) message indicators (semantic indications on aspects of European citizenship - sense of belonging, rights of citizens and citizen`s participation; call for action; representation of topics about youth);
- 3) feedback indicators (liking and sharing; use of commentary section and its` content).

To assure that youth feedback is distinguishable, several criteria are developed that helps to recognize youth on social media and separate them from other social media users.

### Findings/Results

Collection of data is conducted in April and May 2016, thus data, representing the study period, gives results that were observable in that time. Collection of the data in any other period, for example, December 2015 or September 2016, might give slightly different results as social media are still developing, users can opt out at any time and the content might be changed or even deleted by its publishers. For data analysis *SPSS Statistics* is used, ensuring possibility to identify overall situation for each indicator and also giving the opportunity to represent correlation between different indicators, for example, which topics are generating more feedback or can tagging assure a larger reach of audience.

Results of the study suggest that EP is not successfully exploiting all the possibilities that social media can provide for communication with the society. On the *Twitter1* 50% of entries are without any visual material and they are receiving less feedback from social media users. From all 1348 entries in only 54 cases users are directly asked to give their feedback in the form of commentary. Furthermore, EP is not always responding to questions in the commentary sections, which is, in particular, the case with *Twitter2* account.

European Parliament is actively using tagging which theoretically can provide larger numbers of reached audience. However, the results of the study indicate that it is done chaotically and there is no correlation between the amount of tagged users and the feedback that entries are receiving.

In the study period, which is 6 months, more than 80% of entries are about EU institutions and their representatives. According to division of European citizenship aspects that are used in this study, those entries are counted as messages that might affect citizens` sense of belonging. The other two aspects, rights of citizens and citizens` participation, are rarely represented - four to six times less often, depending on the social media account. This disproportion and results of the study suggest that EP is publishing information that is topical at the moment but not much attention is given to use of social media as a source for educating citizens about EU issues in general.

### Conclusions

Although European Parliament provides a good example how institutions make themselves present in the digital age, content that was analysed suggest that EP is using social media mainly just as another one channel for top-down, one-way communication.

According to the results of the study, there is an unused potential for two-way communication and there is a need for production of content that for the followers might develop a better notion of the European citizenship. For now, European Parliament`s social media publications have small potential to reach youth and to construct their notion of the European Citizenship.

This study of European Parliament`s social media content provides an overview on a six-month period which is the minimal timeframe to develop the first conclusions on the effectiveness of social media use by institutions. Nevertheless, there is a need for similar long term study that could provide more information about the patterns of communication between citizens and institutions on the social media, thus giving material that can help to develop better communication strategies for the future.

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# The Analysis of Certification Process in the Field of Energy in Latvia

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## Abstract

Due to the fact that faulty operation of electrical equipment and construction or maintenance of low quality dangerous electrical equipment may cause serious risks, there is a need for professional qualification certificate stating the person's competence in the sphere. However, not always the certificate issued by a certification body confirms the person's compliance with the professional competence requirements laid down in the industry, whereas it protects the employee from the consequences that may result from incompetent professional performance. The study aims to analyse the certification process of energy constructors and evaluate the compliance of competence assessment and implementation of supervision of the constructors' independent practice with the requirements laid down in the sphere of energy in order to develop possible solutions for the improvement of the certification process of energy constructors.

*Keywords:* conformity assessment, certification, certification of persons, energy constructors.

## Introduction

The development of the energy sector is an essential precondition for sustainable growth of the national economy, therefore the national energy policy is directed not only to the promotion of competition and efficient use of energy resources, but also to increased security of power supply. Unfortunately, in practice, there are often cases when certificate holders working in their specialty are not being properly supervised and their professional skills are not improved in accordance with the assigned qualification level. Therefore, certification of energy constructors nowadays is becoming increasingly important because it is closely related to enhancing safety in the operation and maintenance of electrical installations, as well as minimizing workplace injuries and accidents. However, despite its important role in promoting security of power supply and ensuring quality of construction and maintenance of human life-threatening electrical installations, in Latvia the process of certification of energy constructors has been very little studied.

A great role in the certification of persons in the European Union and Latvia is attributed to the compliance of the service provided by the body operating certification of persons with the requirements of the international standard ISO/IEC 17024:2013 "Conformity Assessment. General Requirements for Bodies Operating Certification of Persons". However, several provisions of this standard are ignored in the laws and regulations in the sphere of energy construction. In order to assess opportunities of improving procedures for certification of persons in the future, especially in the field of energy construction that is related to potential risks to human health and life, it is necessary to identify the role of certification in ensuring compliance of construction specialists' professional competence with the requirements laid down in the industry. The study aims to analyse the certification process of energy constructors and evaluate the compliance of competence assessment and implementation of supervision of the constructors' independent practice with the requirements laid down in the sphere of energy in order to develop possible solutions for the improvement of the certification process of energy constructors.

## Methodology of Research

Several research methods, such as literature review, logical and comparative analysis of regulations, annual statistics of certified energy constructors and survey analysis are applied in this research.

## Findings/Results

A goal of certification is to persuade professionals, their employers, and their customers, that those who are certified exhibit high levels of job performance (Lengnick-Hall, 2012). Certification may also protect the public (organizations and employees) from unqualified practitioners who by incompetence or failure to adhere to professional standards may do harm and helps maintenance services become more professional and competitive and provide better quality (Farinha *et al.*, 2013). The process of certification of

persons has an indirect impact on the educational process of the profession to be certified (Uhlir, 2013). Whereas certification of persons by itself does not guarantee a higher professional competence, thus a certificate of compliance with certain professional standards cannot be the decisive factor for the employee's professional performance assessment (Powell, 2014). But a person's professional performance is very much dependent on interaction of many components, i.e., on the way a person is able to apply their knowledge, skills, experience, values and personal character traits depending on the context of situation (Guerrero, 2012).

Upon summarizing the received survey data, the main requirements of construction specialists that received the highest rating and that are important for 50% - 65% of Latvian certified construction specialists are associated with the certification process itself, i.e., the availability of training materials, public availability of most current information and employee professionalism. Also, a large proportion of respondents indicated the need to improve the preparation of the applicants prior to certification by proposing to organize training and also to publish the exam topics and training materials. Thus certified construction specialists focus on the fact that during the certification process not all the necessary information is available to the applicant to prepare for the competence test, which shows that in Latvia the certification process cannot fully ensure the professional competence of persons to be certified with the requirements laid down in the particular industry.

### Conclusions

Certification of energy constructors is not only a way of confirming their professional competence, but also one of the most important qualification control mechanisms in the regulated sphere where the person has no rights to pursue their professional activities without an adequate proof of their competence. Certification also plays an important role in ensuring public and work safety in order to prevent circumstances in which untrained personnel's performance because of their professional incompetence or non-compliance to professional requirements may result in harm to the environment and public safety. Bodies operating certification of energy constructors should evaluate not only the knowledge of the persons to be certified and their professional experience in the particular sphere, but also their ability to apply the acquired knowledge and skills in situations related to their professional activities, i.e. their competence.

This is evidenced by the survey results, where certified construction specialists point out that in Latvia certification process cannot fully ensure the professional competence of persons to be certified with the requirements laid down in the particular industry.

Certification bodies should avoid a situation when certification is perceived solely as a control mechanism. Certification of energy constructors is a socially responsible and sustainable process that does not end with obtaining the certificate, but continues by putting forward a certified person's professional competence development.

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# Intellectual Capital Influence on Enterprise Performance

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## Abstract

The concept and nature of intellectual capital have been studied at large, but there is a lack of a common understanding of its role in the company's sustainable development along with the changing environment and situation in the world economy and in each separate country. This concept has been frequently studied and is still being studied in the context of changes in the company's financial performance or when trying to find out how intellectual capital affects the profit margins and the company's value. The impact of intellectual capital on the company's operations needs to be analysed widely – it can affect not only the financial, but also non-financial performance, which could be called a long-term financial performance. The aim of study is to determine intellectual capital influence on enterprise financial and non-financial performance.

*Keywords:* intellectual capital, enterprise, performance.

## Introduction

In order to preserve its position in the market, the company should ever seek new sources of competitive advantages. Today, intellectual capital is often mentioned as one of such sources, it is a unique resource for companies and can provide a certain competitive advantage. Intellectual capital has been acknowledged at the European Union level, which call for greater attention to the use of this resource in the operation of enterprises. However, in the business environment, this resource is associated with difficulties, which reduce the possibilities for its use, for example, copyright protection mechanisms, knowledge accumulation, problems in building storage and exchange systems, staff turnover, the lack of financial resources needed for the purchase of the required amount of intellectual capital, the problems of recording these resources in accounting etc. Despite the fact that the concept and nature of intellectual capital have been studied at large, there is a lack of a common understanding of its role in the company's sustainable development along with the changing environment and situation in the world economy and in each separate country. In the scientific literature, intellectual capital is interpreted in different ways: as a resource, as an intangible asset, or as knowledge. This concept has been frequently studied and is still being studied in the context of changes in the company's financial performance or when trying to find out how intellectual capital affects the profit margins and the company's value.

There are contradictory results about the intellectual capital influence on enterprise performance presented in scientific literature: some of them disclosures positive effect on enterprise performance (Komnencic *et al.*, 2012, Maditinos *et al.*, 2011, Tsang *et al.*, 2005, Zéghal *et al.*, 2010), but some – negative or neutral effect (Chan, 2009, Garanina, 2008, Puntilo, 2009). Some researchers (Tseng *et al.*, 2005, Huang *et al.*, 2005, Huang *et al.* 2008) distinguish synergy and multiplier effects between intellectual capital components. These effects change intellectual capital influence on enterprise results. For instance, if enterprise separately invests in technologies, there is no significant positive influence on enterprise performance. Enterprises have not optimal assets combination very often. There is no balanced structure of intellectual capital also. Because of these reasons the intellectual capital influence on enterprise results not positive (Naidenova, *et al.* 2011).

The aim of study is to determine intellectual capital influence on enterprise financial and non-financial performance.

## Methodology of Research

In the study, intellectual capital is analysed and studied in the context of value creation, and value is analysed from the perspective of creating shared value. In order to determine a return on investments, it is necessary to have one method which combines and uses the stakeholders' approach and the possibility to define and measure the financial and non-financial results. Here social return on investments – SROI can serve as a basis. In this case the ratio to be calculated can be called intellectual capital return on investments or ICROI.

The author proposes to use the following stakeholders: owners, employees, customers, partners and society.

## Findings/Results

The impact of intellectual capital on the company's operations needs to be analysed widely – it can affect not only the financial, but also non-financial performance, which could be called a long-term financial performance. Using intellectual capital gives rise to a greater positive impact and creates certain value. Every company has a specific amount of intellectual capital of a certain quality that could be insufficient to achieve the defined objective. In this case, it is necessary to ensure that there is enough intellectual capital by attracting additional intellectual capital or improving the existing one, in other words – make investments in intellectual capital. These investments are studied as an intellectual capital development tool, which can be used to create more intellectual capital, improve the quality of the existing capital and create value for all stakeholders involved in this process. Intellectual capital has a dual nature – on the one hand, it is an investment object, on the other hand, it is the result of investments. The company uses a variety of components or types of intellectual capital in its operations and depending on the situation intellectual capital may perform one or more roles at the same time, thus creating value for everyone who is directly or indirectly involved in the process.

The author has defined the possible results and indicators for each type of investments in accordance with the proposed classification of investments in intellectual capital in previous studies (Lentjushenkova *et al.*, 2014). It is important to note that for each result its own indicator should be used. If the company makes investments and there are several stakeholders, the indicator can be used once, i.e., if several results can be measured by a single indicator, then the results should be grouped or other indicators to measure results should be found.

## Conclusions

The proposed methodology enables enterprise to express the generated non-financial value in financial terms, and it takes into account not only the value it creates for the enterprise, but also for the stakeholders. Looking at some examples and calculating the potential return on investments in intellectual capital, we can see that the return exceeds the invested amount several times. Taking into account the result of the calculation before deciding to invest in intellectual capital could increase the amount of investments, if the company has the necessary financial resources and the motivation to make such investments.

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# Benefits of Management System Integration

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## Abstract

The content analysis of articles on integration of Management Systems is indicating that as a result of their implementation direct financial and commercial benefits are less frequently mentioned. More often are mentioned process improvement and HR related benefits. It is a challenge to identify financially measurable benefits of Integration of Management Systems.

*Keywords:* Integrated Management Systems, ISO 9001, ISO 14001, Management Systems Standards

## Introduction

The integrated management system (IMS) integrates key components of a business into one coherent system so as to enable more efficient achievement of its purpose and mission. In this paper authors identify, analyze and describe the concepts, frameworks, existing standards, as well as relevant methodologies used by different researchers for integration of management systems; and afterwards identify benefits of Management System integration by qualitative data analysis of selected literature in respective field.

## Methodology of Research

Digital online databases were used to identify current state of research on IMS: Web of Knowledge, Emerald In-sight, Scopus, Science Direct and social networking site for scientists and researchers ResearchGate. Key words used for search: "Management Systems", "Integration". Afterwards content analysis of articles about benefits from IMS integration were done using the abovementioned online databases, using key words: "Management Systems", "Integration", "benefits". The benefits were split into following categories:

- Financial – benefits related to cost saving, increases profitability or any other financially measurable components
- Process – benefits related to improvement in process, reduction of double efforts, increased efficiency, simplification of processes and management systems, etc.
- HR – benefits related organization and employees – increased motivation, knowledge, skills, employee
- Commercial – benefits related to increased competitiveness of company – better supplier and customer relationships, improved image, better compliance with regulations and laws

Texts were analysed and identified benefits assigned to specific categories.

## Findings/Results

Literature content analysis showed that the most frequently benefits are assigned to Process related improvements, followed by HR related benefits. Financial and Commercial benefits followed.

## Conclusions

There is considerable amount of publications regarding Integrated Management Systems, containing research on definition of IMS and integration process, strategies, methodologies and the level of integration; integration of audit systems, as well as publications, reflecting the benefits and difficulties of integration. Literature content analysis showed that most frequently mentioned benefits are related to internal improvements both in processes and human resources. Direct financial and commercial benefits were less frequently mentioned. That could indicate that it is more challenging to identify financially measurable benefits of Integration of Management Systems, comparing to more qualitative internal improvements.

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# Cloud solutions as a driver for the development in Small Business

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## Abstract

The aim of the study is to analyze current situation and challenges of the use of Information Communication Technology (ICT), particularly - Cloud solutions in Small business (SB) in general and in Latvia and propose recommendation for better use of ICT tools and solutions to enable faster growth of companies operating in SB segment. Extensive literature review and statistical data analyses are conducted to gain the data for preparation of the recommendation. The main conclusions of the study are that still many companies operating in SB sector in Latvia currently underestimate benefits of implementation of ICT tools and solutions. Latvia's ICT infrastructure is well developed and serves as a solid base for more efficient use of ICT solutions and tools to facilitate faster growth and competitiveness.

*Keywords:* ICT, R&D, innovation, growth, small business, cloud

## Introduction

World Economic Forum (WEF) recognizes ICT industry as important factor of economic growth globally (The Global Information Technology Report 2013, 2013). As well European Union (EU) emphasizes ICT industry's importance in EU planning documents - Europe 2020 Strategy (EUROPE 2020: A strategy for smart, sustainable and inclusive growth. , 2010). Majority of world's countries ICT is less than 10% of GDP but nevertheless 90% of public and private sectors are dependent on ICT services and products. ICT solutions' implementation at least triples annual productivity growth rate (Atkinson, 2015). Reliable ICT infrastructure is one of the key elements for successful development of ICT services and products, for attraction of foreign direct investments as well as for each country's economic growth in general. Cloud solutions are an affordable way for SB to benefit immediately from the latest technology trends and facilitate growth.

## Methodology of Research

The research is based on extensive literature review. Current situation is assessed based on statistical data provided by Central Statistical Bureau (CSB), Latvian Investment and Development Agency (LIDA). Global picture is gained by analyzing data from ICT related surveys, WEF data. An important source for assessing current challenges and development vision is Focus Group's interviews.

## Findings/Results

82% of Latvian companies admit that ICT solutions and services significantly increase business process efficiency by improving promotion of products and services; time saving, cost saving, leveraging new *know – how*; increasing security.

Latvia is ranked in the 27th place out of 144 countries regarding availability of latest technologies. In terms of mobile broadband subscriptions per 100 inhabitants Latvia occupies the 28th place out of 144 whereas as for international internet bandwidth kb/second per user Latvia is ranked in the 31st place out of 144 countries. Latvia has a solid platform for development of internet penetration and e-commerce that facilitates the business to customer (B2C) trade which is playing an important role in the development of SB.

Most used ICT solutions in Latvian companies are still quite primitive - Corporate email (90%), Accounting and financial management systems (81%), Data storage solutions (49%), Document management systems (38%), Remote work systems (31%), Cloud services for data storage (28%). (BiSMART, 2015) Unfortunately, despite the visible benefits that can be brought by advanced IT, companies in SB segment are not ready / able to invest to bring their IT to the next level thus increasing performance and competitiveness of the company. Cloud solutions are one of the most suitable ways for SB to start leverage benefits of ICT.

## Conclusions

1. Latvia`s ICT infrastructure is well developed to ensure implementation of various ICT tools and solutions to support business needs and enable faster growth of the businesses, including SB segment.
2. ICT is important growth enabler for SB segment providing access to e-commerce which is currently fastest growing trade option.

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# Innovation Vectors of Greening Economy in Third and Fourth Industrial Revolutions

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## Abstract

The abstract analyses providing elements for forming green economy as well as presents the role of the Third and Fourth Industrial Revolutions in this process. It reflects the socio-economic transformations targeted at the formation of decentralized renewable energy production. It also focuses on economic system transformation for sustainable development, which occur through dematerialization of energy and material usage and flows, greening the economy and as a result reduction of human footprint in conditions of Third and Fourth Industrial Revolutions.

*Keywords:* green economy, eco-efficiency, ecological footprint, third industrial revolution, fourth industrial revolution.

## Introduction

At large scale sustainable development (SD) includes the following three elements – each of which belongs to the class of open stationary systems: a man as a biological organism; ecosystem and biosphere in general; social-economic system. A principal goal of SD is applied at two levels: 1) necessary level, also known as subsistence level, which means physical survival of a biological human being; 2) sufficient level, which means spiritual development of a social human being. Both levels are extremely important.

## Methodology of Research

Social-economic system is the only element that can and must transform rapidly. It is necessary because of: satisfaction of social needs of a human being that change very quickly or in other words they progress; second, because of improvement of the social-economic system itself. Mainstream of an economic system transformation for SD is dematerialization of energy and material usage and flows. It might be called greening economy. Providing elements for forming green economy are: (1) sustainable style of life with the priority of information goods consumption; (2) diversification of green energy sources (solar, wind, geothermal, biogas, hydro); (3) deconcentration of energy sources (hundreds millions power units instead of hundreds ones) integrated in one EnerNet; (4) forming unified solidary economy on the European space.

Two approaches, conservative and that of positive changes constitute a methodological basis of a modern economic mechanism to achieve sustainable development. Conservative approach is based on the use of negative feedback mechanisms. With their help mankind resists any changes that can threaten ecosystem's sustainability. Positive changes approach is associated with incentives to stimulate changes on condition that they help reduce destructive pressure on the environment. Such approach is based on the use of positive feedback mechanisms.

## Findings/Results

To be sustainable organizations must embrace new objectives: optimize operations to minimize environmental impact and improve social outcomes in a manner that also maximizes performance. The key factors that relate economic transformation with sustainable development are innovations. Innovations create the prerequisites for the decrease in demand of a resource or for the substitution of one resource by another, which is more effective from an economic or from an ecological point of view. In this context, economy can increase along a number of pathways: 1). Increase in the efficiency of production or consumption without the substitution of key resources. 2). Substitution of less effective resources by more effective ones. 3). Less effective resources are substituted by more effective in social demand.

By green economy, we understand a phase transition to new energy; new communications; new settlements; new economic relations; a new lifestyle; new needs; and a new man. Green economy include sectors and types of activities, which help to reduce the load of production and consumption processes (goods and services) on the environment and the biological nature of man, as well as create conditions for personal difference human development.

The Third Industrial Revolution creates three crucial important things for greening economy and forming preconditions of the Fourth Industrial Revolution: cheap energy sources; digit as the mean of universal fixing and sending any forms of information; Internet as the mean of global communication; "cloud" phenomenon as the global memory system The Fourth Industrial Revolution ("Industry 4.0") introduces cyber physical systems in production processes. It is foreseen that cyber physical systems will be combined into a single network with the formation of special local "eco-systems" serving for maintenance of a certain house, company or city.

The Third and Fourth Industrial Revolutions facilitate in achieving sustainable development. We can expect two key transformations in socio-economic activity. First, we can speak about: 1. Changes in consumption: transition from creation and production of separate products and services to the formation of systemic complexes for creating comfortable conditions for human biological needs, development of social needs and the realization of human creativity. 2. Changes in production: transition from "torn" production cycles to the formation of nature friendly labor, production and consumption organized according to closed cycles.

Based on the analysis of publications (Schwab K. , 2016) (Nazarov, 2016), the authors formulated the most important functions of cyber physical systems carried out without any human participation: information exchange (a kind of a "dialogue") in real time; control of external and internal parameters; self-activation and stop under certain information signals; self-tuning for optimal operating conditions; forecasted (anticipatory, preventive) systems self-service; interaction with produced goods (production systems case); adaptation to the new needs of consumers; definition of the needed equipment to produce the required products or meet new demands; self-learning of new work methods.

## Conclusions

Greening economy foresees forming the following sustainable sectors: power engineering (green energy sector); dwelling; infrastructure; settlements; construction; food production; transport; consumption. Sustainable economy is grounded on two key elements: renewable natural resources and constant reduction of energy, materials, water, and land input per unit of production

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## Pārvaldība, menedžments, vadība vai kontrole

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### Kopsavilkums

Studenti un doktoranti savos darbos latviešu valodā bieži kvalitātes terminus - pārvaldība, menedžments un kontrole lieto kā sinonīmus, kaut arī katram no tiem ir sava nozīme. Autori šajā rakstā cenšas skaidrot katra termina nozīmi latviešu valodā.

*Atslēgas vārdi: pārvaldība, menedžments, vadība, kontrole*

### Ievads

ES direktīvu un regulu (noteikumu) tulkojumos latviešu valodā, kā arī Latvijas Republikas likumdošanas aktos un nacionālos standartos augstāk minēti termini tiek tulkoti kā sinonīmi, kas tālāk automātiski tiek pārnesti uz bakalauru un maģistra darbiem.

### Pētījuma objekts

Pēc autoru domām lielu ietekmi uz augstāk minēto terminu ieviešanu latviešu valodā atstāja LVS EN ISO 9001:2001 standarta "Kvalitātes vadības sistēmas. Prasības", kad angļu valodas termins *management* tiek tulkots latviešu valodā, kā *vadība*.

Tajā pašā standartā termins *kontrole* arī tiek tulkots, kā *vadība*, piemēram, standarta sadaļā 4.2.3. *Control of documents* latviešu valodā tiek tulkots kā *Dokumentu vadība*. Savukārt standarta punktā 5 termins *Resource management* tiek tulkots, kā *Pārvaldības atbildība*.

Tādējādi vienā un tajā pašā standartā termins *management* tiek tulkots gan kā *vadība* gan *pārvaldība*. Termins *control* arī tiek tulkots kā *vadība*. LVS EN ISO 9001:2008 standarta nosaukumā "Kvalitātes pārvaldības sistēmas. Prasības" termins *vadība* ir nomainīts ar terminu *pārvaldība*.

Savukārt daudzos MK noteikumos un citos reglamentētos dokumentos termins *control* tiek tulkots kā *kontrole*, bet termins *management* tiek tulkots kā *menedžments*.

Tādējādi, atrodoties šādā terminu skaidrojumu daudzveidībā, daudzi autori uzskata, ka termini *pārvaldība*, *menedžments*, *vadība* un *kontrole* ir sinonīmi.

Pētījumu objekts ir šo terminu skaidrojumi latviešu valodā pamatojoties uz Deminga apla koncepciju, Dž. Džurāna atziņām par kvalitātes kontroli un N. Vīnera – par vadības procesiem, kā arī F. Teilora domām par menedžmenta teoriju.

### Secinājumi

Termini pārvaldība, menedžments, vadība un kontrole nav sinonīmi. Autori iesaka tekstā izvēlēties konkrētus terminus atbilstošus teksta jēgai.

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# The Role of Injury Data in the Non-food Product Market Surveillance

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## Abstract

This document presents abstract of research paper aimed to analyse the role of injury data in the non-food product market surveillance. The research paper is developed on the basis of analysis currently existing best market surveillance techniques among European Union member states, with the focus on the priority setting process. The conclusions are made through the prism of globalization and limited resource availability.

*Keywords:* SCEE`2016, market surveillance, injury data,

## Introduction

As defined in the Regulation No 765/2008 Market surveillance are the activities carried out and measures taken by public authorities to ensure that products comply with the requirements set out in the relevant Community harmonisation legislation and do not endanger health, safety or any other aspects of public interest protection. The market surveillance practices among European Union Member States and worldwide are different. The market surveillance of non-food products in the European Union is the responsibility of each Member States. This approach leads to a significant variation in execution, legislative framework differences and supporting material availability. The nature of the internal market within European Union makes it critical to adopt a coordinated proactive approach to market surveillance among Member States. The aim of this research is to analyse currently existing best market surveillance techniques among European Union member states, with the focus on the priority setting process.

## Methodology of Research

The research mainly employed qualitative research methods: analysis of regulations and binding documents, logical constructive analysis and comparison, interviews with experts.

## Findings/Results

The environment of an open market and free circulation of goods that exists within European Union requires improved coordination for an effective market surveillance approach, including common priorities, shared data and resources. The Regulation No 765/2007 establishes an overall framework of rules and principles in relation to market surveillance within European Union. The analysis and the assessment of existing market surveillance activities in various sectors show the place for significant improvements. In the framework of globalization and limited resource availability there is a need for an effective model to improve efficiency of market surveillance approach. It is concluded that the risk based approach in a decision making process offers many advantages to the involved parties. ([Koutsoumanis & Aspidou, 2016](#)). The existing operational context of limited resources and significant amount of surveillance subjects, the strategic choice of resource allocation to reach maximum results is the main issue for the authorities. There is number of systems currently available, such as the Rapid Alert System for non-food dangerous products (RAPEX), ICSMS that provides information on non-compliance that tracks dangerous products found by Member States market surveillance authorities on the market. This information also is used for priority setting by market surveillance authority. The analysis of the data showed the link between the resource availability, checked requirements and findings. The data used to set the priorities for the Market Surveillance authorities plays a very significant role. Multiple authors have stressed the important role the injury data plays in making market surveillance more effective (Organisation for Economic Co-operation and Development, 2010; Product Safety Forum of Europe, 2013; European Association for Injury Prevention and Safety Promotion, 2013). The analysis of accidents in the transportation area shows a good example on how the results of the accident investigation can be used by various levels of decision making that varies from a company where an accident happened to the authority level. ([Hovden, Størseth, & Tinmannsvik, 2010](#)). [The data that is currently available in The European Injury Data Base, produced on a voluntary basis by Member](#)

[States, is analyzed in the process of the priory settings.](#) The research shows that availability of accurate data on injuries caused by a product plays a significant role in this process.

### Conclusions

The author concludes that in the framework of globalization and coordination of limited resource the proactive market surveillance plays a significant role to reduce the risks caused by dangerous products. The risk based approach to the market surveillance is used in various stages of surveillance process such as priority setting and corrective actions. The use of a risk based approach for the decision making process offers many advantages to the involved parties. The key element in this process is the availability of complete and accurate data. The author concluded that the injury data provides significant information and highlights existing safety problems on the market within a specific product group. The research shows that availability of accurate data about injuries caused by a product plays a significant role in this process.

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# Modern Trends in Business Education

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## Abstract

This document presents extended abstract of a research paper aimed to overview modern trends in business education. The research paper is developed on the basis of scientific publications review, using logical and comparative analysis methods. Essence of the work is to analyze the latest trends influencing business education development and management, as well as to summarize the findings and define set of factors affecting higher education institutions (HEI) development.

*Keywords:* business education, higher education institution (HEI), curriculum, massive open online courses (MOOC), competency-oriented education.

## Introduction

Business education is directly connected to business and society as the entities have strong influence on higher education institutions (HEI) perspectives in their curricula development; hence interconnection and mutual impact of these bodies generates new directions for business education development. Aim of the research is to analyze and evaluate latest trends and factors in the global external environment influencing business education development and management.

Changes in local market demand as well as specific turns that might be significant for a country or a number of them are excluded from the research, the author is interested in general results, hence this might be defined as a limitation of the study.

## Methodology of Research

The research was conducted on the basis of scientific publications review, using logical and comparative analysis methods.

## Literature review

Business education reflects the major changes in external environment as it is expected that future business leaders that are trained in higher schools would be capable to respond to the challenges in the environment.

For example, one of the issues is unemployment and to address the problem HEI has to consider employability of the post-graduates. Researchers (Plewa, Galan-Muros, & Davey, 2015) agree that collaboration between business, HEIs, and students improve design of universities program and has positive effect on human capital development as assists in shaping entrepreneurial behaviour and students perception of educational experience.

Globalization and internalization of modern world is another aspect that affects business education in many countries of Europe, US, and Australia. As proportion of foreign students in campus increased steadily and gradually within the last decades, it is required to manage students' diversity to tackle the gap between local and culturally and linguistically diverse international (CLDI) students (Zhang, Xia, Fan, & Zhu, 2016).

As one of the driving forces for the changes mentioned above, technological innovations and the Internet change methods of business education delivery. Massive open online courses made online MBA programs affordable and more popular than campus-based (Clark, 2014). Use of IT in business education is heavily dependant on student learning style, design of the courses, and institutional environment (Whitaker, Randolph New, & Duane Ireland, 2016).

Corporate bankruptcy scandals within last 15 years let many researchers to criticize moral and ethical aspects of business education (Bennis & O'Toole, 2005; Colby, Ehrlich, Sullivan, & Dolle, 2011; Datar, Garvin, & Cullen, 2010; Li, 2010), hence many researchers reveals importance of addressing ethical issues in business education (Remišova, Lašakova, & Bučiova, 2014; Mabey, Egri, & Parry, 2015) and even revealed new directions in leadership pedagogy (Collinson & Tourish, 2015) to increase role of higher school in society. Therefore the key movements and events in external environment enable business education development.

## Findings/Results

Gathering different research results the author collects the following set of factors affecting business education development in recent years:

1. HEIs collaboration with business and students for curriculum design.
2. Competency-oriented approach in curricula design mitigates smoothly the discrepancy between CLDI and domestic students.
3. Use of IT enables new faculty teaching mode and foster development in online education.
4. Critical leadership approach to teaching future business leaders calls many challenges in terms of the courses design and teaching methods.

## Conclusions

The author concludes that HEIs should follow the modern trends in business education development and act as a driving force of the process updating curricula in agreement with topical changes in external environment. While business, students, and society could take various roles in the process, HEIs should proceed proactively and incorporate the latest trends into the institutions' development strategy.

In accordance to aim of the paper, the author suggest HEIs faculty take into account the managerial implications that could arise from the research and align curricula design not just to current market demand needs, but the topical global changes in societies and technologies to hold leadership in human capital building and development. Due to bringing business principals in business schools, designing competency-based curricula, including online courses in educational programs, and keeping modification of other teaching methods, HEIs would refine not only future business school landscape, but also future of business and society.

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# Optimization Problems of Socio-Economic-Technological Systems

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## Abstract

The article is devoted to analysis of conceptual foundations of system approach application for tasks of socio & economic & technological system (SETS) management and optimization as the most complicated systems. The article is based on previous studies, where it was shown that modern high-tech systems are created by combining organizational and technological resources of different agents. We have applied the systems dynamics as a method of complex active systems studying that change over time. Unlike existing approaches we suggested the use of combined analysis of mechanisms of innovation and technological systems.

*Keywords:* high-tech, socio & economic & technological system, analysis, innovation.

## Introduction

Development strategy in high-tech sectors is aimed on providing the continuity and complementarity of complex of innovations flows and flows of wide range of necessary resources, which requires the study of problems of synthesis and analysis of innovation systems and innovation transformations dynamics.

## Methodology of Research

Any high-tech enterprise or project regardless of its size and nature of the production process can be considered as an object of economic activity, which consists of such two main systems: economic and technological system of production process and system of management (Hekkert, 2011). Based on analysis of Quintuple Helix concept (Krapyvny et al, 2015) high-tech industry we propose to consider as a socio & economic & technological system (SETS). The emergence of the social component is caused by both the social context of high-tech projects, and the need to manage of highly qualified professionals who are developing and implementing such complicated systems.

The necessity of using of system methodology in SETS research is based on the feasibility of this object study as a complex system that consists of list of individual elements, which have multiple internal and external relations. In the context of objectives of system analysis and optimization SETS we consider as mechanism of complex transformation of wide range of initial resources into the final results using the complex of tools based on humanity-established skills and knowledge, as well as adequate information, management system of necessary resources and sub-system of dissemination various economic, social, environmental and other results related to this system.

From the standpoint of classical cybernetics SETS management should be considered as a function-oriented (i) for maintenance its basic properties (set of properties, the loss of which entails the destruction of system or its potential loss) in the environmental conditions change and (ii) for implementation certain actions, ensuring the stability of its functioning and development to achieve some target.

## Findings/Results

SETS management according to the selected object of management should be analyzed in two aspects: the first deals with characteristic of self-organizing subsystem (social and economic components); second deals with the technical (or the technological) subsystem. To each of these subsystems two basic approaches are used: activity analyzing approach and process analyzing approach. Selection of specific approach depends upon the nature and complexity of object of management and focuses on the appropriate range of methods and approaches of analysis and decision-making (qualitative or quantitative). In management of high-tech, agents of which, as it was already mentioned above, are the most difficult type SETS, the first approach currently is dominant, and methodological spectrum share of qualitative methods of analysis and decision-making significantly exceeds the share of traditional quantity methods.

These methods as applied to SETS should be considered as part of evolutionary management we offer understood as a process of formation and implementation of such a purposeful influence on SETS as a result

of which the system turn to necessary (target) condition.

As part of management task SETS we offer to consider based on such components:

- 1) analysis of variety of purposes based on potential and resource capabilities;
- 2) analysis of processes of formation of internal environment of SETS;
- 3) data envelopment analysis SETS based on different external factors (impulses and requests).

As an example of system of SETS objectives regarding products (results), system optimization should implement such list of activities:

- justification of concept of creation of list of advanced high-tech subsystems;
- justification of technical performance requirements for properties of advanced models of systems;
- justification of a balanced structural and functional composition of system or some subsystem configuration;
- carrying out evaluation tests of model of structural and functional composition of systems for variety of conditions;
- technical and economic assessment of creation and use of sophisticated high-tech systems;
- training personnel for development and operation of complex high-tech system, especially interdisciplinary teams;
- creation of necessary set of additional supporting technologies.

In general SETS potential can be defined as the maximum possible amount of effect (external and internal) that the system can be accessed through the rational use of all available resources, provided by its technological package. Thus, we have the task of forming such a set of technologies that will provide a competitive cost structure of production with a stable reception of consumer properties.

We propose to calculate the indicator using Eq. 1:

$$P = \sum Ef + \sum (Ea * \alpha) - \sum Ca \quad (1)$$

$Ef$  – actual effect achieved from current technology package of SETS;  $Ea$  – additional economic benefit that an organization can receive from the resources available under the current technological packages, after the realization of all the unused reserves. This effect is generated by such directions: effect of synergy of interaction of SETS components; knowledge spillover, knowledge interpenetration and knowledge integration effects of SETS; technology transfer effects.  $\alpha$  – parameter that indicates the ability to identify and use of unused reserves;  $Ca$  – additional costs required for using of unused reserves of technology package.

The development of technological component of SETS, consisting of single technology systems, is possible through some impact on some of its elements. As such impact action in our studies we propose to consider innovative projects.

## Conclusions

The result of the analysis should be a clear idea of what technologies should receive further development and on which technologies additional financial, scientific, technical and other resources will be allocated. Thus the analysis of technological package is primarily aimed at identifying of most effective technologies which will form the base of technological strategy at different levels of SETS.

For the analysis SETS as an open system is useful to consider the methodology of Data Envelopment Analysis (DEA), which has the close relationship with the neoclassical economic theory, systems analysis and multi-criteria optimization. DEA allows to analyze multidimensional economic development space of SETS, to identify optimal ways of its development, to calculate the most important characteristics of various agents' behavior and simulate different situations.

Thus SETS analysis is complex scientific and methodological problem, solution of which will allow developing effective methods of assessment and finding the best direction of improving efficiency.

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# Would You Mention the Name Of Your Employer in One of Your Social Networks?

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## Abstract

This research investigates the question about the importance to mention the name of the employer to online and offline social networks. The exchange of information is an important part of social networks and social capital theory. Companies can use the networks of their employees to recruit new employees and to check habits and interests of possible new employees. To do that, the employee has to mention the name of the company in these social networks. The paper compares different real social networks used by family and friends and private and business social network sites (SNSs) as online social networks and compares the differences between men and woman. The research has been done with a survey with 238 respondents. The survey data are analyzed with main indicators of descriptive statistics, frequency, ANOVA and cross tables. The results of the research are that real social networks are more accepted than virtual social networks. The difference between the genders is confirmed.

*Keywords:* social networks, human resources management, social network sites, virtual profiles

## Introduction

Social networks are an important part of the society. Most of the society are members of a social network and use networks to exchange information and resources. The social network can be very useful to identify employment opportunities or to exchange employment relevant information (McDonald, Lin & Ao, 2009; Granovetter, 1995). Technical changes create new opportunities to exchange information and resources. Social networks influence our daily life and the membership in a social network can provide support e.g. to identify employment. This support can be used to be successful and explain the importance of social networks for individuals.

Individuals use their social networks to transfer information to other individuals. They are communicating information with the support of social networks. Social networks are different and they have different characters, opportunities, purposes and tasks (Sander, Sloka & Pauzuoliene 2015; Caers & Castelyns, 2010). The research investigates the difference between online and offline social networks by gender of the exchange of employment relevant information.

Companies use social networks to transfer and distribute information about innovations or products but that distributed information is controlled by the marketing department of the respective company. It has been found that the use of SNSs for human resource functions helps in building employer branding and is beneficial for attracting right talent for the firms (Collins, Stevens, 2002; Davison *et al.*, 2011). Employer branding represents a firm's efforts to promote, both within and outside the firm, a clear view of what makes it different and desirable as an employer (Backhaus, Tikoo, 2004). Many companies do not have explicit strategies for employer branding in SNSs. However, if companies expertly follow strategies for building and maintaining SNS presences, they could reach their target groups even more efficiently. (Brecht et al, 2011). The question would be if individuals would mention their employer in their social networks to create a benefit for the employer and would voluntarily be part of the employer branding.

## Methodology of Research

In the paper scientific publications review is used, as well as survey. Respondents were asked to note their attitude in the scale 1 – 6, where 1 - very important; 6 - very unimportant. As all respondents in the survey were from Germany the scale was created based on German school grading system. The survey data are analyzed with indicators of descriptive statistics, frequency, statistical hypothesis testing, ANOVA and cross tables.

## Findings/Results

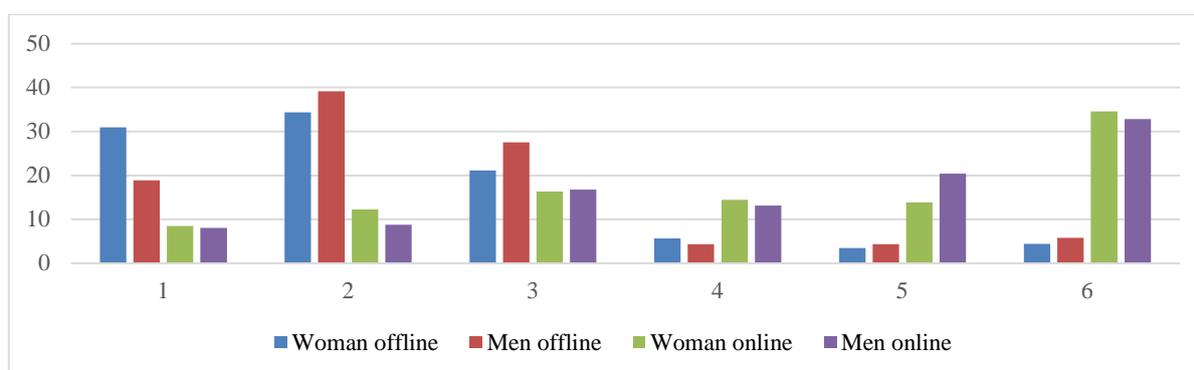
The paper concentrates on the exchange of the employer name in social networks. The research question is to investigate on which social network individuals exchange information about their employer and to identify differences between online and offline social networks. The use of SNSs depends on the gender (Sander, Sloka & Teh 2016). This current paper compares the differences between offline and online social networks under consideration of the gender. Main indicators of descriptive statistics are presented in Table 1.

**Table 1.** Main indicators of descriptive statistics on evaluations for question “ How important is it for you that other people are informed about your employment in the company you work?”, Evaluation scale 1 - 6 , where 1 - very important; 6 - very unimportant, source Tom Sander conducted survey in 2016, n = 238

	Family	Friends	Private SNS	Business SNS
Arithmetic mean	2,23	2,57	4,58	3,87
Median	2	2	5	4
Mode	1 and 2	2	6	6
Standard Deviation	1,328	1,304	1,543	1,731
Range	5	5	5	5

The motivation of individuals to mention their employer in social networks depends on the kind of the social network. Online social networks compared with real social networks provide the information that people do not use online social networks e.g. private or business SNSs to transfer or represent the name of their employer. It is not important to mention the employer in these networks. Private and business SNSs compared provide the clear result that the participants mainly avoid to use the private SNSs to represent their company. It is not important for them.

Men and women are different in the use of social networks. Women have the opinion that it is more important to use the offline networks to transfer and share with other people the employer names than men. The differences at SNSs are more homogeny but for men are less important to mention the name of the employer compared with women. That means women have for both kind of networks a higher tendency that it is more important to present the employer in online and offline social networks than men. This finding is in line with other studies, proving that women are more open to disclosure in online SNSs than men (Tufekci, 2008). The Figure 1 presents the results divided in online SNSs and real social networks for men and women. The online social networks are the business and private SNSs. The real networks are the family and friends. There exists a significant difference between men and woman. The largest gap between men and woman evaluations is on the first stage (or with evaluation 1 that means that is very important) for real networks with 12% points.



**Figure 1.** Distribution of evaluations of online and offline networks and gender for the question “How important is it for you that other people are informed about your employment in the company?”, Evaluation scale 1 - 6, where 1 - very important, 6 - very unimportant, n = 238, source Tom Sander performed survey in 2016

Companies need to evaluate the reasons why their employees use real networks to exchange the name of the employer but they do not use SNSs. The SNSs are a great tool with potential to motivate and to inform individuals about companies. The relationship can be used to transfer more information and the relationship to individuals can increase trust against other individuals. Human resources management needs new tools to inform potential candidates about their attractive offers to potential employees. The communication in social networks reduce the transaction costs, is counted as more trustful and faster. That means companies and their employees have many opportunities to use SNSs to be more successful for their recruiting process for excellent employees. SNSs are an interesting tool with functionalities and possible operations for the human resources management. Human resources management needs more information and research to use SNSs more effective and efficient to reach their objectives.

The assumptions are confirmed by the theoretical findings and survey results.

### Conclusions

There are differences between the gender, kind of network and purpose of the network for purposes of sharing information about the employment issues. That means any network is different and it is difficult to use all networks in the same way. Companies have to research the networks, creating a tailor made strategy for the network and have to take under consideration the objective – which individual should be reached. Social networks are too various and have to be explored to know if they are useful and successful for the company.

Further research is needed to explore the reasons not to use or to use SNSs to mention the employer name in these networks need more explanations that companies can use the membership of their employees to transfer a positive picture about the company and their products.

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# Smart Innovation: the Modernization Factor of Greening Economy

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## Abstract

The abstract analyses providing problems and prospects of greening economy as well as presents the role of smart innovations in modernization process. It presents the experience of implementation of the smart innovations for the sustainable development. It also focuses on problems of environmental costs and eco-destructive processes that compel the companies to generate a compromise management decisions and implement smart innovations that are able to reverse the traditional eco-destructive policy management.

*Keywords:* greening economics, modernization, smart, innovation, effect, sustainable development.

## Introduction

It is known today that sustainable development is the basis for the effective operation of socio-economic systems in the future due to the development of modern innovation. The objective necessity of the formation of the sustainability of socio-economic systems requires deep study and formation of mechanisms for effective management taking into account environmental factors. At the same time, evidence that the economy needs to grow on the green way is no one in doubt. Environmental costs and eco-destructive processes are forcing society to produce a compromise management decisions and implement those innovations that are able to reverse the traditional eco-destructive policy of management.

## Methodology of Research

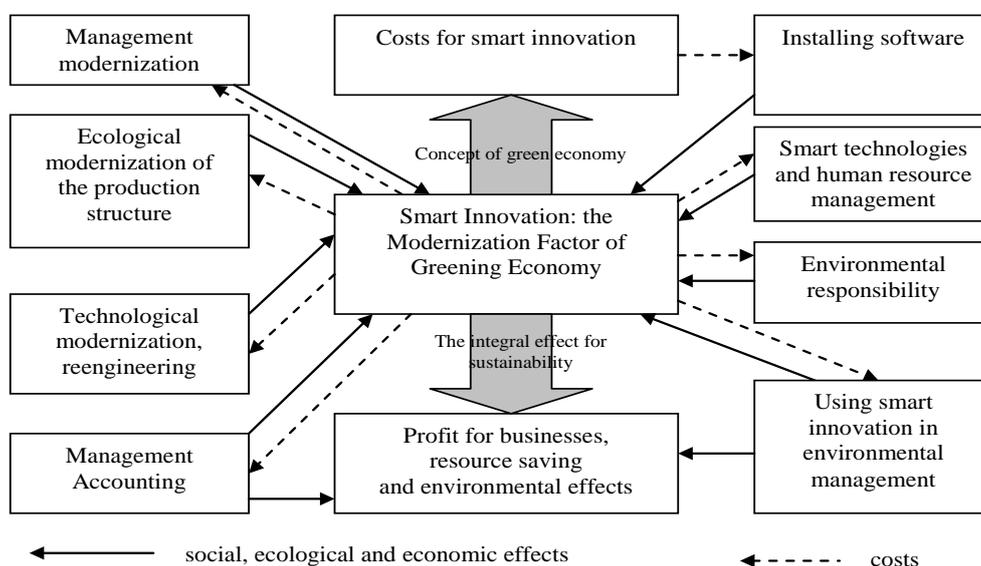
Mainstream of transformation of economic system for sustainable development, by prof. L. Melnyk is dematerialization of energy and material use. It is a basic precondition of greening economy. Based on the analysis of scientific literature it was found that to questions of modernization for sustainable development, resource saving process, greening economic systems is given enough attention that gets its further development in the field of study of the processes of dematerialization. Management of processes of dematerialization involves the formation of the main components of the controlled system, that is, those objects or subjects of the economic system, which is directed administrative influence, as well as the mechanisms by which it is carried out. Modern innovative trends stimulate the capabilities of traditional environmental management together with the use of smart technology and smart innovation. This requires the development of a system of efficient algorithms for management decision-making with regard to the requirements of the green economy. Using smart technology and smart innovations according to experts' promises to decrease the ecological and resource-capacity production.

## Results

In our opinion, "smart innovation for green economy" is a fundamentally new intellectual technology or processes of innovation, which have a qualitatively new features "intelligent" problem solution, comply with the requirements a modern level of development, based on the highly successful inventions using software complex and contribute to significant resource savings. Smart innovation for the green economy should include the following types of innovation: 1) Process innovations based on smart technologies, which mainly include the development and implementation of technologically new or significantly improved technological production methods. An example could be the implementation a robotic engineering and technology; 2) Technological innovation based on smart technologies – the development and application of new technologies in various industries and areas of human activity. An example could be the formation of pan-European system of energy-producing and consumption of "green energy» – EnerNet. EnerNet – information-energy active system enabling the gathering (from separate sources), transfer, storage, conversion and use of electrical energy in the most effective regime. 3) Organizational innovations on the basis of smart technologies, which are related with the process of reforming organizational structures, improving the organization of production and labor. An example could be the S.M.A.R.T.-method (Specific.Measurable.Attainable.Realistic.Timely) of goal setting which is to understand the directions of

activity of each organization in the detailed coverage during objective setting. The technology of smart goal setting needs to take into account the urgency of the problem, the way to achieve it, measurability and concreteness. 4) Administrative innovations based on smart technologies associated to the restructuring process of the management company. An example is the integrated resource management. For instance, "Intelligent Water" project involves the use of smart objects for the needs of the water industry combined with GIS and the use of "smart" sensors. 5) Information innovations is based on smart technologies that solve the problem of rational organization of information flows in resource saving economics.

These factors changes the nature of the economic activity, reduces information cycle and the timing of production, reducing the production of waste. The implementation and application smart innovation requires a fairly large amount of time and financial resources, however, carries with it significant social, ecological and economic effects. Smart innovations as a modernization factor of the green economy suggest decisions for the use of computer technology with the lowest environmental damage and the maximum positive effects to the environment by reducing specific energy consumption, providing a longer service life, possibilities recycling and safe disposal of devices and network components, as well as the transition to alternative energy sources for the activities data storage and processing centers. According to the forecast data application of smart solutions in sectors such as energy, construction, transport and trade will allow to save up to \$ 600 billion € and create 15 million of green jobs across the world by 2020. The process of implementation of innovative directions of development of socio-economic systems for a green economy based on the smart innovation is shown in the Fig. 1.



**Figure 1.** Costs and the effects of smart innovation implementation

## Conclusions

One of the main directions of formation of modern green economy is the implementation of smart innovations that allow today to develop economy without compromising the ability of future generations to meet their own needs. It will provoke a synergistic effect by reducing energy and resource consumption in all sectors by creating the conditions for the modernization of smart transport, energy and social infrastructure, optimization and automation of production/consumption cycles.

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**SUBSECTION**

**“POLICY AND STRATEGIES IN HIGHER EDUCATION  
AND SCIENCE”**

## EU Funding in Higher Education of Latvia

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### Abstract

It is well known that innovation and research is one of the top EU priorities and without doubt it goes hand in hand with the higher education systems among all EU countries. In the beginning of year 2014 the EU launched its latest seven year research programme “Horizon 2020” that unites all the funding for innovation and research in one integrated system. The estimated contribution in addition to the private and national public investment is determined to be 80 billion Euros.

Around 125,5 million Euros are allocated for higher education in Republic of Latvia, therefore, it leads to main objective of this research - to determine if European funding finances for Higher Education in Latvia are spent in an efficient way and define the level of contribution in future perspective.

Expected result of the research is to prove that in Republic of Latvia EU funding finances are mostly spent for constructions and machinery, increasing the value of tangible assets in Latvian universities, however, not leaving a remarkable impact on quality indicators, such as amount of contracted work, publications, private funding, revenue from tuition fees and other indicators.

In order to prove that, evolution of above mentioned indicators must be compared to evolution of EU funding in higher education of Latvia as well as yearly tangible asset changes for Latvian universities. Also correlation between Europe funding and value of tangible assets must be determined. As a result the capacity gap between the invested resources and outcome is calculated.

Used statistical data is publicly available and collected by Central Statistics Bureau of Latvia, Ministry of Education and Science of Latvia and Eurostat.

*Keywords:* EU funds, funding, higher education

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# Universities in Latvia – from the Soviet to European Higher Education Area

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## Abstract

The paper will describe the development of universities in Latvia from 1950's to nowadays. The higher education system experienced changes along with the political transformations of the country. Latvia was incorporated in the Soviet Union in 1940, regained its independence in 1991 and joined EU in 2004. Since 2012 Latvia is a fully fledged participant of the European Higher Education Area. The paper will describe the transformations of universities in Latvia from the perspective of a cultural learning theory and transfer of knowledge defined by Gita Steiner-Khamsi. It will provide the reference to an external education model, its modification and metamorphosis into a local educational model. Latvia as a small country and relatively new culture had found itself in the situation to learn from the cultural experiences of countries that have longer experience of democracy and had to overtake the ideas of the education systems from other countries and adopt them to the local needs.

*Keywords:* Higher education; Bologna declaration; educational borrowing; University; Latvia.

## Introduction

In 2018 the state of Latvia will celebrate its first one hundred years. In this relatively short period the country had experienced various political transformations, which affected the system of education in the country. In 1919, a year after the establishment of the Latvian statehood, the first national University of Latvia was founded. In 1940 Latvia was occupied by the Soviet Union, experienced the World War II and was reoccupied again, and this occupation lasted almost fifty years. During that time the University was functioning along with other higher education institutions (HEIs), providing tertiary education suitable for the Socialist system. In 1991 Latvia regained its independence and started to reform its education system in order to fit the European model of education.

The research of the development of university activities is important to find out higher education transformations in the conditions of the political power change because university as a research institution reflects vividly the democratization trends of higher education.

This paper aims at illustrating the development of the universities keeping in mind a complex political context. The task of the research is to find out how due to the political changes the university activities have transformed into a local model specifically corresponding to Latvia's situation. The higher education in Latvia had to adjust to the new political situation several times in a short period of time and therefore supposedly universities have taken over and adapted the higher education model of other countries in order to ensure the continuity of the functioning of the institutions.

## Methodology of Research

The concept *educational borrowing* that is offered for overcoming the normative paradigm in education research not only answers the questions about the essence of education reforms but also helps to explain the historical and contextual dimension of education the research of which is important for making out specific education transformations in different countries. (Fuchs, 2012)

Gita Steiner-Khamsi's theory that is used in this study combines in itself the historical and comparative approaches allowing the "lending and borrowing" phenomenon in education drawing analytically closer to the comparative research of global education processes. (Steiner-Khamsi, 2002).

Applying the above mentioned theory in this study the authors will find out *why* (historical context), *how* (implementation of educational processes) and *who* (agents) implements the transformation processes in the field of university activities in Latvia in the transition from the Soviet to the common European higher education area.

## Results

Referring to the educational borrowing theory it has to be concluded that during the Soviet period in Latvia initially in higher education there was the import of the ready external model based on Soviet ideology. (Steiner-Khamsi, 2002) Besides this import was implemented in a revolutionary way and not

evolutionary, i.e., in a violent and non-voluntary way. (Ozola, 2014) However, during the Soviet period in Latvia also the second phase – modification of certain higher education components according to the needs of the local education system was present. The generation of young local agents that implemented the Soviet principles of higher education had formed at the beginning of 1960s thus giving a possibility to develop the action model of Soviet universities with the necessary features to satisfy the local needs.

However, university activities in Latvia during the transition period from 1991 till 2004 correspond to the first two phases of the educational borrowing theory, externalization and re-contextualization: during the post-Soviet period initially there was a reference to the external model in which learning from the cultural experience of Europe took place both in a diachronous, i.e., historical and synchronous way – trying to return in the European intellectual space at an accelerated speed and trying to master the topicalities of European higher education area. The modification of the external model into the local model according to the needs of Latvia as a democratic country, i.e., starting to develop the science and higher education model corresponding to the modern demands, was also started during this time.

Since 2004 when Latvia became the member state of the European Union the third phase of the educational borrowing model, i.e., internationalization: it is possible to speak about the metamorphosis of scientific knowledge in the local model as a result of purposeful university activities in the democratization, internationalization, mobility and Europeanization process, has been initiated in the university activities in Latvia. That means that education reforms are incorporated, adapted and perceived as local. Educational policy ideas are borrowed, transformed and internalized into the local education policy and institutions. The ideas are transformed for local needs and the aims, functions and essence of local system of education.

## Conclusions

Looking back at the development of the university activities in Latvia since 1920s it has to be concluded that during the time period after 1991 in comparison with the paradigm transformations caused by the changes of the previous political powers higher education in Latvia evolutions as an independent social system in the context of common European higher education area.

Only one university functioned in the Soviet Latvia but after regaining the independence the number of universities increases and the number of disciplines offered in universities also expands. At present universities offer studies for state and private funding.

Today there are six state-founded universities in Latvia that have developed from higher education institutions established earlier. There is no university among the private HEIs in Latvia or founded during the last 25 years. It means that private higher education institutions cannot offer broad scope of disciplines, but offer only those study programs that are requires by the market mostly business and social sciences. The public universities, on the other hand, offer wide variety subjects, including engineering or sciences that are high cost studies.

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# Horizon 2020 and Risk of Increasing Heterogeneity of Research and Development in Europe

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Assessing the possible impact of the Horizon 2020 with respect to innovation in Europe and opportunities to meet goals of the corresponding chapters of the Europe 2020 strategy, one can expect unequal impact in individual Member States. In order to achieve its objectives (drive economic growth and create jobs) Horizon 2020 invests in excellent science without cohesive component. Based on current heterogeneous status of countries (EU15 and EU13) such approach increases the gap between these country groups. However, as shown by the example of Estonia, EU13 countries may perform on equal level with EU15.

*Keywords:* Horizon 2020, research and development, heterogeneity.

## Introduction

US has the largest national science and research system in the world, however Europe as a whole demonstrates higher performance in this area. Scientific Capabilities index values for Europe exceed the ones for North America since 2005. (Frietsch, Rammer, & Schubert, 2015). One of the driving forces for this advancement in Europe is the strong commitment towards development of knowledge and innovation based economy which is supported by relevant European policy initiatives. For example, the first of the three priorities laid down in Europe 2020 strategy (A strategy for smart, sustainable and inclusive growth) is Smart growth: developing an economy based on knowledge and innovation. This priority is linked to one of five mutually-related EU headline targets – 3% of the EU's GDP should be invested in R&D, with a particular focus on private investments in research and development (according to current Eurostat data: EU28 – 2.1%, US – 2.8%, Japan – 3.4%; two latter have higher level of private investments). The first of the seven flagship initiatives for achieving the priorities set for growth is Innovation Union with an aim of reorientation of research, development and innovation policies towards tackling our major societal challenges (from basic research to commercial use) as well as developing and enhancing the role of EU financial instruments in supporting the innovation (e.g. structural funds, rural development funds, R&D framework programmes, etc.) thus promoting knowledge partnerships by strengthening the links between education, business, research and innovation.

Major and efficient financial instruments implementing the Innovation Union policy are European Framework Programmes for research and development. Financing for this purpose is continuously increased with every successive Framework Programme reaching 80 billion Euro for Horizon 2020 programme. The current programme is focused on excellence: submitted proposals are assessed exclusively according to quality and impact without any consideration of geographical distribution of proposers. Such approach certainly contributes to higher levels of investment returns, but given the already high European heterogeneity it could reinforce further heterogeneity.

In order to analyse reasons for heterogeneity in Europe two indicators should be considered - both investments in research as well as use of these resources. R&D expenditure with respect to GDP varies in EU countries from above 3% (Finland, Sweden, Denmark) to below 1% (Poland, Slovakia, Greece, Malta, Bulgaria, Croatia, Latvia, Cyprus, Romania). Also the strategy of employing European funds considerably varies across the Europe: for example, in the Netherlands 24% of EU funds are dedicated to R&D, 10-15% for this goal are allocated in France, United Kingdom, Belgium, Sweden, Luxembourg, Finland, Denmark, Austria, Germany. Just few countries (Latvia, Greece, Portugal, Romania, Poland) invest less than 3%.

The analysis of R&D resource deployment (Frietsch, Rammer, & Schubert, 2015) shows that the highest patent publication and efficiencies are Germany and Switzerland, but considerably lower figures are for Eastern and Southern European countries (except Italy). Using the same level of inputs to generate patent output in Germany and Switzerland is ten times higher than, for example, in Portugal, Hungary, or Czech Republic.

The above said leads to large divergence in innovation based growth. According to the Innovation Union Scoreboard indicator, developed by the European Commission, the difference between top and bottom EU countries are three and four times (Veugelers & Cincera 2015).

## Methodology/Findings/Results

The study analysed publicly available statistics on Horizon 2020 and the research and development in Europe and in Latvia. Results on the implementation of the Horizon 2020 Work Programme 2014-2015 disclose large differences across EU countries. The outcome for Latvia is not encouraging: Latvia is among the last ones for EU financial contribution to participants (in absolute values, Euro) and is found among bottom six countries also for other indicators: financial contribution per capita, investments of GDP; partly satisfactory results could be considered related to financial contribution per researcher where Latvia finds herself just below median of the list. It should be noted that relatively weak results are for a number of Eastern European countries (Poland, Slovakia, Romania, Lithuania, Bulgaria, Croatia). Similar situation has been observed also for previous Framework Programme where Latvian share to FP7 budget was approximately two times larger than EU financial contribution to the project participants from Latvia. Other EU13 countries also failed to perform. For example, the 15 member states had received 34 times more research funding under the FP7 Health programme than the 12 newest members. That difference cannot be explained by the 3.8 times larger population of the EU-15 members, nor their 13.3 times greater combined GDP, nor even their 12.8 times greater contribution to the EU budget (Galsworthy & McKee, 2013).

Nevertheless, these data do not indicate hopeless situation for the EU13 countries. A severe correlation could be found between Horizon 2020 EU financial contribution per capita and GDP per capita ( $r=0.73$ ), percentage of GDP investments in R&D ( $r=0.36$ ), percentage of R&D from EU funds ( $r=0.58$ ). Since it is impossible to increase national GDP rapidly, for other positions having of political will devoted to enhancing these issues would be sufficient. One of such activities is raising the quality of tertiary education. Successful examples could be found with our northern neighbours – in Estonia 1.44% of GDP is devoted to R&D while in Latvia only 0.69%; in Estonia 6.5% of EU funds are assigned with R&D (in Latvia – 2.5%). QS World University Rankings from 2016 list only one higher education establishment from Latvia (University of Latvia – rank from 651 to 600), while for Estonia with smaller population there are two (University of Tartu – rank 347, Tallinn Institute of Technology – rank from 601 to 650).

## Conclusions

Horizon 2020 will likely increase the heterogeneity of research and innovation systems in EU. The main winners will be the countries with established research financing systems and higher innovation index (mainly EU15 countries), but much smaller gain is expected for EU13 countries. However, the Estonian example shows that combined efforts of politicians, scientists and science administrators can promote more successful participation in Horizon 2020 and increase the EU research funding accumulated by this country. In turn, it will contribute to the Europe 2020 strategy implementation.

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# Impact of Stakeholders Groups on Development of Regional Entrepreneurial Ecosystem

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## Abstract

This paper discusses the relationship between the entrepreneurial ecosystem and stakeholders groups involved in sustainable development of regions. Findings from empirical research of Latvian regions brought researchers towards improvement of entrepreneurial ecosystem model. This paper develops an ecosystem model that assists in planning and designing of regional sustainable development. Findings from empirical research might help to identify additional contribution of stakeholders groups for sustainable development of regional entrepreneurial ecosystem. Paper is aimed to improve understanding of the entrepreneurial ecosystem structure and suggesting ways for individual companies to flourish the components of entrepreneurial ecosystem. By summarizing the research results, the impact of stakeholders groups involved in the sustainable development of regional entrepreneurial ecosystem is explained.

*Keywords:* stakeholders, regional development, ecosystem.

## Introduction

Ecosystem principles are broadly discussed in the scientific literature. Ecosystem concept has been analysed from a lot of fields and perspectives. Entrepreneurial ecosystem is a dynamic economic model that can be used for strategic planning process, providing the framework for mutual relationships among the stakeholders involved in it, and for defining the customer needs, which in the future can ensure increase in the value proposition.

In his research Moore (1996) believes a biological ecosystem to comprise all elements, which cooperate with each other, while an entrepreneurial ecosystem comprises all stakeholders related to it. Therefore, the following questions represent our specific interests in this study: What are the important determinants of regional entrepreneurial ecosystem from the perspective of the stakeholders groups?

At the regional level, factors associated with regional variation in new company formation at a regional level have been explored through studies of structural differences in geographical, industrial, and organizational variables ((Armington & Acs, 2002; Audretsch & Lehmann, 2005; Brixy & Grotz, 2007; Kirchoff, Newbert, Hasan, & Armington, 2007; Wang, 2006; Woodward, Figueiredo, & Guimaraes, 2006).

Many scientific studies tried to attempts at definition of entrepreneurship and identification of factors affecting regional-level relationships. It has attracted many researchers because these findings can provide more direct empirical evidences into regional and national level by identifying most factors in promoting entrepreneurial activities and increasing performance. Regional-level studies are also important to researchers since entrepreneurial activity has been recognized as one of the most important drivers of regional economic growth (Acs & Armington, 2004; Audretsch & Keilbach, 2004). In addition, the regional clustering theory raises the importance of geographically localized networks for entrepreneurial activities and found to be empirically significant (Sorenson & Audia, 2000) reinforcing the value of regional-level entrepreneurship research.

Nonetheless, the selection of factors that affect regional entrepreneurial activities is associated with co-creation relationship and supports ecosystem principles. The ecosystem principles suggest that the entrepreneurial entities and environments coexist and reciprocally co-evolve together, not that the companies simply adapt to their environments, as suggested by SCP (Structure-Conduct-Performance) paradigm (Lewin & Volberda, 1999; Porter, 2006; Tsai, Hsieh, Fang, & Lin, 2009).

Among many interpretations of regional factors, the 'triple helix', or university-industry-government relationships, has been increasingly recognized as a major source of regional growth. Relationships drives the transformation of scientific and technological contributions into economic outcomes (commercialization). Scientific studies underline that considerable innovation is created through interaction among the elements of the triple helix model, supporting structuralized regional approach and economy transformation into a knowledge-based economy (H Etzkowitz, 2003; Henry Etzkowitz & Zhou, 2007; Leydesdorff, Dolfsma, & Panne, 2006).

The triple helix model and co-evolutionary theory have been widely recognized for studying the complex dynamics of ecosystem networks and interactions among the ecosystem components, empirical studies examining the interaction among the three components and its contribution to regional growth are still narrow. Most empirical studies on the triple helix have studied the relationship and interaction between university and industry, but often due to methodological limitations such as relationship evaluations method. However, only several empirical studies have attempted to investigate the essence of the university-industry-government relationship outcomes on regional level.

### Methodology of Research

Systematic literature review, empirical research, factor analysis.

### Findings/Results

This paper has practical contribution that incorporates the data from the regional companies of Metalworking industry of Latvia and their entrepreneurial ecosystem partners (stakeholders groups). This paper has its own unique place in creation of a regional entrepreneurial ecosystem strategy. The authors propose to distinguish between different types of stakeholders groups and their impact on sustainable development of regional entrepreneurial ecosystem and develop appropriate competitive advantage as a basis of a company strategy.

### Conclusions

In this paper, we examined the impact of the triple helix of university-industry-government relationships on the regional level. We selected triple helix variables based on Isenberg (Isenberg, 2011) entrepreneurial ecosystem components (R&D - related factors such as university incubators, government institutions, and industrial knowledge networks ). We also considered regional (geographical) peculiarities, representing major geographical regions.

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# Higher Education Financing Policy, Tuition Expenses According to Thematic Fields and Indices Applicable to them at Higher Education Institutions: The Case of Latvia

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## Abstract

The present article aims to analyse higher education policy and associated normative acts, to identify and update thematic field study expense figures and their indices at higher education institutions in Latvia. To achieve research results, the authors have initially performed content analysis of higher education financing policy documents in the European countries. Using different kinds of qualitative and quantitative research methods the authors analysed the existing higher education financing model in Latvia and the regulatory legislation.

The study has been performed in several stages: 1) considering the expense items per student at different higher education levels; 2) developing questionnaires for higher education institutions on the basis of expense items; 3) processing the survey data with statistical data processing methods; 4) on the basis of survey results, thematic field indices have been defined by means of direct calculation.

Having determined thematic fields and indices applicable to them by means of direct calculation, it has been concluded that: 1) it is possible to determine expenses of each study programme of a higher education institution and each thematic field; 2) higher education institutions have full autonomy; 3) to ensure a high-quality study process it is necessary to systematically upgrade and purchase equipment; 4) determining the thematic field indices by study programmes, the aspects of regional factors should also be taken into account; 5) the number of students differs at various study programmes.

*Keywords:* Higher Education, Latvia, Tuition Expenses, Thematic Fields, Indices.

## Introduction

In the recent years, higher education has been ascribed an increasingly greater role not only in meeting a broader public interest and promoting economic prosperity, but also in benefitting each individual on the way to improving one's own material and spiritual world. This is evidenced by research conducted by Johnstone, 2005, and Yang & McCall, 2014, as well as by other authors [1; 2].

Consequently, taking into account that expense items per student, calculation methodology as well as the determination of tuition expense index value in thematic fields in Latvia specified in the Regulations of the Cabinet of Ministers No. 994 as of 12 December 2006 "Procedures for the Financing of Institutions of Higher Education and Colleges from the Funds of the State Budget" were drawn up in 1996 and did not change significantly and became obsolete, it is necessary to update expense indices for higher education institutions [4]. Based on the above-mentioned information, the authors see the need to make radical amendments to Regulations of the Cabinet of Ministers No. 994, taking into account the current situation and the trends in financing of higher education institutions in Latvia and following the best practices of the countries in and outside Europe.

The present article aims to identify and update thematic field indices at higher education institutions in Latvia. To achieve the goal the authors used quantitative and qualitative research methods, including statistical data processing.

## Methodology of Research

To determine and update the tuition expense indices for thirty thematic fields of Latvian higher education institutions, within the research methodology the study has been performed in several stages:

1) The authors have examined in detail base items and expenses per student (1st level professional (college) study programmes; academic and professional Bachelor study programmes; higher education study programmes; Doctoral study programmes);

2) Based on the authors' previous studies and industry expert method, the authors have developed a questionnaire for higher education institutions. The questionnaires have been sent to a total of twenty-one

state higher education institutions and colleges, eighteen of which participated in the survey and the results have been found valid;

3) The survey results have been processed using statistical methods of data processing, thus determining expenses of each thematic field for different study programmes and levels based on the data files submitted by higher education institutions;

4) Based on the requirements for the calculation of expenses per student, the indices of the thematic fields have been determined by means of direct calculation.

### Findings/Results

Based on the authors' previous studies on the financing of higher education institutions in Latvia, the questionnaire included the following variables: N1 – salary per student a year, N2 – the employer's national social security contributions, N3 – expenses related to business trips/official travels per student a year, N4 – service fees, N5 – materials, energy resources, water and equipment, N6 – the purchase of books and magazines, N7 – the purchase of equipment and upgrading expenses.

Study level indices have been illustrated according to the Regulations of the Cabinet of Ministers [5] and the research previously conducted by the authors: college studies – 0.9; Bachelor studies – 1.0; Master studies – 1.5%, Doctoral studies – 3.0.

On the basis of joint index and study level indices, the levelling of indices was conducted and average study thematic field index was determinate.

### Conclusions

Based on the thematic field actualization through direct calculations conducted by the authors and determination of thematic field indices it has been concluded that through direct calculations it is possible to determine study programme and thematic field expenses for each higher education institution, however, mean values of higher education institutions do not completely correspond to the common tendencies of each thematic field of studies.

In order to ensure high-quality study process, as well as the possibility to master a particular study programme, a systematic upgrade and purchase of equipment is needed depending on the field and offered study programme, that is the reason why such dramatic differences between study thematic fields exist. In this regard, technological equipment needed to ensure high-quality study programmes as well as their exploitation expenses should be taken into account. Determining thematic field indices by study programmes, the aspects of regional factors should also be taken into account, which is also confirmed by the survey of higher education institutions. For example, the same expense items are lower in some regions than at higher education institutions in other regions and Riga. Different number of students at each study programme should also be taken into account. For example, for mastering certain study programmes apart from studies in groups, individual tutorials should also be organised.

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# Regulatory Compliance Governance as a Tool of Strategic Knowledge Management in Entrepreneurial Ecosystem

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## Abstract

Recently in European Union RCG often is understood as a tool for companies which are operating in heavily regulated sectors like financial services. Nowadays proactive strategy toward regulatory compliance becomes a part of strategic knowledge management in almost all industries.

The total market value for RCG software expenses is increasing year by year. In scientific literature it is mentioned 32 billion US dollars on 2008 (Hagerty et.al 2008) and it is continuing to increase. A lot of companies, especially in US, analyzing costs of RCG and losses caused by lack of RCG in a company admit that there are not only substantial financial losses but also high risks of a damaged reputation, decreased shareholder value and severe fines. "The extrapolated average cost of compliance for 46 organizations is more than \$3.5 million, with a range of \$446,000 to over \$16 million. The extrapolated average cost of non-compliance for 46 organizations is nearly \$9.4 million, with a range of \$1.4 million to nearly \$28 million" (Ponemon Institute, 2011) "78% of CEOs around the world view increasing regulation as the top threat to business growth" (PWC, Bernstein, & Falcione, 2015). "Almost a third of global executive respondents say that they spend more than 6% of their organization's annual revenues on governance, risk and compliance activities" (KPMG, 2012).

*Keywords:* Regulatory Compliance Management, HER management, knowledge management, entrepreneurial ecosystem.

## Introduction

"Strategic planning is a disciplined effort to produce fundamental decisions and actions that shape and guide what an organization (or other entity) is, what it does, and why it does it. It facilitates communication and participation, accommodates divergent interests and values, fosters wise and reasonably analytical decision making, and promotes successful implementation and accountability." (John M. Bryson, 2004, p.6) "Strategic thinking, acting and learning are promoted by systematic information gathering about the organization's external and internal environment and various actors' interest, thoughtful examination of the organization's successes and failures, clarification of future direction, establishment of organizational priorities for action, and in general, attention to the acquisition and use of knowledge and skills" (John M. Bryson, 2004, p.11) Other authors emphasize the value of strategic thinking instead of strategic planning (Mintzberg, 1994)(Quinn, 1980). That links strategic management with knowledge management – tacit knowledge role in strategic planning. The term "knowledge management" first appeared in the beginning of 20th century, when it was mentioned as a business practice. At first it drew attention of academics and consulting companies. Knowledge management as a discipline emerged in 1995, when Takeuchi and Nonaka published the book "The Knowledge Creating Company" (Nonaka & Takeuchi, 1995), describing the dynamics of innovation in Japanese companies and how Japanese companies became leaders in the automotive and electronics industries. The authors stressed that it is the result of the ability to create new knowledge and its use to produce successful products and create excellent technology (A.Haslinda & A.Sarinah, 2009). In the end of 20th century knowledge management solutions became a widespread tendency in large companies.

Regulatory compliance management links with the knowledge management within the third generation where focus is on content management - how to describe and organize content so that end-users are aware that it exists, is easily accessible and applicable (A.Uriarte, 2008) (MIT, 2008) (Dixon, Knowledge Management Evolution, 2009 ) Collective Knowledge Processing integrates social media and social processes perspective. It marks the era in which information is stored in "bottom" and passed "up" - the leadership that it gathers and gives it meaning. This is an era when information becomes meaningful and is used at source (joint sense-making), it is constantly changing and adapting to the situation. Globalization, wide availability of information, rapid technological development creates an ever more complex tasks and challenges where solutions cannot search historical experience or even already existing scientific answer. These tasks are not expected, the problem is not obvious and solution is complex. It describes three solutions:

- 1) different awareness / understanding of inclusion perspective - the company's problems go beyond company boundaries and is involved in the external environment or the problem is not directly connected to the company;
- 2) enterprise knowledge integration - interdisciplinary knowledge sharing, the structure of the company co-operation and knowledge sharing, with no direct common task;
- 3) full disclosure - all have access to all other data, plans and prospects. (Dixon, MC Evolution Part 3, 2009)

### **Methodology of Research**

The research approaches RCG from company management perspective by focusing on strategic planning and knowledge management (KM). Authors define stakeholders of entrepreneurial ecosystem and perform field research inquiring their practice of knowledge management paying particular attention to one part of it - regulatory compliance management. Field research results are processed by applying mathematical and statistical tools (SPSS) and are discussed in focus groups. On the basis of research results recommendations for further research are developed.

### **Findings/Results**

The research reveals the extent to which stakeholders apply RCG in their strategic knowledge management and proves that it is a component with growing importance.

### **Conclusions**

The results of research confirmed rising role of RCG in strategic management, especially in regulated sectors of national economy. Also it is confirmed that RCG becomes a part of strategic planning of companies, more and more SMEs understand impact of RCG on their further development. Further research can be performed to reveal role of corporate governance and synthesize most successful strategic knowledge management models that strengthen competitive capabilities for the stakeholders of the entrepreneurial ecosystem.

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# How Regulatory Compliance Governance can support Higher Education and Research Institutions Strategic Management

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## Abstract

Higher education and research system is facing new challenges due to substantial changes in the business environment, as well as increasing regulatory impact. The strategic management process is becoming more complex, accordingly. Nowadays proactive strategy toward regulatory compliance becomes a part of strategic management in almost all industries. Regulatory compliance governance (thereafter - RCG) is becoming a new emerging discipline that copes with the challenges of companies to follow all the rapid changes of regulatory requirements. The research reveals the extent to which management apply RCG in the strategic management of Higher Education and Research Institutions and proves that it is a component with growing importance.

*Keywords:* Regulatory Compliance Management, HER management, strategic management.

## Introduction

The nature and spectrum of regulatory compliance is getting broader due to impact of globalization and to expanding compliance expectations. It influences the content and structure of strategic management. Regulatory compliance governance (thereafter - RCG) is becoming a new emerging discipline that copes with the challenges of companies to follow all the rapid changes of regulatory requirements.

Recently in European Union RCG often is understood as a tool for companies which are operating in heavily regulated sectors. Higher education and research management is facing new challenges due to substantial changes in the business environment, as well as increasing regulatory impact on the industry. The strategic management process is becoming more complex, accordingly. Nowadays proactive strategy toward regulatory compliance becomes a part of strategic management in almost all industries.

RCG as an academic area is mostly addressed in information technology research. This research approaches RCG from organization management perspective by focusing higher education institutions (hereafter HEI) and strategic planning. Authors perform field research which reveals the extent to which management applies RCG in the strategic management of higher education institutions and proves that it is a component with growing importance. Higher education and research institutions recognize impact of RCG on their further development. Further research can be performed to reveal role of corporate governance and synthesize most successful strategic management models that strengthen competitive capabilities.

## Methodology of Research

Authors perform expert interviews inquiring their practice of strategic management paying particular attention to one part of it - regulatory compliance management. Content analysis is applied for HER strategies. On the basis of research results recommendations for further research are developed. For completing the research, the triangulation method is applied – theoretical background is formed on systematic literature review (state of art method). Theoretical investigations are approved by field research, qualitative and quantitative data analysis methods.

## Findings/Results

The results of research confirmed growing role of RCG in strategic management, especially in regulated sectors including higher education and research. Also it is confirmed that RCG becomes a part of strategic planning. Higher education and research institutions recognize impact of RCG on their further development. Further research can be performed to reveal role of corporate governance and synthesize most successful strategic management models that strengthen competitive capabilities.

## Conclusions

The research revealed the main gap in understanding the impact of RCM on decision making process and strategy development. Universities are fairly autonomous and on the first sight there is little regulation. However, state owned HEI administrative and support functions are quite heavily regulated by local legislation mainly addressing financial management, procurement procedures and program accreditation. Most of the universities are highly dependent on EU funding. In order to be able to get access to the EU projects, they must comply to the EU recommendations that are often integrated within the conditions of the EU financing. Thus strategic management of the universities is often quite heavily indirectly regulated by financial tools. That makes RCM function an important part of HEI strategic planning since it involves more than local legislation or even EU regulations.

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# Impact of EU Policy on Teaching and Research Capacity of Higher Education

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## Abstract

Since EU policy includes various funding schemes and initiatives; it is necessary to identify where effort should be put to make a difference in HE reforms and how to make the process more efficient. It is crucial especially for EU countries like Latvia, where the GDP per capita and the average income for inhabitants is comparatively low, thus a problem emerges on how to manage the HE system efficiently. The purpose of this research is to find main factors hindering the changes in higher education capacity and to emphasize the kinds of instruments to carry out policy changes.

*Keywords:* higher education, capacity, expert evaluation, EU policy

## Introduction

Teaching and research capacity of higher education in authors' understanding includes teaching and research quality, relationships among the institutional level, faculties and chairs or the internal organisation departments, it also includes the quality of curricular governance organization and structure, internal quality assurance mechanisms, external cooperation etc. Since Latvia has been experiencing different higher education-related issues recently, it is crucial to find out the weakest points in the system of higher education. Thus, the purpose of this research is to find main factors which are hindering the enhancement of policy. To do that, authors suggest to do a deep analysis based on capacity of the system.

This far, authors have identified and thus offer four main HE capacity elements that have impact on teaching and research capacity (TRC):

- policy making capacity (what are the aims, desired outcome, are policies linked to other policies, policy implementation process etc.)-PC,
- legal capacity (normative base, accreditation system, potencial of state organizations etc.)-LC,
- funding capacity (including national resources and European funding as Horizon 2020.Erasmus+,etc.)-FC,
- information capacity (benchmarking exercises, exchange of good practices etc.)- IC.

## Methodology of Research

Expert interviews and judging on the elements was done. The group of experts consisted of 5 very experienced specialists in the field of Higher Education (representatives from Latvian Council of Science, State Education Development Agency, top managers of universities, including former minister of Higher Education and Science). There were three questions formulated for the experts. The first question was about EU policy impact to the capacity elements of higher education in Latvia during the last 20 years. Experts was asked to judge these elements (capacity elements) in interval scale from 1-10 (10- very high impact, 1-very low impact. ). The second question was about the significance of HE capacity elements to make a necessary changes in HE in Latvia. Experts were asked in the same scale to judged elements of capacity. After, experts were asked to judge interrelated impact of HE capacity elements in the following scale:

+2 – high positive impact, +1 - positive impact, 0 - no impact, -1 - negative impact, -2 - very negative impact. The interrelated impact of elements was used to find second level impact of each element, for this reason the third question answers were standartized in a scale: 1;0,5;0;-0,5;-1 .

## Findings/Results

Results show that funding capacity has the main impact to teaching and research capacity, but legal capacity has a negative impact on funding capacity. It means that the first thing to do is the improvement of legal capacity, which is the first part of the chain on the interrelated impact of teaching and research capacity.

**Table 1.** Interrelated impact of HE capacity elements

	PC	LC	TRC	FC	IC
PC	XXXXXX	1,0(0,2)	0(0,315)	1,0(0,25)	0,5(0,05)
LC	0(0,175)	XXXXXX	0(0,2)	-0,5(0,075)	0(0)
TRC	0(0,2)	0(0,067)	XXXXXX	0,5(0,125)	0,5(0,05)
FC	0(0,125)	0(0,05)	1,0(0,45)	XXXXXX	0,5(0,175)
IC	0,5(0,125)	0,5(0,075)	0,5(0,0)	0,5(0,05)	XXXXXX

### Conclusions

It is possible to make a conclusion about the necessary steps of the research - to find capacity elements second level impact to other element, which will allow us to find necessary actions to change capacity of all HE system. The authors mark the significance of elements (table 2) and organize as vector - column B, while elements of (table 4) as matrix C. Then multiplication of the elements shows the second level impact on other elements.

### C\*B

**Table 2.** Second level interrelated impact on HE capacity elements

PC	LC	TRC	FC	IC
23	-5	9	12	18

Again it is possible to see the same result, which the authors obtained previously – the most negative impact has been detected in legal capacity as the main negatively influencing factor. While, for instance, teaching and research capacity as final outcome element has not significant impact to other elements. If the information capacity has to be analyzed, experts also make an emphasis that information exchange and contacts with partners in other countries help to make positive changes in teaching process and organize international teams to win project tenders.

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**SUBSECTION**

**“INTERNATIONAL BUSINESS, LOGISTICS,  
CUSTOMS AND TAXES“**

# Customer Service Problems in Bureaucratic Culture Organizations

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## Abstract

*Keywords:* Organizational culture and behaviour, customer service, bureaucratic organizations

## Introduction

One of the basic daily functions of enterprises and organizations is serving customers and the offered customer service. Customers need not only to receive the necessary information, submit and receive documents or complete formalities, but also high-quality customer service. High-quality customer service includes friendly attitude, competent consultants, information that is easy to understand and can be perceived quickly, as well as flexible and fast completion of formalities. In order to ensure customer satisfaction, organizations need to have a strong and well-developed internal and external communication culture, a clear flow of information logistics within the organization, as well as qualified customer consultants.

Bureaucratic organizations are based on a large amount of internal and external regulatory documents, an internal management hierarchy and a complex and complicated management structure, decision-making processes and division of competences among the responsible employees. It is also necessary to take into account the availability of data, as well as the role of information technology in providing customer service.

Consequently, this is a topical problem, where on the one hand, there are customer expectations and needs, and on the other hand, bureaucratic culture organizations and their ability to meet these expectations. The study aims to explore the activities of bureaucratic organizations, their advantages and disadvantages, creating a link with the quality of customer service.

## Methodology of Research

Literature review, logical and comparative analysis are applied in this study. The research analyses development of organizational culture phenomenon in bureaucratic culture organizations. Customer satisfaction will be analysed with the help of questionnaires, and the main problems will be defined as a result of the analysis.

## Findings/Results

High customer service culture is the image of any enterprise or organization. It forms the organization's image in the public space, which in turn affects the organization's own sustainable development. Establishing essential customer service problems in bureaucratic culture organizations and the level of customer satisfaction gives the opportunity to develop problem-solving strategies and to avoid problems as much as possible in the future. Max Weber, one of the researchers of bureaucracy as a phenomenon, indicates that bureaucracy exists not only in state institutions but also political parties, churches, educational institutions and private enterprises. So traits of bureaucratic culture can be observed in various organizations and their departments. Consequently, enterprises and institutions working in various fields encounter customer service traditions and culture.

## Conclusions

A number of management styles: democratic, authoritative, liberal, bureaucratic or administrative, distant, contact, collegial and others have been defined and are widely known in organizational culture and psychology. One of the oldest and most common management styles is bureaucratic management style. It is most often observed in public administration organizations and educational institutions as well as enterprises. Formal execution of duties, performing the defined tasks within the framework of competences and rigorous and strict following regulatory procedures are the key features of management style and bureaucratic culture organizations. Often these features are troublesome and cause problems in customer service. Therefore, it is essential to define the most topical problems and look for ways to solve these problems in the internal structure of enterprises or organizations.

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# Possibilities for design of Distribution Network in Alternative Tourism Supply Chain

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## Abstract

This study presents applying opportunities of the tools benefits of Geographic Information Systems (GIS) to design optimal distribution network for the Supply Chain System in alternative tourism. MapInfo GIS analyst tools and the Centre-of-Gravity technique were used to locate the Distribution Centre in a geographic area with Green Lodges and Guesthouses. The GIS-based analysis enabled to prepare the dynamic maps illustrating location of the producers, customers and DC. This study also confirmed that a significant improvement could be gained by amending the delivery time including number stops, transport distance, transport time, etc.

*Keywords:* Supply Chain System, distribution network, GIS, alternative tourism.

## Introduction

The Alternative tourism works in conditions of complex, dynamic and difficult foreseeable environment. This necessitates analysis of the Supply Chain System (SCS) parameters and research on possibilities for modelling in optimal range. To achieve the aims and objectives of Tourism SCS is particularly important Distribution Network Structure (DNS). Alternative Tourism characteristics and complex nature of Green Lodges and Guesthouses require to used integrative approach for analysis of the SCS. This scientific research presents applying opportunities of the tools benefits of GIS to create optimal distribution chain for the SCS in alternative tourism.

## Methodology and object of Research

In this study MapInfo Professional analysis tools was used widely. For this the raw data with relevant information were processed and used for location analysis.

The Centre-of-Gravity technique uses the distance goods moved and weight of goods to locate the Distribution Centre (DC) at the centre in a geographic area. This technique it was used only to carry out a preliminary analysis and identify some potential location for DC. Its mathematical formulation is given in equations:

$$X_{DC} = \frac{\sum_{i=1}^n X_i \cdot j_i}{\sum_{i=1}^n j_i} \quad Y_{DC} = \frac{\sum_{i=1}^n Y_i \cdot j_i}{\sum_{i=1}^n j_i} \quad (1)$$

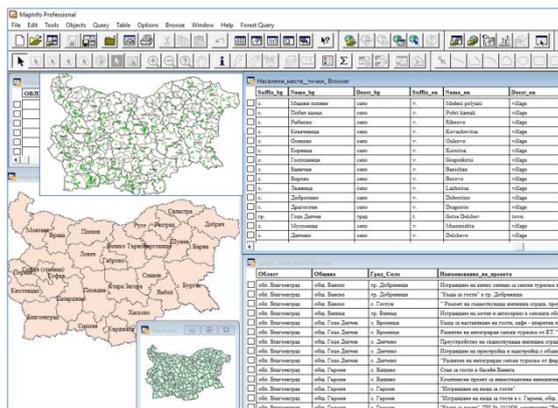
where  $X_{DC}$ ,  $Y_{DC}$  are coordinates of new DC;  $X_i$ ,  $Y_i$  - coordinates of delivery point  $i$ , in decimal degrees;  $j_i$  - relative weight of delivery point  $i$ .

The objects of study are the certified Green Lodges and Guesthouses in Bulgaria, according to data base of State Fund Agriculture (SFA) and Bulgarian Association for Alternative Tourism (BAAT).

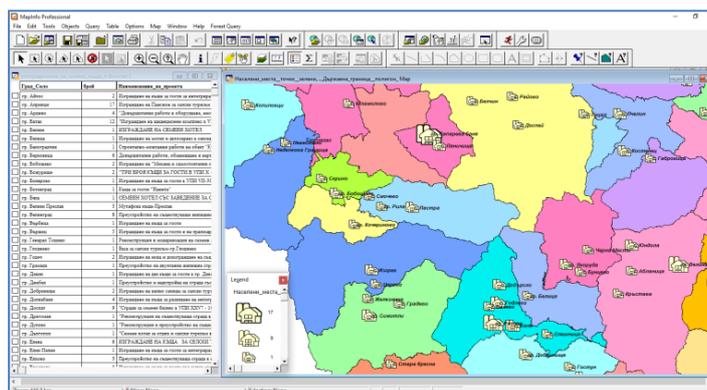
## Findings/Results

The results of research point out the potential for creating, processing, and integrating specialized data in alternative tourism. It is based on existing data of certificated Green Lodges and Guesthouses and national administrative data base in Bulgaria. In creating of GIS database for Green Lodges is used and integrated all data via MapInfo Professional and other software packages as MS Excel and Google Earth. A primary graphics database includes vector data of boundaries in 5 levels as region layers and town/village location as point layer in MapInfo GIS environmental (Fig. 1).

A graphical vector and attribute data for territory of the country are collected in a GIS database, supplemented by an attribute data of the list of certified Green Lodges, according to BAAT.



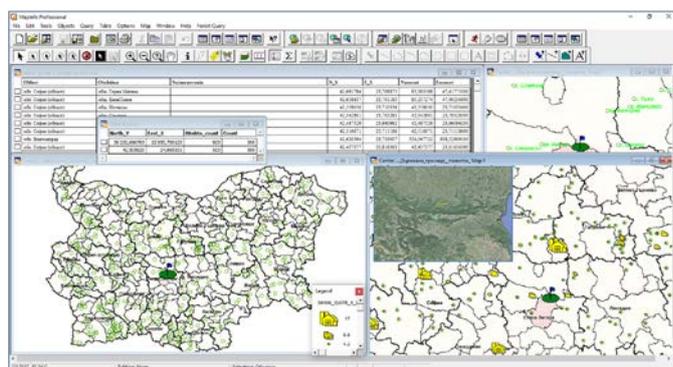
**Figure 1.** Spatial data base and locations of certificated green lodges in Bulgaria



**Figure 2.** Thematic map of distribution of certificated green lodges

The data is organized in some relational tables with suitable key (Grad\_selo = Suffixs + "" + Name\_bg) of relationship among the tables. Location of green lodges is analyzed using modules of package MapInfo. As result thematic maps and tables are created to describe distribution of certificated green lodges by settlements and count of the lodges (Fig. 2).

User-friendly applications for analysis, visualization and browsing of data support next step of experimental work. It is possible to extract the longitude and latitude data of points from a map of settlements (towns or villages). It is used to find coordinates of locations of the green lodges in the World Geodetic System (UTM - WGS84, format DD.DDDDDD) and calculate the DCs coordinates by Eq. 1. Final graphics and attribute data are exported to other formats SHP, DBF and XLS to work with external database (Fig. 3).



**Figure 3.** Visualization of final results and determining Distribute Centre

## Conclusions

Efficient supply chain management could integrate producers, distributors and consumers enabling these actors to compete in the modern global market. The GIS-based analysis enabled to prepare the dynamic maps illustrating location of the producers, customers and DC. This study also confirmed that a significant improvement could be gained by amending the delivery time and this can be applied as there is high level of trust among the partners and there is cooperation of customers. The significant reduction in number stops, transport distance and transport time are possible.

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# The Importance of Effective Governance Within Economic Recession and Labour Force Shortage Environment

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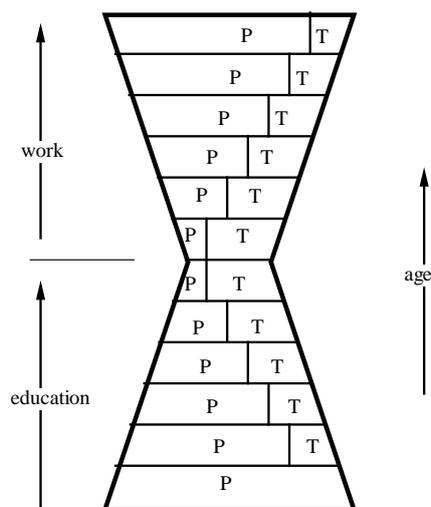
## Abstract

The topicality of this thesis is related to importance of constant development of personal and managerial skills, in order to achieve most effective management approach, especially in economic environment pressured by recession and shortage of the labour force. Exploration of the object of the research, namely, Personal Skills (“P” side of the person’s evolution model), enable to discover what skills lie within it and to develop some expertise in those skills. The goal of research is to transfer the source of person’s self-esteem, thereby generating a desire to develop managerial skills which has lasting impetus in such tough economic environment.

*Keywords:* Economic Recession, Labour force shortage, Effective Governance, People Skills

## Introduction

Person’s learning curve during life falls into one of two main categories: people skills (P) and technical skills (T). The balance between these two depends on many different aspects and will vary. At early stage there is a high demand for people skills, however, as long as people go through education, the focus becomes narrower, more specialized, and shifts from people to technical or task oriented skills. As it is graphically illustrated in Fig. 1, during person’s evolution in education stage, the “P” side of the person’s skills is squeezed out by “T” skills, and vice versa at person’s working stage.



**Figure 1.** Person’s evolution model

As we progress in our career, however, and begin to work more in teams, the balance shifts again towards a renewed need for people skills. We need to be able to influence people, to manage people, to negotiate and to communicate effectively. This topic becomes crucial within periods of economic recession, and under labour force shortage or surplus extremes. This research is about exploring the 'P' side of the model, to discover what skills lie within it and to develop some expertise in those skills.

## Methodology of Research

There was a major research project conducted at The Riga Technical University, examining the patterns of behaviour displayed by group members participating in implementing and invention of Total Quality Management approach in different organizations. The goal of this research is to determine whether there are any common characteristics among groups, which could be identified as either high performing or low performing groups. Authors used psychometric and organizational measures to analyse the sorts of people who made up successful and effective teams.

## Findings/Results

Authors identified that successfully performing teams were composed of persons who collectively showed a capacity to work in a number of different roles (coordinator, shaper, plant, monitor/evaluator, implementer, resource investigator, team worker, finisher) and had ability and willingness to adopt something new and change. When these roles were truly represented, the team appeared to be balanced, for it made the best use of its resources, it was flexible and resilient, had few creative members, but was less dependent on key people than the unsuccessful teams.

## Conclusions

The main conclusions of this research are following:

1. Authors considered it is possible to predict success on the basis of testing and allocating individuals prior to team formation although it is possible to indicate that it is easier to predict teams that will fail than those which would succeed.
2. People do prefer to work in one of the team-roles in a group situation, and that they do have some long-term stability of role preference. Preferences do not change very much over time, but participation in other roles which are compatible may be developed with training.
3. The main factor determining best management style to employ in a specific economic environment within recession and in situation of shortage of labour force, is the job-related development of staff members, defined as the ability and willingness of people to take diversified responsibility for directing their own behaviour - specifically in relation to the particular task to be performed.
4. In an organisation in which top management is very concerned with short-term results, managers are pressured to behave in a task-orientated, controlling and directing style.

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**SUBSECTION**

**“INTERNAL SECURITY AND CIVIL PROTECTION “**

# Indicators, Factors and Criteria for Assessing of the Customs Performance

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## Abstract

The aim of the research is to analyze the most important elements of the customs performance assessment system and their applications. This topic is very actual because customs function and task priorities changes, customs services need to pay more attention to international threats. Similar tasks in different countries would be appropriate to use a similar strategic management methods.

Keywords: capacity of public governance, effectiveness, assessment of operations, customs performance indicators, assessment criteria, factors of influence of customs operations.

## Introduction

Internal safety is directly dependent on the quality of work of the public administration. The broadest concept, which is widely used nowadays to characterize quality of work of a company, an institution or an organization is – governance. Governance has become an odd reality nowadays, which not only affects the place of the country in ranking charts and indexes, but also competitiveness of every company in the market and organization of operations of public governance. Nowadays important role is played both by institutional construction of the state and by the capacity of state administration in exercising of relevant core functions regarding integrated actions in defining the problem and coordination of implementing reforms, strategic planning, change management, communication about causes of state actions and achievable results.

As high the capacity as effective the operation and, to assess it, a comparative and methodical assessment of institution must be carried out.

## Methodology of Research

The research has been carried out on the basis of theoretical aspects of strategic management, public administration and the customs matters. Author studied experience of various countries and international organizations recommendations of customs work planning, implementation and evaluation.

## Findings/Results

Customs institutions possess various functions, quite rapid and wide amplitude of priority change, as well as dependency on external circumstances. At assessment such criteria as the following must be set apart and correctly interpreted: results of customs work; indicators as results of customs work and as pointers, which can be established within customs environment and outside of it; factors that affect results.

Maximum of those pointers must be studied, then most relevant and objective must be chosen and used to characterize stage of fulfillment of strategic aims, functions and objectives. It must be completely clear – how and why an indicator becomes a criterion, in its turn the chosen criterions must correspond to the aim of assessment. The assessment system must be a component of governance.

Studies show that every state exercises development of these indicators and criterions, international organizations express their opinion about methods and elements of assessment, separate experts research these issues, however, a one-fits-all methodology, that would allow to fully and objectively assess the work of customs, has not been discovered yet. It has been observed in practice, that states choose the easiest path by offering work results as indicators for assessment without proper analysis. Reasons for this could be the multiformity of customs functions, external environment conditions, which change rapidly, hardships of forecasting and planning of results, or disinclination of deficient performance of the system.

The assessment system is affected by organizational model of the border enforcement agency. In the reports of work results of enforcement agencies in the US, the aspects of safety and defense dominate, in Estonia and Latvia customs agencies are deeply integrated within the state revenue service, therefore the assessment criterions are associated with collecting revenue. Russian criterions of assessment of customs agencies work are associated with prescribed aspects of effectiveness.

According to the above mentioned the following thesis for research, discussion and further examination can be imposed:

- by implementing the multiform functions, the assessment system must correspond with priorities and aims set by the strategic planning;
- pointers used in assessment must be extensive enough, taking into account the variety of functions and objectives carried out by customs and the aim of assessment, etc. conditions;
- when assessing pointers of customs work and its influencing factors, correct, objective and suitable indicators must be chosen, in order to create criterions for assessment and improvement of work;
- operational indicators and assessment criterions must be chosen accordingly to the purpose of assessment;
- reforms in the state administration are to be implemented only on basis of previous assessment with the purpose of enlarging the capacity of bringing into effect the set functions and objectives;
- In times, when the role of customs in carrying out the fiscal function decreases, the defense and safety issues arise, therefore ever larger integration of customs into the revenue service is not acceptable.

### Conclusions

Internal and external safety is greatly dependent on the capacity of public governance. In order to assess the capacity of public governance, an assessment system must be created, by taking into account the functions, objectives and operational features of each institution. Capacity of customs agencies must correspond with internal priorities and international liabilities, as well as objective conditions.

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## **Fight with Tax Terrorism**

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### **Abstract**

There are significant losses in tax revenues across the European Union (EU). There is the VAT gap in the EU €170 billion, including €2.3 billion or 41% in Latvia (TAXUD, 2013). There is huge illicit cigarettes market in the EU 9.8%, with tax losses €1.3 billion, including 26.7% or €77 million in Latvia (Project SUN, 2015). The global corporate income tax (CIT) revenue losses are estimated about 4% to 10% of global CIT revenues, i.e. USD 100 to 240 billion annually (OECD, 2015). It is tax terrorism! Therefore, the fight with aggressive tax planning, tax fraud and illegal activities is on the agenda of the EU, OECD and all the national governments.

The author have designed an action plan how to tackle tax evasion more active. The objective of this article is analyse factors of tax avoidance and evasion, to present an overview study of losses in tax revenue, discuss the best practice how to limit the tax gap and protect the legal market, as well as develop recommendations for improvement of tax administration.

*Keywords:* tax revenues, tax avoidance and evasion, illicit market

# Microwave Reflection and Absorption Properties of Wet Snow

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## Abstract

The microwave may be attenuated if the material in the landscape possesses absorptive characteristics. On the other hand, reflective materials provide a favoring path to the waves to propagate. In an outdoor laboratory setting, snow samples (600x600mm) were prepared, involving a sample tray in near free-space conditions, three standard gain horn antennas, radiofrequency generator (2.4 GHz, 10dBm) and signal analyzer. The snow was tested by 2 cm layer steps up to 12 cm thickness. The transmission measurements indicate no large difference in between the poured snow sample and the stamped snow sample, except at 12 cm thickness. The transmission is most reduced with the first 4 cm, after which the transmission characteristics remain the same till the thickness is raised to 12 cm (stamped snow). The highest reflection coefficients for both samples were achieved at thickness of 12 cm, whereas stamped snow created significantly better reflections than freely poured snow.

*Keywords:* snow, winter, microwave, radiofrequency, electromagnetic field, reflection, transmission.

## Introduction

Microwave propagation across the landscape is dependent on many factors, microwave reflectivity of the surrounding material being one of these. The microwave may be attenuated if the material in the landscape possesses absorptive characteristics. On the other hand, reflective materials provide a favouring path to the waves to propagate.

Controlling microwave propagation is not only of interest of assuring the functions of the wave e.g. radio communications such as mobile telephony, mobile networking etc. In the near vicinity of the high power microwave sources, controlling every factor, including the microwave reflectivity of the environment, is of importance in guaranteeing the safety and health of humans. These scenarios may include mobile telephony base station antennas, radio and TV broadcasting, TETRA emergency services network antennas, radars etc. If the surrounding environment provides good reflective properties, the levels of microwaves may rise, due to e.g. standing waves and multiplication of waves.

This study investigates the microwave propagation properties of snow, which has granulated due to multiple melting-freezing cycles, also called as wet snow, present in times close to spring..

## Methodology of Research

For the purpose of this research an outdoor laboratory setting was prepared, involving a sample tray in near free-space conditions, three standard gain horn antennas, radiofrequency generator and signal analyzer. One of the horn antennas radiated the snow sample with a preset frequency of 2.4 GHz (20 dBm) while the other horn antennas were measuring the reflection from the sample and transmission through the sample.

The snow was placed on the sample tray within a 600x600mm radiofrequency transparent holder. The holder was filled gradually by 2 cm layer steps up to 12 cm, with measurements made at each step. There were two types of samples prepared: freely poured snow and stamped snow.

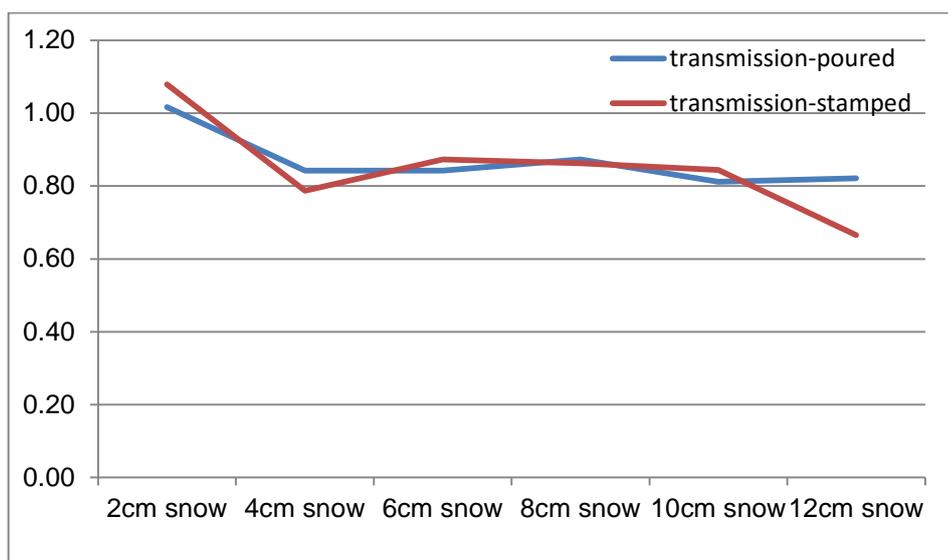
Reflection and transmission coefficients were calculated. Reflection coefficient ( $\Gamma$ ) is the ratio of the reflected wave ( $E^-$ ) to incident wave ( $E^+$ ), both measured as an amplitude of the electric field (formula 1).

$$\Gamma = \frac{E^-}{E^+} \quad (1)$$

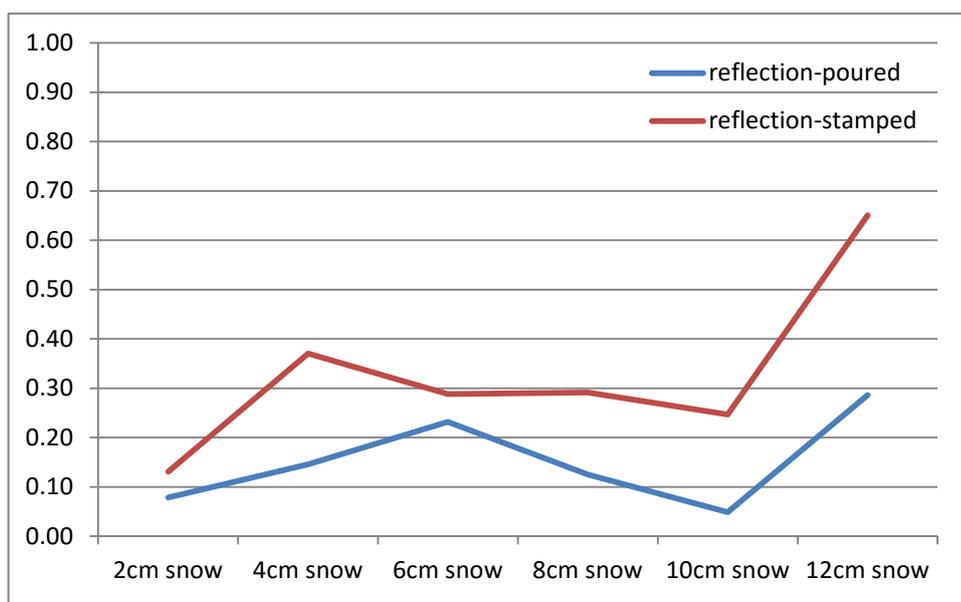
## Results

The transmission measurements indicate no large difference in between the poured snow sample and the stamped snow sample, except at 12 cm thickness. The transmission is most reduced with the first 4 cm, after which the transmission characteristics remain the same till the thickness is raised to 12 cm (stamped

snow). The highest reflection coefficients for both samples were achieved at thickness of 12 cm, whereas stamped snow created significantly better reflections than freely poured snow.



**Figure 1.** Transmission coefficient



**Figure 2.** Reflection coefficient

### Conclusions

In average stamped snow had 0.18 higher reflection coefficient as compared to poured snow of the same thickness. This indicates that stamped snow creates higher reflectance than poured snow especially at 4cm and 12cm thickness.

At the same time there was no significant difference in transmission coefficients of poured snow and stamped snow with exception at 12cm thickness, where the stamped snow had 0.15 lower transmission coefficient. In transmission the stamped snow also provides noticeably less transmission in the same thicknesses as compared to unstamped snow, however in other thicknesses the transmission difference in the differently prepared samples is less visible.

# Salt Water Sprayed Paper Microwave Attenuation in Shielding Workplaces

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## Abstract

The relevance of radiofrequency electromagnetic screening grows larger each year with the development and utilization of new radio communications technologies. This study tested makeshift microwave screening material under mobile communication frequencies: 950, 1850, 2150 and 2650 MHz. The microwave reflectivity of the developed material was determined by the non-destructive microwave characterization measurements. A layer of paper was prepared by spraying it with saline water. The saline water was prepared of the same salinity as the sea water. The layers of papers were separated from each other by stretch wrap packing film. The final sample consisted of 10 layers of newspaper sheet. The results show the saline solution to supply paper with fairly good radiofrequency screening properties. The return loss is diminished by each additional layer of saline solution sprayed paper. In case on 10-layer sample only 4 to 6.5 dB of radiation were lost to transmission through the sample or to absorption within the sample and hence not reflected by the sample.

*Keywords:* microwave, radiofrequency, radiation, electromagnetic field, reflection, shielding, materials, building.

## Introduction

The relevance of radiofrequency electromagnetic screening grows larger each year with the development and utilization of new radio communications technologies. Currently 2G, 3G and 4G networking protocols are in use with the development of 5G protocols ongoing. More radiotransmitters in the living and working environments are expected in a few years time with the launch of new 5G services.

There might be a necessity to protect sensitive electronic equipment from the electronic interference caused by the microwaves (Roh *et al.*, 2008; Aniołczyk & Koprowska, 2004). Also, the methods of counter-espionage may require the use of RF screening materials – electronic surveillance is often done by means of microwave transmissions. In addition, in case of strong RF EMFs, there is a requirement to protect the personnel in the working premises may require the utilization of RF mitigation design and materials. In recent times, more focus has been paid on the safety of humans in being exposed to the RF radiation (IARC, 2013). Also, it has been proposed and required that certain people in risk groups, may need additional protection from the RF EMFs (European Parliament, 2009; Council of Europe, 2011).

Where screening of radiofrequency electromagnetic fields is required, sometimes the need is urgent and solutions should be readily available. An option is to produce a makeshift microwave screening material from general products, present in households.

## Methodology of Research

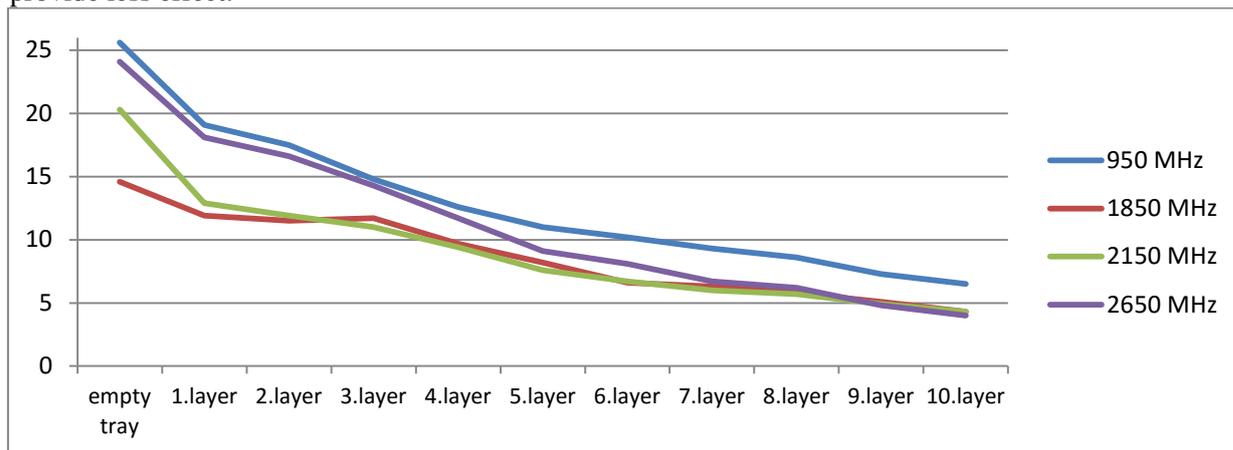
This study tested makeshift microwave screening material under mobile communication frequencies. The microwave reflectivity of the developed material was determined by the non-destructive microwave characterization measurements.

The measurement setup consisted of transmitting and receiving log-periodic antenna (Aaronia Hyperlog, 4060) with a guaranteed accuracy at the frequency range of 600-6000 MHz. The two antennas were separated by a screen, in order to prevent transmitting antenna affecting the receiving antenna directly. The antennas were connected to a signal analyzer (Rohde&Swartz Communications protocol tester CRTU). The selected frequencies represented the main mobile frequencies in use: 950, 1850, 2150 and 2650 MHz representing GSM, UMTS and LTE mobile communications protocol carrier frequencies. The signal generators output was 10 dBm for all tests (50 Ohm system). The samples were cellulose products, namely 1) newspaper sheets and 2) heavy paper used in constructions to protect floor and 3) carton (cardboard). Multi-layer samples were prepared of the afore-mentioned cellulose products. A layer of paper was prepared by spraying it with saline water. Each layer was treated with approximately the same amount of saline solution (38 g in average); the sprayer container was measured before and after spraying each layer. The saline water was prepared of the same salinity as the sea water, i.e. 35 g salt per 1 kg of water. The layers of

papers were separated from each other by stretch wrap packing film. The final sample consisted of 10 layers of newspaper sheet. The sample size was 0.6 x 0.6 m.

### Findings/Results

The results show the saline solution to supply paper with fairly good radiofrequency screening properties as illustrated by the figure 1. The return loss is diminished by each additional layer of saline solution sprayed paper, till reaching 4 to 6.5 dB, depending on the frequency with the ten layer sample. This means, only 4 to 6.5 dB of radiation were lost to transmission through the sample or to absorption within the sample and hence not reflected by the sample. As compared to the empty tray (no screening material) the first layer of the saline solution sprayed paper reduced return loss by 2.7-7.4 dB (with reference to full transmission) depending on the frequency. The first layers reduced the return loss the most, with the latter layers provide less effect.



**Figure 1.** Return loss of saline solution sprayed paper

### Conclusions

The saline solution sprayed paper has proved to provide considerable screening properties against commonly used mobile telephony frequencies. The results have shown, that in order to achieve a good screening effect, at least 10 layer sample should be prepared.

The future research could take benefit of testing different types of cellulose products and also considering different concentration saline solutions.

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# **Adaptation of the Competency-Based Approach in the Job Descriptions and Professional Standards of Customs Officials**

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## **Abstract**

The planning of work and assessing of the work performance in an institution is related to all processes of human resource management. The assessment of the professional qualification of employees involves checking the results of the employee selection and obtaining information for the planning of further training and development. In addition, the remuneration level depends on the work performance according to the remuneration structure and an algorithm used to determine it. For the managing authorities of the State Revenue Service it is important to know the current qualitative state of the human resources. Objective and scientifically substantiated employee evaluation can provide an information on the current composition of officials. In order to identify the requirements for the employees serving in particular posts of the customs authorities as well as linking them to the recommendation of the World Customs Organisation and EK TAXUD as well as providing the necessary information on the knowledge and skills to be acquired in the education process to the educational system, the author suggest creating an integrated identification mechanism for the job descriptions and professional standards.

*Keywords:* customs, professional standards, job description.

## **Introduction**

Thus far, the State Revenue Service (SRS) does not have single clear mechanism with the following human resource management processes as selection, assessment, training and planning complementing each other. In order to systematize the requirements for the employees serving in particular posts of the customs authorities as well as linking them to the requirements of the international and transnational organizations, and providing the necessary information on the knowledge and skills to be acquired in the education process to the educational system, it is necessary to create an integrated identification mechanism for the job descriptions and professional standards. Traditionally the job descriptions and professional standards with the respective formulations of knowledge and skills are formulated based on the expert experience. The division of knowledge and skills for the purposes of job description and professional standards can be carried out according to the process management system defining general knowledge and specific knowledge and skills necessary to perform each process and sub-process. It would be a tangible mechanism for identifying a range of employees who need new knowledge and skills or who perform identical duties as well as for defining knowledge and skills necessary for the new employees beginning to work for the customs authorities.

## **Methodology of Research**

The research is based on the analysis of three interrelated documents: (WCO) World Customs Organization PICARD Professional Standards, National standard for customs profession (Latvia), job descriptions of the SRS regarding the knowledge and skills necessary for executing job duties as well as Regulations of the Cabinet of Ministers regarding the educational qualifications. In the framework of this study the potential application of the process management system has been analysed. EU competence system served as guidelines for formulating the specific knowledge and skills.

## **Findings/Results**

The process management system involves identification and formulation of general and specific knowledge and skills necessary for each process and sub-process and assigning the identification code to each indicator of the specific body of knowledge and set of skills. In addition, certain value is assigned to each indicator depending on its importance with regard to the corresponding professional standard. Therefore, it results in a matrix with four rows. Therefore, it results in a matrix of professional standards.

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} & \dots & a_{1i} & \dots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \dots & a_{2i} & \dots & a_{2n} \\ a_{31} & a_{32} & a_{33} & \dots & a_{3i} & \dots & a_{3n} \\ a_{41} & a_{42} & a_{43} & \dots & a_{4i} & \dots & a_{4n} \end{bmatrix} \quad (1)$$

where  $A$  – professional standard;

$a_{11} a_{12} a_{13} \dots a_{1i} \dots a_{1n}$  — general knowledge in the professional standard;

$a_{21} a_{22} a_{23} \dots a_{2i} \dots a_{2n}$  — general skills in the professional standard;

$a_{31} a_{32} a_{33} \dots a_{3i} \dots a_{3n}$  — specific knowledge in the professional standard;

$a_{41} a_{42} a_{43} \dots a_{4i} \dots a_{4n}$  — specific skills in the professional standard;

Matrix for a job description of the specific post is obtained in a similar way.

## Conclusions

The education process is completed successfully, if the person is able to meet the professional requirements or he/she can perform the tasks in order obtain certain final product of the process. Consequently, there is a certain range of general knowledge and skills as well as specific knowledge and skills an employee has to acquire for being able to perform the tasks involved in the process. Using this methodology for analysing the professional qualifications of employees it is possible to prove that hiring employees with a relevant professional qualification is rational and therefore to minimise the tendency of hiring friends and relatives. By comparing indicators of each criteria it is possible to identify the missing knowledge and skills and focus on them.

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# **Ergonomics Interventions Significance in Collaboration Between Baltic and Nordic region**

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## **Abstract**

The research focuses on work related health problems and ergonomics interventions significance in collaboration between Baltic and Nordic region. This topic is very actual because work related health problems are rapidly growing due to inadequate work environment, work pace, compulsory work postures and stress at work and Nordic countries have found effective solutions for minimizing the mentioned problems. The aim of the research is to carry out theoretical analysis of the problems and solutions for ergonomics intervention at the workplaces to develop sustainable working environment and compare Nordic and Baltic region approaches.

*Keywords:* ergonomics, intervention, work environment, Nordic region, Baltic region

## **Introduction**

At present, rapid changes are taking place in the labour market. Economic situation has put forward a trial for organisations also in Latvia, Estonia, Lithuania: to exist or disappear. It means that organisations should be able to adjust to new conditions during the restructuration of economy (Cekuls et al., 2016). Ergonomics is a science concerned with interaction of a human and work (Roja, 2008). Majority of society is comprised by people capable for work, who form the economic basis of any country (Kalkis, 2014). Therefore, in order to maintain human's capacity for work and labour productivity, safe and healthy work environment is essential (Kalkis et al, 2015; Elgstrand & Petersson, 2011). In Europe, nowadays occupational health problems related to ergonomic risks (overload, psycho-emotional stress, inadequate work organisation, etc.) are rapidly increasing (Roja et al., 2016). In Latvia, work related health problems resulting from overload annually comprise ~ 60 – 65 % of total number of occupational diseases. In comparison in Estonia it is 70 – 80 %, but in Sweden approximately 70 % (WHO, 2016). The most common cause of occupational diseases is inadequate work environment, since it does not correspond to physiological and psychological needs of an employee (Roja et al., 2016, Kalkis, 2008).

The aim of the research is to carry out theoretical analysis of the problems and solutions for ergonomics intervention at the workplaces to develop sustainable working environment and compare Nordic and Baltic region approaches.

## **Methodology of Research**

The monographic and comparison research method (Vosyliute, 1981) were used to analyze literature of the ergonomics, its intervention possibilities and differences in Nordic and Baltic regions.

## **Findings/Results**

Taking into account the Guidelines of the Nordic Council of Ministers' Co-operation with Estonia, Latvia and Lithuania and the Finnish Presidency of the Nordic Council of Ministers, life quality of the population and its improvement in Nordic and Baltic regions is the main task (Guidelines for the Nordic Council of Ministers, 2013). These guidelines include several fields of collaboration: Education, research and innovation, Business, cluster co-operation and creative industries, cross-border regional co-operation to promote joint fundamental values, such as democracy, good governance, gender equality, freedom of speech and tolerance etc (Nordic-Baltic Co-operation, 2016). One of the instruments to solve it is to seek common solutions of these common challenges.

The challenges of the Nordic and Baltic region is a healthy and safe work environment that promotes competitiveness and business development, thus perfecting wellbeing of the region as well (Roja, 2014; Kalkis et al., 2014). Research analysis discovers common solutions that could be developed in order to improve work environment and decrease risks related to it, with this protecting employees and increasing

sustainability of the organisation. It can be achieved by working out collaboration programmes, including exchange of information and experience between scientists and specialists of different countries, as well as promoting collaboration between the public, employers and employees, that could involve national ergonomics societies.

The Guidelines of the Nordic Council of Ministers' Co-operation with Estonia, Latvia and Lithuania and the Finnish Presidency of the Nordic Council of Ministers pay great attention to collaboration among non-governmental organisations, the public, employees and employers (Guidelines for the Nordic Council of Ministers, 2013). Hence the collaboration within the Baltic and Nordic region can be organised by Latvian, Estonian and Lithuanian Ergonomics societies jointly with Nordic ergonomics society to continue education of the public, employers and employees on issues related to integration of ergonomics in work environment.

## Conclusions

Successful implementation of the collaboration projects between Baltic countries and Nordic countries ergonomics societies could promote not only sustainability of healthy and safe work environment, but also education of the public and development of innovations related to ergonomics. Thus, business working environment would be improved, which benefits such forces as the public, organisations, investors and workforce and sustainable business development in general.

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## Analysis of Profit and Costs from Work Safety Measures at the State Emergency Medical Service

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### Abstract

The aim of these thesis is to study and analyse assessment of funds allocated for work safety measures. The thesis are based on assessment of work environment risks, mandatory health insurance payments, occupational health, analysis of accidents, analysis of budget and expenses of SEMS.

*Key words:* accidents, work safety, risks, mandatory health checks, occupational diseases.

### Introduction

The societal development is determined by human activity in various fields. We are currently living in fast-changing times. The work changes along with the time. Work becomes more intensive, requires maximum attention and concentration, harmonization pursuant to physical and mental abilities, solution of psychosocial and organizational issues (Matisāne L., 2015).

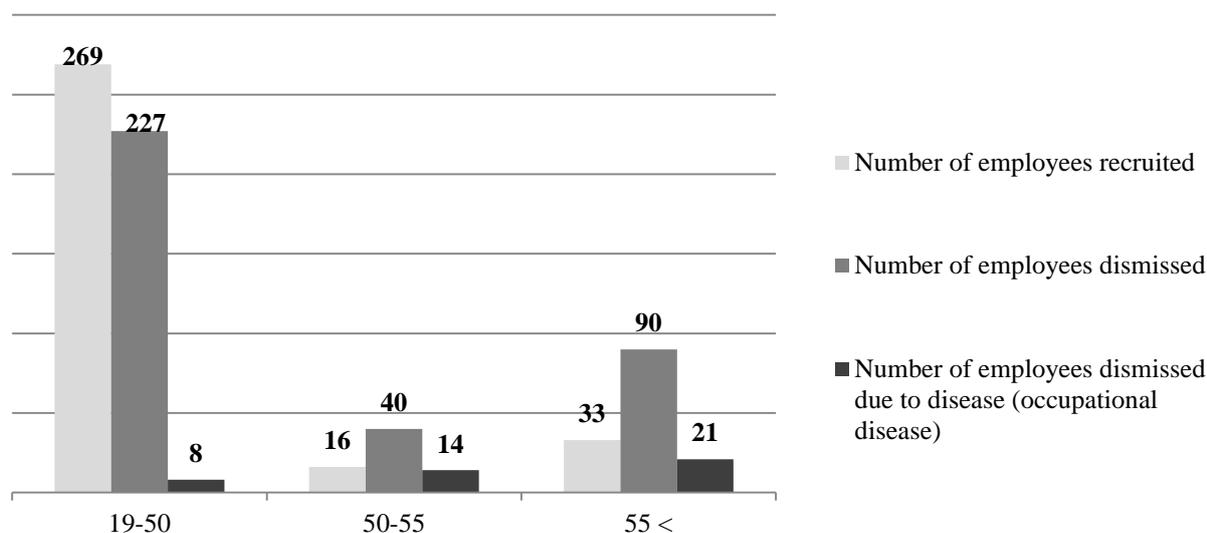
Work safety and observation of related issues brings actual profit to a company that can be measured in currency. During the past years this topic has become topical and a tendency may be observed that companies wish to demonstrate their care for employees and their work ability, which is one of the main aspects of activity that is addressed with considerable care and receives investments.

Topicality of issue regarding work at the SEMS is reasonable given the number of employees, high costs of work safety and occupational diseases. Financial costs from work safety in SEMS are economically favourable and subject to increase in efficiency.

Work safety an health protection system is based on the organizational framework of work safety in SEMS. Timely recognition of risk factors, mandatory health checks, purchase and proper use of individual protection remedies enables reduction of harmful, hazardous and health-threatening impact from risk factories on health of the workers.

Factors that cause danger or accidents are presence of physical, mechanical, chemical or biologically active substances, ergonomic, psychosocial, organizational and other factors (Kaļķis V., 2008).

Risk assessment is the first step in recognition of accidents and occupational diseases at workplace. Risk assessment facilitates selection of preventive measures depending on their effectiveness, as well as improve implementation an control of preventive measures (Free Trade Union Confederation of Latvia (LBAS), 2010).



**Fig.1.** Recruited and dismissed employees by age groups at SEMS, 2014

683 mandatory health checks were carried out in 2014. 43 employees were dismissed due to occupational diseases. In 2014, 173 accidents that occurred or almost occurred were registered at SEMs, and 70 of those accidents that occurred at workplace underwent investigation. There were 103 accidents registered that almost occurred, 48 were light accidents, and risk of infection was registered only in 20 cases, whereas serious accidents at the SEMs were registered twice.

Aging of workforce and health conditions resulting from psychosocial risks are serious issues in Europe and Latvia. Hazardous working conditions, unhealthy work environment, conflict situations at work and lack of work culture results in acute and chronic diseases (Kaļķis V., Roja Ž. & Kaļķis H., 2015).

Financial costs of the SEMs which are related to diseases of employees, occupational diseases or accidents including organisation and ensuring of work safety.

Work safety measures facilitate work efficiency, by creating more convenient and safe for the SEMs's employees. Safe work environment is one of the key prerequisites for efficiency and maintenance of health among employees.

The workplace reflects in the most direct way upon attitude of the employer towards employees. Should he care not only for profits of the company but also for safety and health of the employees, he will also ensure that they feel good at their workplaces. Actually by taking this step towards the employees, the employer will benefit himself because the employees will strive to return favour and perform their duties in good faith as they feel positive attitude from the management and feel that their safety and health matters (Ministry of Welfare, 2003).

## Methodology of Research

An empirical method (collection, compilation and processing of data), statistical data processing method and comparative analysis were applied for the research.

## Findings/Results

The goal of the research has been met. The data and results obtained may be applied in practice at the SEMs.

## Conclusions

1. At the SEMs, financial costs are related not only to supervision of occupational diseases among employees, when an employee falls ill, occupational diseases is detected, employee is involved in an accident, but also in cases when an employer terminates work relations with an employee. It has been calculated and proven that accidents at workplace and absence of employees due to illness cost more to the employer than introduction of effective preventive measures.
2. Care for health and well-being of employees as well as work environment is highly dependent on the decency of the employer. It is often observed that employees do not speak up on health issues as they are scared to lose their jobs. Due to this issue, many occupational diseases in Latvia have not been recognized and recorded. Inter alia, irregular and low-quality mandatory health checks of employees.
3. Financial costs of work safety and protection in the SEMs can be assessed as justified, useful and necessary, but insufficient. Preventive measures and work protection measures are highly dependent on the budget or annual funds allocated.
4. The gains from financial costs in the SEMs' work safety are enhancement of work efficiency and productivity, reduction of absence among employees and money paid to employees in sick leaves and damages for accidents.

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# New Method of Estimation of Resources Potential of Waste of Chemical and Oil Industry

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## Abstract

New methods and approaches to estimate resource potential of waste of chemical and oil-gas industry are suggested. Main of suggested criteria are historical, chemical, physical, technological, economical.

*Keywords:* Waste, chemistry, oil, industry, resource potential, estimation

## Introduction

The volume of waste of chemical and oil-gas industry is growing every year. Very important task is increasing of resource potential of waste and to extract valuable components for further secondary using. Thus, it is necessary to develop the criteria of estimation of resource potential of waste of chemical and oil-gas industry and to investigate a number of waste of chemical and oil-gas industry.

This paper is devoted to development of approaches to estimation of resources potential of waste of chemical and oil-gas industry and to its approbation in conditions of Samara Region of Russia.

## Methodology of Research

Analysis of existing classifications of waste of enterprises of chemical, oil chemical and oil extracting industry is allowing to conclude that it is necessary to develop new approaches to classification. For creation of system of estimation and of technologies of using of resource potential of waste of enterprises of chemical, oil chemical and oil extracting industry it is necessary to systemize existing information, develop absent components and to test theoretical developments on real waste of oil gas industry. Authors are suggesting new conception of resource potential of waste which may be determined as a cost of a number of components of waste (secondary product), having such combination of characteristic of composition and properties that determine possibility of using of waste (and/or its components) as a secondary raw (production) with selected technology of extraction of resource potential. Criteria of estimation of resource potential should include all variety of composition and features of investigated waste. Main of them are: historical, physical, chemical, technological, economical.

Historical criterion is very important because the history of waste origin (formation) is very significant for waste further investigation and treatment. First step during estimation of resource potential according to historical criterion is study of history of appearance needs of economic in carrying out of one or other process or using of product. As main step of system analysis of waste it is recommended to consider investigation of technological process, setting of technological stages as sources of waste origin, and also about target product of basic production, raw, used reagents, auxiliary materials etc.

Physical criterion of estimation of resource potential means obtaining of informational data about physical characteristic of waste. It is connected with visual experimental laboratory investigations. Physical and chemical criteria as the most connected may be also united in one criterion – physical-chemical.

Chemical criterion of estimation of resource potential is one of the most important because chemical characteristic of oil gas waste are considered as basic and as physical, as technological characteristic of object of estimation. As a rule, estimation according to this criterion is complicated task. Let us point out some properties connected with chemical criterion of oil gas waste. Among of them it is necessary to determine the main criteria: – radioactivity; – acid-alkaline reaction of medium; – component chemical composition of each phase; – dissolubility in water and in organic solvents; – fire safety (temperature of flash, ignition, self-ignition, concentration explosive limits of vapour of volatile components); – chemical activity in relation to water, air; – corrosion activity in relation to structural and alloy steels etc..

Technological criterion of estimation of resource potential in composition of set of informational blocks about oil gas waste as about the objects of resources restoration is, from one point of view, stage of target focus combining of results of estimation according to above described criteria, and from the other point of view, is a stage of analysis of specific. It is possible to formulate main directions of collection of

information about characteristics of waste and secondary products of oil gas industry for estimation of resource potential.

Estimation of resource potential of oil gas waste according to technological criterion in combination with chemical and physical information blocks allows to approaches to development of economical criterion. Economical criterion of estimation of resource potential is considered with account of innovation part in activity of industrial and domestic waste treatment. For estimation of resource potential according to economical criterion it is possible to determine the following main characteristics: – volume of generation (accumulation) of wastes of oil gas industry; – class of danger of waste; – presence in composition of waste of valuable components, which are may be potentially used as secondary material or energetic resources; – ratio of concentrations of valuable components of wastes with its concentrations in natural raw from which it is extracted for main technological purposes of industry etc.

All above mentioned characteristics of oil gas waste and of secondary products are derivatives from conditions of forming of waste in particular industrial enterprise, from its phase and chemical composition, sanitary-hygienic values. Forming of informational block of reliable data about economical criterion of estimation of resource potential of waste and further its analysis are allowing to correctly outline the strategy of carrying out of managing, ecological, technological and economical measures, aimed at organization of waste treatment.

### **Findings/Results**

New methods and approaches to estimate resource potential of waste of chemical and oil-gas industry are suggested. Main of suggested criteria are historical, chemical, physical, technological, economical. Criteria for selection of possible places of displacement of treatment of oil sludge were determined. Following to above mentioned criteria there were determined possible places of displacement of facilities of treatment of oil sludge on the territory of Samara region: towns Otradny, Novokuibyshevsk, Syzran, Neftegorsk.

### **Conclusions**

In total it is necessary to increase the process of integration of Russian higher education to the international educational process (also according to Bologna agreement requirements) in general and in specific field of technosphere safety.

### **Acknowledgement**

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# Peculiarities of Higher Education in Technosphere Safety in Russia and Perspectives of International Integration

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## Abstract

Russian experience of higher education in the field of technosphere safety is described. The different levels of higher education in the field of "technosphere safety": baccalaureate, speciality, magistracy, postgraduate level are analyzed.

*Keywords:* higher education, technosphere safety, international integration.

## Introduction

In Russian Federation there is a large experience of teaching of students in the field of technosphere safety. The term "technosphere safety" is rather new. Traditionally in Russia higher education was given for such different specializations as environmental protection, labor protection, life protection, fire safety etc. In 2009 Ministry of education and science of Russian Federation have ordered new educational standard for all universities, where all these specializations were united to one - so called "Technosphere safety". According to the deep opinion of the author and of the other scientists (Vasilyev, 2002; Vasilyev, 2005; Vasilyev, 2010; Naumov et al, 2011) such unification is unsuccessful and in some cases may lead to the reduction of quality of education. Therefore the group of scientists is developed the alternative project of standard for specialization "Environmental protection" (Naumov et al, 2011). But this project was rejected by the Ministry.

There are the different levels of higher education in the field of "technosphere safety": baccalaureate, speciality, magistracy, postgraduate level. It should be noted that system of postgraduates training in Russia is still differs from the system in West countries where PhD level is common for all countries. In Russia there are two different levels: aspirantura (postgraduate study) and doctorantura (doctoral candidacy).

In this paper Russian experience of higher education in the field of technosphere safety is described. The experience and perspectives of international integration of Russian education in technosphere safety to international system of education are considered.

## Methodology of Research

It is evident that during teaching the students according new educational standards in Russia it is necessary to support and develop international cooperation, to implement advanced foreign educational experience, but also to save all the strong and successful features of former Russian education.

In Samara state technical university during teaching of the students to the technosphere safety the programs of international and All-Russian mobility of lecturers and students are developed. Main directions of increasing of international cooperation may be subdivided as following:

- study of educational programs and plans of baccalaureate, magistracy, postgraduate levels in foreign universities and comparing with Russian programs;
- development of international contacts and partner relations with foreign partners (universities, scientific centers, companies etc.);
- joint scientific investigations with involving of students and postgraduates;
- development of joint educational courses, books, programs and its approbation in educational process;
- invitation of leading foreign scientists and specialists for lectures, seminars, master-classes for students, participation in conferences etc.

Deep educational and scientific contacts with Riga Technical University, Second Naples University and University of Florence (Italy) are supported (Vasilyev & Maffei, 2011; Luzzi & Vasilyev, 2005; Vasilyev & Luzzi, 2009). In framework of international summer school "Built environment: representation, protection and safety" with participation of the Second Naples University (Italy) several educational modules were determined:

- - Multicriteria representation of the build environment;

- - Soundscape preservation and noise control technologies;
- - Structural safety of buildings;
- - Structure and modern approaches to environmental monitoring of buildings;
- - Monitoring of physical pollutions of buildings and of urban territories;
- - Calculation of sanitary protective zones for buildings and living areas etc.

Each module has 2 credit units and contains some issues of noise and vibration control.

For teaching to each module methodical materials have been developed: lectures, laboratory workshops, methods of teaching to practical skills of noise and vibration measurements of different sources in open environment, inside of buildings, in industrial cities etc.

Author of the paper in 2014 was invited to the Second Naples University of Italy to take part in PhD commission as a foreign scientist. It gave him good possibility to compare Russian and European experience of education.

### Findings/Results

In Samara state technical university different educational programs connected with technosphere safety are realized successfully. Magister program "Monitoring of the territories with high anthropogenic load" is realized from September 2015.

Department of chemical technology and industrial ecology have advanced laboratory and methodical base as well as high qualification staff – 6 doctors of science, 12 candidates of science.

It is necessary to point out successful experience of organization of international congresses ELPIT (starting from 20030 where leading scientists from Latvia, Italy, France, Poland, Denmark, USA and from other countries are participating).

In framework of realization of program Erasmus it is assumed to develop new educational network in the field of environmental protection: "International Life-Long Learning Network in the Field of Environmental Protection" with participation of Russian and foreign partners.

### Conclusions

In total it is necessary to increase the process of integration of Russian higher education to the international educational process (also according to Bologna agreement requirements) in general and in specific field of technosphere safety.

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## Ways of Ensuring Society's Environmental Stability

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### Abstract

Human society is more and more negatively influencing the environment. Besides caused damage there is inefficient use of useful resources. An efficient approach to reducing the negative influence onto the environment at the constant development of society has to be complex. It is relevant to consider possible variants of saving approach towards resources that the human takes from the environment and, at that, to take into account possibility of recycling them and using sources of renewable energy. At that point the active social mind towards ecological problems and ways of solving them in different areas of technocratic society's activity is important.

*Keywords:* Society, negative influence onto the environment, recycling, renewable energy sources, active social mind.

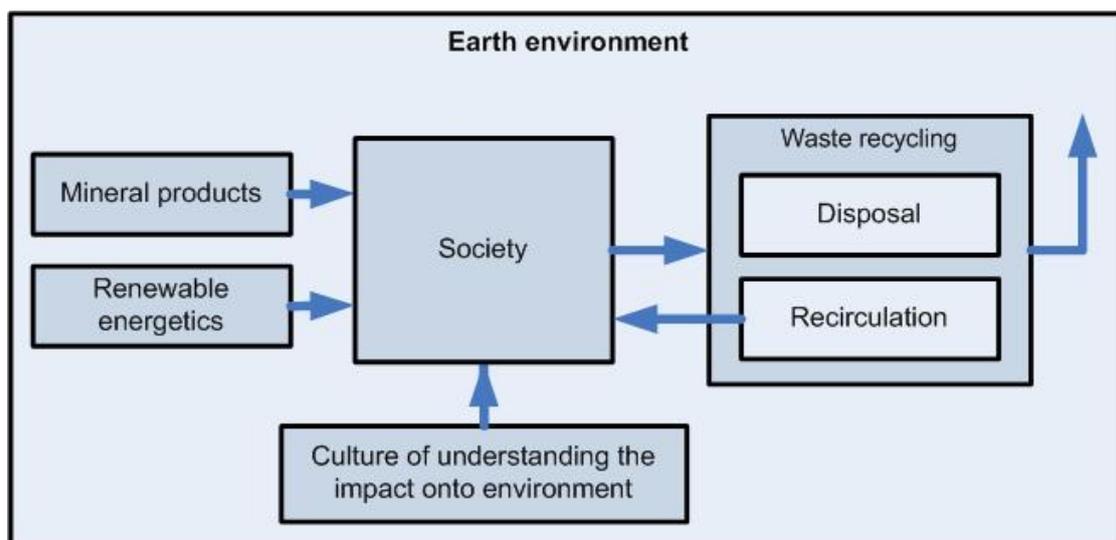
### Introduction

The human intervenes into the course of natural processes with faster and faster pace and growing force. The is why problems, related to ecology and safety of our lives, appear more and more often. Nowadays the general power of anthropogenic pollution sources, in lots of cases, exceeds the power of natural ones.

The most powerful sources of, almost, all kinds of pollution (mechanic, chemical, physical, biochemical) are, first of all, big industrial complexes. They are located around the mineral deposits, big cities and water bodies. The most dangerous polluters of air are metallurgic, chemical, oil processing and machinery building plants, factories, some military enterprises (Krasyllov, 2003).

### Methodology of Research

The possible variants of sustainable use of natural resources that the human takes from the environment are based on recycling of the share taken from the environment and use of renewable energy sources (Fig.1).



**Figure 1.** The complex approach towards the problem of constant society development at reducing negative impact onto the environment

Among the renewable energy sources the future-oriented one is use of wind energy. The direction of using not big autonomous wind powered units for supplying particular user is suggested (Zinko, 2014).

In such cases the capacity of autonomous wind devices is limited 10-20 Kw and such devices are used (Zinko, 2012), for example, for separate farming enterprises, remote from energy supplies tourist camps, cottage settlements etcetera.

Development of efficient facilities for recycling wastes will provide an opportunity to decrease the amount of minerals and other materials taken from the environment (Zinko et al., 2014). There are some methodologies offered, such as the ones using synthesis, construction and modeling of processes and constructions of machines for wastes recycling (Burmistrenko et al., 2012). Such methodologies will provide an opportunity to research exploiting capabilities of machines depending on construction characteristics of its elements and flow of disintegrating process. Similar methodologies can be used for development of technological cycles of high efficiency.

Contemporary tense ecological situation requires special research of peculiarities of human's attitude towards the nature in different cultures. Relations between the culture and the nature, between social and ecological factors are fundamental and permanent. Basing on these relations, nowadays the necessity of harmonizing relations of the human and the nature has appeared (Zinko et al, 2008). Majority of people is convinced that culture is the most important, basic feature that differentiates human and social existence from the existence of the wild nature.

No less important is the culture of understanding human's influence onto the environment. Here the important point is the understanding of the conception of the constant development of not just general human education but also its ecological aspects. The conceptual approaches to the education in general, distant or web education and classification of learning methods are considered. At such learning, the person chooses the time, the intensity, the profundity and completeness of knowledge volume (Dzhulai & Bilyk, 2004). But the person does it not spontaneously and randomly but according to the developed methods (Bilyk, 2005).

## Conclusions

The problem of negative ecological influence onto the environment is complex. It is relevant to consider possible variants of saving attitude to the sources that a human takes from the environment, at that taking into consideration the possibility of recycling and using the renewable energy sources. Here the active social mind to the ecological problems and ways of solving them in different areas of technocratic society activities is important. The right development of social mind might be provided by the efficient ecological education.

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## **SECTION**

# **“SCIENTIFIC PROBLEMS OF ENGINEERING ECONOMICS OF CONSTRUCTION, REAL ESTATE MANAGEMENT, REGIONS AND TERRITORIES DEVELOPMENT”**

## **SUBSECTION**

# **“PECULIARITIES OF ENGINEERING ECONOMICS IN CONSTRUCTION, REAL ESTATE AND LAND MANAGEMENT“**

## Assessment of Sustainable Energy Efficiency Solutions

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### Abstract

Sustainable development is influenced by several factors, both directly and indirectly affects the choice of the energy efficiency solutions. Energy efficiency measures implementation is significantly important in the achievement of the state certain objectives. The study is concerned with an impact of the energy efficiency solutions on business sector and housing sector according to the market action and behaviour.

*Keywords:* energy efficiency, energy efficient solutions, sustainability, sustainable development

### Introduction

Nowadays, more and more attention is paid to the national economic and energy sustainable development regulation and to this topic related researches. National sustainability development indicators in each country has a number of features that directly and indirectly affect both – the economic situation and the energy sector. There are several factors at different levels that impact and encumber energy efficiency solution in decision-making process. For the energy efficiency targets achievement and the country's total energy consumption improvement (such as energy performance-enhancing) should be offered alternative solutions that prevent or minimize the negative decision, that does not comply with the principles of sustainability, making the potential impact as well as reinforce the positive effects.

### Methodology of Research

In order to achieve the aims, the conventional qualitative and quantitative methods of economics and management science are used in the process of the research: analysis and synthesis, induction and deduction, logical constructive, graphics, methods of historical approach, analysis and collection of information, comparison, data grouping; sociological research methods: the analysis of documents and expert survey, the focus group method, study of normative documents, as well as collection and analysis of statistical data

### Findings/Results

The study shows that for achieving certain energy efficiency objectives, according to the Directive 2012/27/EU of the European Parliament and of the Council “On energy efficiency, which amends earlier Directives 2009/125/EC and 2010/30/EU and repeals the Directives 2004/8/EC and 2006/32/EC”, it is necessary to set up energy efficiency solution sustainable strategic assessment model, as well as to provide classification depending on the type of the energy efficiency solution and its financial capacity. The model gives opportunity to determinate the most appropriate solution for sustainable energy efficiency according to the relevant energy efficient needs and usage, and to develop recommendations for the situation improvement.

### Conclusions

International experience evaluation will provide an opportunity to compare different national experiences and to find effective solutions for sustainable energy-efficient measures. Scientific and practical solutions and recommendations will enable businesses and households more efficiently plan their activities, which in turn can improve the overall energy efficiency and sustainable development indicators in the country.

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# The Analysis of Interdependence Between Corrosion, Physical Depreciation and Market Value in the Evaluation Process of Special Construction Assets – Pipeline Transportation Systems

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## Abstract

In the assessment of pipeline transportation systems is very important for the assessor to analyze how market value is influenced by the size of corrosion. It is also interesting to analyse the interdependence of corrosion, physical depreciation and market value. Evaluation of special construction assets like pipelines is a complicated process that does not use traditional approaches to evaluation, but rather a mixture of evaluation methods because each pipeline is unique in its own way, but also because its value is influenced by many factors.

*Keywords:* value, pipelines, physical depreciation, corrosion.

## Introduction

This paper present how varies size of corrosion, physical depreciation and market value and the corrosion is influenced by several factors. The corrosion process is a complex mechanism that occurs during operation of all equipment and technological equipment in the refineries or pipelines systems or found in petrochemical installations and is done at oscillating temperature and pressure (high/low), in the presence of some work environments (type: crude oil, compressed gases, petroleum and petrochemical products, etc.). Corrosion is defined as the destruction, in a certain span of time, of metals and metal alloys as a result of chemical and/or electrochemical actions of the technological environments and surrounding or due to physical dissolutions. From the point of view of the assessor-engineer whose aim is to determine the assessment of pipeline transportation for petroleum products one is able to highlight the influence of corrosion within its depreciation.

Physical depreciatoin is defined as a loss of value due to physical factors such as elements of the pipe not repaired in due time, changes in the structure of materials, the difference between the life span of the materials which the special construction is made from.

In terms of evaluation process the impairment  $d$  is expressed quantitatively as the ratio of the effective age of the installation and the lifespan as to the cost of the new installation .

$$d = \frac{\text{Effective Age}}{\text{Lifetime}} \times \text{TheCost of New} \quad (1)$$

Applying and influence of corrosion on the evaluation can calculate depreciation according to the formula :

$$d = \frac{\text{Effective Age}}{\text{Lifetime}} \times \text{TheCost of New} \times \varphi \quad (2)$$

$\varphi$  – the influence factor of depreciation due to corrosion

$$\varphi = \frac{M_n}{M_i} \quad (3)$$

$M_n$  – the pipeline at the time  $n$  when calculating depreciation;  $M_i$  - the initial mass of the pipeline at the initial time. The influence factor of depreciation due to corrosion  $\varphi$  represents the ratio of the material mass at the time of estimation of the pipeline market value and the initial mass of material that the pipeline is made of.

In normal operation of the pipeline system there are complex corrosion processes which depend on many factors, but this corrosion processes can be grouped in two categories: corrosion which have as finality added

mass of corrosion material and corrosion which have as finality loss mass of corrosion material. In these conditions the influence factor of depreciation due to corrosion it has the following relationship:

$$\varphi = \frac{Mi+Ma}{Mi-Mc} \quad (4)$$

Mi - the initial mass of the pipeline at the initial time; Ma – the added mass of corrosion material; Mc – the loss mass of corrosion material

If in the process of corrosion occurs only added mass of corrosion material and if in the process of corrosion occurs only loss mass of corrosion material are also the situations that we analyze in this research and graphics dependencies that can be analyzed.

### Methodology of Research

The research methods used in this paper starting from the documentary research of the literature in the field of pipeline operation and evaluation, analysis and synthesis of it and improving the theoretical and practical research results by logical inference and logic abduction.

### Findings/Results

The relation between deterioration and the influence factor of depreciation due to corrosion is the quantitative expression of the correlation between depreciation and corrosion and is a very useful tool for assessors in predicting of the market value for pipeline transportation systems. The value of this factor directly influences corrosion. The higher this factor is, the higher the amount of depreciation, the smaller market value is.

### Conclusions

The quantitative implementation of corrosion for the estimation of market value of technological pipelines is an ongoing concern of evaluators as engineers have been determining the existence of corrosion for a long time now, yet this could not be found in a mathematical relation that was to show the interdependence between corrosion, depreciation and the market value. The relation between depreciation and corrosion by means of this factor is very useful for assessors in predicting depreciation. The emphasizing of corrosion within the estimation of market value through the influence of the factor of depreciation due to corrosion is a first step in a broader process of research which is meant to mathematically highlight the dependence of impairment due to corrosion on the characteristics of the material which the pipe is made of. My next research field is to measure the level of corrosion of pipelines by traditional methods and development of correlation charts between corrosion and impairment.

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# Social Partner Involvement with Latvian Special Economic Zones

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## Abstract

With rising global competitiveness, countries must do more to attract and keep businesses. One way involves attracting a core of foreign investors with the help of special economic zones (SEZ) and then integrating them in the local economy, causing industrial clustering. The purpose of this research is to find out the degree of cooperation between Latvian SEZ, and social partners in the form of various employer associations and their members. The empirical research relied on survey results conducted among 27 business associations with the combined member count of over one hundred businesses, operating in 12 broad fields. Initial results gathered from the 24 organizations that responded to the interview questions show that there is a very low degree of involvement with the SEZ by the various social partners. This shows that something has gone awry in the way SEZ operate in Latvia and has led to a lot of missed opportunities from both sides.

*Keywords:* Special economic zones, SEZ, social partners, cooperation, cluster

## Introduction

Regional development is now very topical in Latvia, since a new SEZ has been proposed and is currently in the works. The state has devoted significant resources in an attempt to boost the overall economic development, but has been met with mixed success. The fact that a new SEZ was chosen as the most recent instrument, proves that the two existing ones have achieved good results. As noted by (Zeng, 2015), SEZ can be a very powerful tool if done right, as evidenced by emerging economies all over the world, particularly in China,

However, there is more to do with SEZ to maximize their benefits. A working SEZ provides a lot of businesses in one area and thus creates a potential for future clustering. Clusters are a path to the enhancement of competitive advantages. The government should construct economic zones with cluster characteristics in an effort to enhance industry competitiveness (Hsu, Lai, & Lin, 2013).

However, a cluster cannot really be made, only encouraged. Companies need to notice the benefits and come together, without that interest there will be no cluster. In order to ascertain the amount of interest and possible cooperation between Latvian SEZ and local businesses, a number of relevant employer associations were selected and approached with a survey.

## Methodology of Research

A survey, consisting of both closed and half open questions, was addressed and sent to spokespeople of 27 business associations, asking them to resend it to their members or answer in their behalf. Said business associations work in 12 broad fields and are tasked with promoting the interests of their members both nationally and internationally. The aim was to find out the degree of cooperation between various employer organizations and Latvian SEZs, with the broad range being chosen on purpose, to find out as many possible links as possible.

## Findings/Results

Less than half of the total number of possible responses were received. From the received responses, no organization had any sort of business ties with Latvian SEZ. When asked for reasons why, the most common answer was that they simply didn't know what sort of services the SEZ needed. All 24 respondents said that they would be willing and ready to establish closer business ties with the companies working in SEZ.

## Conclusions

With the creation of a new SEZ in Latvia, regional development is very topical. SEZ are an excellent way to attract investments when done right and provide a good reason for business concentration. With good policies and incentives, it is possible to start a clustering effect. Unfortunately it seems that there is very little

to nothing in the way of business interactions between SEZ and major employer associations as of now, making it very difficult for any potential clustering to occur.

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# City Competitiveness and Development (Theoretical Aspect)

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## Abstract

Cities in the same way as firms have to grow up and development. City management must not only create an attractive social environment, a strong economy and stable development. City economic development depends on its ability to attract and support small business, medium business, as well as major local and international companies. In order to ensure the attraction of business to ensure economic development of the city city management to become aware of their options. Therefore, one of the approaches to identify your options is to use "city competitiveness" concept .

*Keywords:* City competitiveness, city development, city economics

## Introduction

The city played the role of organizing and structuring elements of the national economy. It is in the cities mostly focused financial and commodity markets, there the decisions that determine the whole course of economic life. Cities, concentrating production potential and developed commodity circulation system creates a large part of the gross domestic product. That is the main wealth of national economies is formed and focuses. .Therefore, one of the trends that characterize the world economy is the competition between cities. Such concepts as competition and competitiveness have traditionally been used in relation to the categories of goods, the company and the industry (market), Then now the competition concept is extended to countries and also to the cities. The concept of city competitiveness and broader than the concept of investment attractiveness and investment climate. Competitiveness includes categories that contribute to the attraction of the city is not only investments, but also a number of other factors. This fact determines that city competitiveness analyzes exist different theoretical approaches. This theoretical approach analysis makes it possible to better understand the city's competitive nature and its use in practice

## Methodology of Research

The aim of the article is to comparative analyze the different theoretical approaches to city competitiveness analysis. Task of the article is to make a research on academic literature. The paper adopts qualitative and analytical research methods.

## Findings/Results

The comparative analysis of city competitiveness of various theoretical approaches of is made of the theoretical base which can be used for analyzing the practical decision-making.

## Conclusions

Competition forces will increasingly make the territory as much as possible to use the total potential that they possess. Therefore, to assess the competitiveness can be based on the determination of the existence and level of development of components of the potential estimation of which will improve the efficiency of their use, and will contribute to the overall improvement of city competitiveness.

Quality information about the manager in order to evaluate his professional activities and integrity. In addition, the legislation does not provide any sanctions for cases where managers do not register in the system even if they manage only one property.

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# Housing Concept and Classification Analysis

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## Introduction

Housing plays an important role in a country's economy, typically accounting for 10 to 20 per cent of total economic activity. In addition, housing is often an individual's biggest asset (European Commission, 2005). Housing is one of the most important life components both in primeval community and nowadays giving shelter, safety and warmth, as well as providing a place for a rest. The need for housing is not only one of the human basic needs, but also one of living standard indicators of the population. Today it is topical that housing has to be comfortable, economical and reasonably maintainable, as well as architectonically expressive and well compliant with the environment (Henilane, 2015).

The concept "housing" has been treated in various ways in the economic literature, for example *as consumption good* (Smith, 1776); *as a tangible asset with potential attractive returns* (Ricardo, 1817); *as a capital similar to a machine if provided by employer but otherwise as a consumption good* (Marshall, 1890), *as the wobbly pillar under the welfare state* (Torgersen, 1987). In the dictionary of Webster housing are defined as "*dwelling provided for people*" (Webster). Similar definition of housing is given in Macmillan Dictionary "*buildings for people to live in*" (Macmillan Dictionary).

Over time have been changed approaches of housing concept which depends on the changes in the political, economic and other spheres. Designations used within applied economic literature for explanation of concept "housing" should be understood as identical ones, and at the same time there is a lack of unified definition in general for above concept.

The author believes that nowadays more attention is focused on the benefits and costs of the housing. Housing should be comfortable, convenient and appropriate, but at the same time energy-efficient and economically maintainable. Construction and maintenance of housing should be proportionate to the benefits that can be obtained from the housing.

Many concepts related to housing are defined in laws and regulations in Latvia, for example there are given the definition of concept of "flat", "building", multi-apartment building, etc., but the concept of "housing" are not defined in any of them. At the same time, since 1996 following the adoption of the Housing Policy Conception, which has considered as the first housing policy documents since Latvia regained its independence, there are used terms "housing policy", housing programs", etc. (Housing Policy Conception, 1996).

The aim of the study is to define the housing concept in general and develop proposals for the classifications of housing. Principal objectives are: to describe and analyze the literature connecting with the concept "housing" and to develop the definition of housing concept in general that could be useful for housing policies; analyze the main housing policy approaches; to develop housing classifications.

The research paper is structured in three parts. In the first part there are analyzed economic literature, scientific articles, other information resources connecting with the housing concept and developed housing concept definition in general. In the second part there are analyzed housing policy approaches. In the third part there are developed the proposals for the classifications of housing, by dividing them by different characteristics. The scope of investigation is housing concept and classifications of housing.

## Methodology of Research

The analytic research method and comparative research method are applied for the research.

## Findings/Results

Based on analysis of economic and scientific literature and also on personal working experience with housing policy issues, author has developed definition of housing concept in general and the classifications of housing.

Author has defined the housing concept in general as follows: "*Housing are buildings or building structures that individuals and their family may live in all around the year that meet certain normative regulations, including the address of housing*" and developed the proposals for the classifications of

housing, by dividing them: *by housing type; by size of housing; by housing amenities; by housing location; by social group of people living in housing; by housing ownership; by housing construction period; by housing construction materials* and by other characteristics.

The definition of housing concept and classifications of housing could be suitable for housing policy purposes in public administrations and statistical purposes not only for Latvia but also for other EU countries.

### Conclusions

There are many housing concepts and it is possible to classified housing by different characteristic. Author has developed the definition of housing concept in general that could be used for housing policy issues, especially it could be important for Latvia because there are no the definition of housing concept in any of normative regulations in Latvia, and also it could be useful in other EU countries.

Author has developed the proposals for the classifications of housing, by dividing them by different characteristics. The classification could be useful for housing policy preparation and implementation purposes and housing statistical purposes.

Housing policy is concerned with the process involved in state intervention in the housing market. There are many approaches to understanding housing policy, for example: laissez-faire economics, social reformism, Marxist political economy, behavioral approaches and others, but it is important to know that each approach is linked to a political agenda and contains an explanation of why the state became involved in housing and, explicitly or implicitly, a normative theory used to establish the nature of housing problems to be tackled by the state (Understanding Housing Policy).

The author's further researches in this sector will follow.

Keywords: housing, housing concept, housing policy approaches, housing classifications, Latvia.

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# **Economic and Social Sustainable Real Estate Market and Economic Development Problems – Historical Overview**

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## **Abstract**

The real estate market development is closely related also to the economic development, philosophical issues, and the analysis of these issues over the course of time makes it possible to explore both the historical development of these issues and the problems. The objective of the study is to analyze the main economic and real estate market development problems in the course of history, by placing a special emphasis on the economic development cycle and sustainability issues. Analysis, induction, deduction, historical and logical access methods were used in the research. Economic problems affect also the real estate market development, so the analysis of these problems is necessary in order to find and implement the solution.

*Keywords:* cycles, economic development, economic problems, history, Latvia, real estate, real estate market, sustainability.

## **Introduction**

The real estate market development and acquisition of real estate market as a whole is significantly associated with the purchasing power of the population, income splitting, formation of social strata with the course of time, and other issues, which are of great importance for the formation of economic thought. The objective of the study is to analyze the main economic and real estate market development problems in the course of the history, concentrating on the business cycle and sustainability issues.

## **Methodology of Research**

Analysis, induction, deduction, historical and logical access methods were used in the research. The historical development of the economic thought, types of the cycle and the reasons were explored in the study. The study involves the historical survey of real estate market economic, social and environmental sustainability, the influencing factors and aspects.

## **Findings/Results**

Various problems have always existed in the economy, society and real estate market. Interestingly, the development has over time also contributed to inequality. Limited resources and unlimited needs have always existed. Inequality and fair income distribution issues have been present throughout the history.

Economic problems have existed in the course of human development, and it is very difficult to achieve the satisfaction of all members of the society and high standard of living. At the same time, an optimal balance between the government regulation and free market regulation should be found, which would be appropriate for the sustainable development of the society.

## **Conclusions**

Land and real estate are the main components of the material socio - economic base, so all land redistribution issues were always important and significant for the development of the society. The real estate was always related to the economic, social, ecological, technological, political and legal issues. In any case, the society should strive to the sustainable development of the economy and the real estate market. Sustainability can be analyzed on different levels. Developed multilevel sustainability concept for real estate market is planned to be done in the future researches.

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# The Improvement of Russian State Regulation of Natural Monopolies in the Sphere of Fuel and Energy Complex

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## Abstract

It's an open secret that nowadays Russia is experiencing housing services systemic crisis: the gas industry investments are strongly constrained by unnecessarily slow pace of reforms. To overcome the crisis the interrelated program is required in all directions and levels. First of all, resolute actions in regulating natural monopolies are of paramount importance. As long as such measures are not adopted, it is impossible to organize effective public regulation. That would lead the conservation of inefficiency and high costs, low shares value on the equity market, underinvestment and conflict relationship between companies and regulators.

*Keywords:* natural monopolies, reorganization, competitive landscape.

## Introduction

Investment projects of natural monopolies are characterized by high costs and long payback periods. To successful capitalraising in such projects it is important to provide investors with a stable operating environment, to identify and fix in the Russian law characteristics of different kinds of contracts between the state and investors. It will lead to an effective mechanism of raising private investment in the real sector of economy.

Housing service monopoly enterprises in Russia have no serious economic incentives to optimize their tariff structure, reduce unreasonable costs of material and technical resources. As a result, for example, electricity costs for production and sale of 1m<sup>3</sup> of water are 30% above the European average. Water consumption per resident is 1,5-2 times higher than in Western European countries.

Monopolies subtle price formation leads to production inefficiency, to unit costs increasing of products and services, to the reduction of sales with high level of fixed costs. At the same time, tariffs discrepancy of natural monopolies could entail the budget revenue reduction, inability to update their fixed assets and further welfare decrease.

Thus, because of the management system of the company not involved in competition, production of "Gazprom" in 2014 amounted to 617 billion cubic meters of natural gas. The company managed to find buyers for just 444 billion cubic meters. The remaining 173 billion cubic meters of hydrocarbons were unclaimed (NewResume, 2016).

It is necessary to take measures aimed to promote competition in the gas industry and to the use of efficient gas saving technologies. Russian independent gas producers must obtain a non-discriminatory right to access to available capacities of Gazprom's gas transportation system.

Moreover, Gazprom will need to adapt to the new energy rules in Europe. It's possible and useful to support the proposals of "Rosneft" on:

- The Gazprom separation to two companies: transportation and mining;
- To abolish the monopoly on natural gas export;
- To liberalize the export of liquefied natural gas (Podobedova, 2015).

In 1995 the Federal law "On natural monopolies" was adopted (The Federal law "On natural monopolies", 1995). It defines the regulation forms and methods of monopolies activity, including price regulation, through the establishment of prices or their limit. However, the implementation of the Law is not effective.

Overall, in the sectors of Russian natural monopolies it's necessary to implement several reorganizations:

- Transparency and availability of information to regulators;
- Elimination of existing holding companies and the establishment of several competing enterprises;
- To create conditions for the emergence and development of independent private and public companies, which would compete with monopolies;

- To reorganize the mechanism of corporate-joint management of natural monopolies;
- The investment process must be brought into compliance with the requirements of the market economy;
- Costs should be reduced and economic efficiency should be improved.

These steps will allow to create a competitive environment and to implement effective state regulation. This will bring strong benefits to everybody: to consumers by low prices; to unregulated companies by greater market liberalization, to regulated companies by the establishment of a stable regulatory regime that will entail new investment and technical development.

The natural monopolies functioning should become a priority of industrial policy of the Russian authorities. This policy must be based on long-term forecasts of needs for products and services of natural monopolies on the domestic and global markets.

### Conclusions

It's worth pointing out, that state regulation of natural monopolies should be considered as one of the most important tools of social and economic policy of the Russian Federation.

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# Visual Environment Planning Functions in the Process of Real Estate Development

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## Abstract

The study reviews main functions of visual environment planning during the development process of real estate. Planning of visual environment responds in a practical and creative way to both the function and identity of a place. It puts land, buildings, community, economics, infrastructure and other resources to the best possible use – over the long as well as the short term.

The relevance of this topic is due to increases of the visual environment planning influence on the social and cultural spheres of life. Harmonious design becomes undeniable condition of competitive advantage in today's market and plays an important role in private life. Planned living conditions on today's real estate market are not only legal requirements, but also a tool of social control and monitoring. It forms social values, supports traditions, develops new trends, creates comfort and safety, brings stability and excitement at the same time.

*Keywords:* Visual environment planning, design, real estate market.

## Introduction

Good quality planning of the visual environment is an integral part of real estate development. The planning should drive up standards across all forms of development. As a core planning principle, plan-makers and decision takers should always seek to secure the quality of planning.

Achieving good planning is about creating places, buildings, or spaces that work well for everyone, look good, last well, are sustainable, efficient for use, safe and healthy, increase quality of living, creates added value for real estate and will adapt to the needs of future generations.

The assignment of this paper is to identify core functions of visual environment planning for the real estate development, which planning processes and tools can be used to achieve mentioned goals for entire project where visual environment planning is implemented.

## Methodology of Research

Qualitative content analysis of literature used during the study of this topic. Planning practice reports were reviewed to secure qualitative content analysis. Factors which influence real estate development processes were observed for historical and comparative analysis.

## Findings and Results

Processes and tools, objectives visual environment planning helps to achieve were identified and described. In performing an analysis of planning practice reports and literature, were identified and described 9 visual environment planning functions in the process of real estate development.

## Conclusions

1. Planning of visual environment is an integrated approach to be used in real estate development processes. Real estate projects bear the stamp of time, the level of technological progress, social and political structure of society. Main challenge is to create visually holistic, aesthetically attractive, economically valued, ecologically sustainable and harmonious project. Special importance of visual environment planning is to use resources of cultural studies, physiology, sociology and psychology, along with economics, engineering and technical knowledge. All of these skills are integrated in planning model of the visual environment which significantly increases the quality of life.
2. Real estate development proposals should reflect the requirement for planning of visual environment set out in national and local policy. Local planning authorities should assess the quality of planning proposals against their Local Plan policies, national policies and other material considerations;

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# Commercial Property Development Positively Influencing Factors: Case of Lithuania

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## Abstract

The authors are examining the key market indicators, supportive instruments for the international companies and evolution of the building policy in Lithuania, providing guidelines to the developers, who are entering the Lithuanian commercial property market. The aim of this research is to highlight the factors, which are positively affecting the commercial property development in Lithuania. The comparison, data analysis and logical access methods have been used in the research. The research results show that conditions for the commercial property development in Lithuania are favourable now.

*Keywords:* commercial property development, Lithuania, investments, governmental supportive instruments, construction policy.

## Introduction

One of the most important preliminary phases of project development is market analysis. It provides guidance for many decision makers, who are involved in property development. This ongoing process provides information during the predevelopment, acquisition, development, marketing, and disposition of property. The objective of the market analysis is to minimize the risks and maximize the opportunities for the developer by providing analysis that is as timely and accurate as possible. The data collection on the prevailing market trends is significant in construction and property development industries.

The aim of the research is to identify the factors, which are positively affecting the commercial property development in Lithuania. The scope of this research is to review main commercial property market indicators, the benefits for international companies (operating in Lithuania), and the evolution of the construction policy in Lithuania. All these factors are significant for local Lithuanian developers, as well as for international companies, international construction companies and international developers, entering the Lithuanian commercial property market.

## Methodology of Research

The data analysis, comparison, and logical access methods have been used in the research. The literature review was done through scientific publications, literature, market reports of the leading property companies and online resources analysis. The main tasks of the research were analysis of the commercial property market, analysis of the supportive investment instruments, and analysis of the building policy in Lithuania, from the view of the developer or construction company.

## Findings/Results

The research is based on data, extracted from market reports of the leading property companies, presentations from the World Economic Forum and other online resources and reports. The extracted data show the extension of investment volumes, rise of the rent rates in Lithuania. The good investment climate and effective construction procedures ensure favourable commercial property development activities in Lithuania. Due to governmental support, Lithuania is a leading country in the Baltic States in attraction of the international companies, which are creating significant demand for the commercial property.

## Conclusions

The research overviews the commercial property market indicators in Lithuania as well as factors, which are positively influencing the commercial property development in Lithuania. In the authors' opinion, there is huge potential in Lithuania for commercial property development. "Build-to-suit" projects are strongly recommended, when the project is being developed accordingly to the requirements of the end-user.

In case of speculative development, examples of the other competitive projects can be useful, to have an information about potential lessee or purchaser of such premises.

The evolution of the construction policy in Lithuania is also a positive trend. All procedures, related to construction process and territorial planning, can be performed in electronical and timesaving way (online, at any day, at any time).

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# Real Estate Valuation in Terms of Divided Ownership Rights of Land and Buildings

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## Abstract

In 20th of March 1991 Supreme Council of the Republic of Latvia passed a resolution and by the legislation of Latvia came into force a privatization process of Government`s and municipalities` properties – “About government property and ground rules about its conversion” that marked main reorganization guidelines in economics. Law “About government`s and municipalities` residential buildings privatization” stated that upon privatization is any apartment in government`s or municipalities` buildings, ignoring the fact if the dwelling space is located fully or partially on the land of the previous owners or their heirs and without the need of privatization of the specific part of land. However joint share properties appeared during the time of privatization, most of the apartment buyers as well as evaluators of the real estate properties did not pay any attention and did not consider that as a major fact that could affect market price of the property.

*Keywords:* real estate, valuation, divided ownership, municipal land rent, real estate tax, cadastral value

## Introduction

Around year 2009 in the market began a tendency at which apartments in the buildings that were located on the land that belonged to other owner or joint owners were in less demand comparing to those which included the part of land in the real estate property. This tendency shows that buyers were aware of this feature and took into discount that this fact may indicate existent or potential rent charge about the usage of part of land under property.

## Methodology of Research

The comparative method, historical approach method, data analysis and expert assessment method have been used in the study. The scientific research literature, scientific articles have been analysed, as well as the work with statistical databases.

## Findings/Results

Disproportionately wide range of cadastre values and their discrepancies to the income of the residents till now have forbidden to set a proportionate and appropriate tax according to the goals of the real estate taxes. And it should be also taken into discount that increase of such taxes could be problematic to those who have concluded mortgage contracts and have not planned payment of such taxes.

In Latvia, there is a lack of unified real estate valuation system regarding the cases of separate ownership rights, so the real estate evaluators depend only on their own experience and subjective point of view. Lack of ownership rights of the land under the building is considered a major encumbrance and such objects are not marketable, therefore a number of transactions of such objects are limited. To apply identical coefficient of the lack of land`s ownership rights in a calculation of flat`s market value would be inaccurate, because in the same housing estate the rent charge of land for the flats with a similar dwelling space may differ despite the lack of land`s ownership rights. In calculation of the market value of dwelling houses the lack of land`s ownership rights is included in evaluation with externals or economical depreciation that is made by the real estate evaluator and based on his own subjective opinion, because there has not been developed up a unified system regarding the evaluation of such objects. The problems arise in nonstandard situations, when the real estate evaluator has to resolve individually on the particular object and make a decision about the land`s actual market value`s assessment or regarding it as equal to a standard market model.

## Conclusions

Taking into discount that market situation even more and more indicated that apartments without parts of land included in the estate property are offered at lower prices comparing to those with parts of land included in the property, the real estate evaluators of the properties in the recent years considered it as a negative factor if the land under apartment property was not included in the estate property itself.

In order to calculate the apartment's market price, application of identical coefficients about parts of land that are not included in the real estate property to all of the compared objects can be inaccurate. Unfortunately, market situation and concluded contracts do not display any particular decrease of market price to the specific apartment and specific area. In such situations the real estate evaluator has to assume one specific, but approximate value decreasing correction that not always correspond to the market situation as it based on assumptions.

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# Net Zero House: Perspectives and Opportunities in Ukraine

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## Abstract

In the paper the author analyzes the future of the development of “net zero house” for Ukraine. The author systematized the main approach to define the meaning of “net zero house”. Also the author highlighted the features, characteristics and principals of “net zero house”. In addition, the author analyses and identify the opportunities of “net zero house” in Ukraine. Moreover, the author makes the economic justification of effectiveness the “net-zero house”.

*Keywords:* eco-friendly house, passive house, climate's house, energy-efficient

## Introduction

In ongoing world situation the environmental problems are the most actual. The world leaders have been researching and implementing the incentive mechanisms to solve the environmental problems for a long time. Thus, a lot of research has been already done by scientists in different directions: green economy, renewable and alternative energy, clean technology, recycling, environmental management and audit and etc. And in the modern situation it is very important to enlarge and implement the results of researching at the all level from government to an everyday people's life. It is necessary to underline that in EU countries and USA the idea of “green” mind and behaviour has already spread through civil society.

The main purpose of this article is to analyze the main characteristics, parameters and principals of net zero house with purpose to show the economic and ecological benefits through civil society. Particular emphasis is placed on the opportunities of the “net-zero house” in Ukraine.

## Findings/Results

Thus in nowadays the “net-zero house”, “passive house”, “climate's house” and “energy-efficient house” are going to mainstream in the modern world. You can find a lot of definitions and approaches to classify the “eco-friendly house”. The European countries identify the “eco-friendly house” like the “energy-efficient house”. Besides, the own standards of the energy-efficient house were accepted by the leader countries. By the way the energy-efficient house is the house with consuming less, than – 70 kWh/m<sup>2</sup> per year (Ecotown, 2016). In Switzerland the house is built according to the standard MINERGIE-P is classified as energy-efficient house. According to the US Department of Energy the net-zero building is an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy (US Department of Energy, 2015).

In South Tirol the “eco-friendly house” is named like a “climate's house”. This house is built from the environmental friendly construction materials. Besides, this building is heated by renewable resources and consumes less than 50 kWh/m<sup>2</sup> of heating energy per the year. Moreover, according to the standards the “climate's houses” is classified by three categories: A, B and C. Also the “climate's house” with category C has been being the compulsory minimal civil design standard for new building since 2005 (Ecotown, 2016).

In Germany the energy-efficient building is built according to the following standards: KfW-55 i KfW-70. The numbers indicate the maximum percentage of the annual primary energy consumption and heat's loss from the minimum indicators which were accepted by the Germany government in the energy-savings' documents. Thus the primary energy consumption according to the KfW-55 standard less than 40 kWh/m<sup>2</sup>, and to the KfW-70 standard – 60 kWh/m<sup>2</sup> (Ecotown, 2016).

The analysis of EU experience is shown that only energy-efficient house is built according to the standard of passive house is similar standard in the all EU. This standard was accepted in Darmstadt (Germany) by Institute of passive house. Thus, the energy consumption of the passive house should be less, than – 15 kWh/m<sup>2</sup>. Also the passive house should be built according to the following requirements:

1. Space Cooling Demand – roughly matches the heat demand with an additional, climate-dependent allowance for dehumidification.
2. Primary Energy Demand – not to exceed 120kWh annually for all domestic applications (heating, cooling, hot water and domestic electricity) per square meter of usable living space.

3. Airtightness – maximum of 0.6 air changes per hour at 50 Pascal’s pressure (as verified with an onsite pressure test in both pressurised and depressurised states).
4. Thermal Comfort – thermal comfort must be met for all living areas year-round with not more than 10% of the hours in any given year over 25°C (Passive House, 2016).

Summarizing the results of analysing of the approaches to define and classify the energy efficiency house the following types of it can be highlighted: standard, low-energy, passive, zero-energy and plus-energy buildings. The basic parameter of this classification is primary energy consumption in the house.

Unfortunately in Ukraine it is very difficult to change the people's mind and convince them that “green” behaviour is not only costs, but it is moreover the economic, social and environmental benefits. That is why in Ukraine the problem to enlarge and implement of green mind through civil society is running very slowly. First of all it is connecting with limitation of the detail information about energy efficiency house in Ukrainian weather’ conditions. Also the lack of understanding is invoked by the real picture of calculation the total costs and benefits of energy efficiency house.

As an example in the research we propose to calculate the economic efficiency of the passive house in the Sumy Region (Ukraine). In our research we try to calculate the costs to install the following green technologies: TIGI's solar system; Solar panel; home biogas station. For results we took the cottage with 150 m<sup>2</sup> in the village. According to the Official Database (State Statistics, 2016) in Sumy Region in average three persons live in such house. According to the receiving results we can make conclusion that payback period relate to power of saving energy technology (power of solar panel, biogas installation and etc.)

### Conclusions

The foreign experience shows that in this sphere a lot of researches have been done by scientists. Unfortunately in Ukraine the “net-zero house” have no spread yet. That is why it is actual goal for Ukraine to learn the foreign experience, adopt it according to Ukrainian features and implement to people’s everyday life. The results of analysing the Ukrainian experience in green house show that people have started to install the solar energy installation, warming house and etc., but all this activities are not complex and enlarge.

In our research we made the economic justification of effectiveness the “net-zero house”. The results of our research showed that people couldn’t see the real examples of living in the “net-zero house”. That is why it is necessary to create and implement the practice mechanism of purchasing the “net-zero house”. Moreover, it is very important to enlarge the results of living in the “net-zero house” through the civil society.

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# Estimates cost reduction opportunities using analogue building materials

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## Abstract

One of the most important parameter in building process, that is used in public and private procurement, is the lowest price. In other words – legislation of Latvia permits that in estimate forming process does not include criteria of quality, durability, the potential high cost of maintaining the building during the exploitation time. That allows the builder reduce the cost of estimate using the cheaper product or technology and let not to provide highest possible quality and the basic principle of sustainable construction.

One of possible construction cost reduction solutions is replacement of building material with equal building material, at the same time assessing the quality and replacement impact on the estimate direct costs.

Tasks of the research: do literature analysis (what is estimate, what include estimate, on what basis it is made); analyse existing building estimate, figure out which building materials is used, search for technical characteristics of materials, also explore specific junction of construction; replace selected building materials with analogous, thus reducing the direct costs of estimate; assess the impact of the building material price to quality; compare obtained estimate costs with current estimate costs; do laboratory research and compare the building materials and analogue materials technical characteristics, are they performing parameters that is definite in the declaration of performance.

As a result, obtaining construction direct costs comparison and analyzing the quality of building materials, it is possible to provide the most appropriate offer of the estimate direct costs to satisfy customer's interests.

*Keywords:* estimate, construction products, quality, technical characteristics, costs.

## Introduction

In Latvia there are no regulations for estimation of construction costs, that would determine specifically how to draw up the estimate and what must be included in the estimate. There also are no regulations, which define how extensive should be descriptions of construction. The only legal act for estimation of building costs is the Latvian Building Code LBN 501-15 "Procedures for Determination of Construction Costs". Each customer is interested to achieve the desired goal, but the most important is to do the work, consuming the least possible financial resources.

Low costs of building object is one of the factors that influence the quality of construction. The lowest price principle cannot be assessed as objective and it does not guarantee the quality of the building. During evaluating offers it would be more objective to take into account the price-quality ratio. (The possibility of errors in construction) Unfortunately, the lowest price shows the cheapest result. This correlation is observed directly in the public sector, where the customer does not wish to overpay and even sometimes are forced to choose the lowest offer, as a result there are a number of problems during construction or exploitation time. In private sector with paying capacity the building result usually is much more qualitative. (Lowest price)

Customer must evaluate existing risks by choosing the offer with the lowest price and carefully examine each offer, otherwise in the long term customer would have to pay for the same work twice. Sometimes the actual price cannot be determined, because customer chooses the lowest price offer, but it does not mean that the object is going to be built by presented value of building costs. During the execution of the work or approaching object putting into service there could be announced additional works, which sometimes can be up to 15% extra costs of starting price. (Construction practice)

## Methodology of Research

Research is based on real estimate of family residential house with there included building materials. During the research process there were selected certain building materials, done analysis of their technical data, found analogue materials, done their laboratorial and theoretical comparison, compiled data and compared costs of one unit of building material.

For selected building materials are searched alternatives – after following technical characteristics analogue building materials.

During the research there were carried out analogue and similar building materials technical properties and costs analysis and comparison between manufacturer data and estimates. While developing research work, there were used data collection, comparative method and analytical method.

### Findings/Results

In the result of the research work are gathered laboratory measurements and the results are compared with producer defined building materials parameters. From the results it is found that the selected analog materials are equivalent. In the result of the test estimate costs are overviewed and determine what is the change in the price, does it increase, remains the same or decreases.

### Conclusions

The following conclusions were drawn:

- the hypothesis of the research was confirmed - direct construction costs can be reduced by the replacement of the building materials with analogous materials;
- as a building materials prices are variable , need to carefully follow the changes, also the same building material cost can be different at dissimilar building materials suppliers;
- selecting analogue building materials it is possible to see that unknown building materials producer offer equivalent materials, but for remarkable lower prices;
- customer need to evaluate existing risks when choosing to realize the offer with the lowest price. During making decision it is necessary to objectively evaluate price and quality relation.

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# Impact Investment of Project Financing: Opportunity for Banks to Participate in Supporting Green Economy

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## Abstract

The article analyses impact investment of project financing. Companies' own funds, own funds of the consortium members, the company's own resources and budget funding, own funds of the company on the basis of a production sharing agreement, borrowed funds; the funds raised by the bond issue are all considered as the project financing sources in the natural resource field. The purpose of this article is to consider various opportunities to support environmentally oriented projects in the framework of project financing, including through attracting funds of banks for the development of "green" economy. The role of banks and the banking sector in supporting environmentally and socially oriented projects is analysed. The experience of banks in Asia, Europe and the United States in terms of "green" economy projects is shown. Moreover, environmental and social risks, and impact of a project, the project compliance with the norms and standards of responsible finance are all considered in this article.

Classification of environmental projects with the purpose of project financing is proposed, and also the scheme of interaction between stakeholders is shown, including banks, in the implementation of projects reducing greenhouse gas emissions. Furthermore, impact investment in financing projects with the participation of banking sector is analysed and justified on the example of such countries as Mongolia, Russia, Japan, the United States and others. Evaluation procedures and the selection of projects for social investment purposes are shown in the article, including the measures of supporting banks for the project implementation in the field of "green" economy. The following research methods are considered: systematic analysis, environmental economic analysis environmental auditing, statistical methods for evaluating the costs and benefits from implementing environmentally oriented projects, methods of assessment of damage from environmental pollution, etc.

*Keywords:* Bank participation, environmental economics, "green" economy, impact investment.

## Introduction

Project financing is a special form of financing projects in which the assets and liabilities of investors, not related to the project, are legally separated from the project, while the return on capital is ensured not with assets of the borrower but by the project future cash flows. Social investors, in comparison with the traditional ones, while making investment decisions, consider not only the expected financial results and the level of risk, but also the expected social impact. High efficiency in solving social problems can balance low profitability. At the same time impact investors can rely on a number of benefits.

**Firstly**, it is a fast-growing market. According to the forecast of social investors' global network (Global Impact Investment Network – GIIN) and JP Morgan, in comparison with the year 2015, there will be a 20 % growth of total investment of 125 leading social investors in 2016.

**Secondly**, almost all countries face the necessity of permanent reduction in budget expenditures. It encourages governments to transfer their social functions by outsourcing private companies that can provide more efficient use of funds and ensure better quality of social services. In addition, private providers of social services can be more creative being in compliance with the established quality standards by the country, and also their services are more focused on the needs of specific customers.

**Thirdly**, the principle of "payment for social results" in country's social policy is getting replaced with the principle of "payment for services". This approach reduces the risk of impact investors due to their diversification.

**Fourthly**, some social investments, such as microfinance, provide a good financial return on the average market level.

## Methodology of Research

The following research methods are considered: systematic analysis, environmental economic analysis, environmental auditing, statistical methods for evaluating the costs and benefits from implementing environmentally oriented projects, methods of assessment of damage from environmental pollution, etc.

### Findings/Results

“Natur-Aktien Index” (Nax) was established to evaluate the effectiveness of environmentally oriented investments, which shows that these investments have achieved great success as compared with most of other funds and individual stocks. Analysis of market opportunities determines the direction of banking services diversification and the creation of new types of ecological services of banks. This is the flexible use of a wide range of banking products for financing environmental business. NERAX Eco indices can already be used to attract investment of socially responsible foreign funds to cooperate with Russian companies.

### Conclusions

Taking into account the public opinion about banking activities of environmental protection, in our opinion, it is advisable to use “integrated reliability index”, which takes into account the degree of support of the bank in environmental programs and interventions. Sponsorship of banks in the improvement of environment and holding ecological lottery, the raised funding which is directed to the preservation of rare species of animals, financial support for social “green” movement and others have significant effect on the overall image of the bank.

To objectively assess the bank there should be the following indicators based on its activities in the field of environmental protection:

1. The share of funds allocated for environmental purposes;
2. Liquidity ratios should be calculated taking into account the client’s environmental obligations, while issuing the credit.

Commercial banks, in addition to their classic operations, may invest in environmentally oriented projects that will allow them not only fulfil their social responsibility and thereby strengthen the confidence of present and future customers, but also manage their resources effectively.

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# Community Participation In Village Development: a Case of Latvia

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## Abstract

The research provides an insight into the village development planning essence, at the same time looking at the village planning from the point of national planning framework. Also local settings of the village development have been taken in account. The research provides information about possible approaches for local community involvement in development decision making.

*Keywords:* Village planning, community development, community involvement

## Introduction

Over the last decades after the Republic of Latvia regained independence there has been significant changes in the country development. There has been established a democratic country, advancing a new base of regulatory enactments to ensure development of the country, as well as devoting major effort to the development of civil society. Taking into account the positive changes, as well as necessity of the continuous process development, there is a need to encourage the system of regional improvement in the country, in the direction that would make local communities in its lowest territorial levels to participate more actively in decision-making as well as to participate in the development of its area. This article aims to look at the current situation in the involvement of local communities in the progression of local territories and to present proposals for public involvement models pate more actively in decision-making as well as to participate in the development of its area.

## Methodology of Research

The primary method used in the research was logical and historical access method. In addition, analysis of the factors, induction and deduction methods were used in the research.

## Findings and Results

In performing a more thorough analysis of national legislation, international context and principles of sustainable development 3 models of local community participation in development decision-making were identified. During the analyse and comparing of these models, authors created conclusion that most effective way of community involvement is composite model with formal and informal features.

## Conclusions

Based on this research following conclusion are made:

1. Europe and the world has experience with village planning approach to foster local development – both through private initiatives, as well as with the common national policies. At the same time the planning system of Latvia does not lay down specific terms of local (village) development planning.
2. In the panning system of Latvia is not intended for village development level, although the local society is best aware of its local problems and are able to find the most effective solutions to prevent them. At the same time has to be aware that the highest added value to the village planning (including implementations of plans) can provide mutual cooperation, because there are advantages in the hands of each side (for example, local society - knowledge of local problems, but local municipality – material and non-material resources). Use of common advantages in combinations to the qualitative administration could find better solutions, as well as increase the life quality of the village citizens and satisfaction of their residence.
3. Using the mixed village planning model and involving wider range of sides interested into village development, it can be obtained widest possible range of views (and the needs), to promote shared public responsibility of the village development, as well as find the most effective (in financial terms as well) solutions, which could considerably increase citizens of village satisfaction with the living space in the future.

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# **Analysis of Quantitative Methods of Risk Assessment and Selection of the Optimal Using Venture Investment in Innovative Projects in Construction**

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## **Abstract**

One of the main factors which constrain activity using of venture investment in innovative projects in the construction is a high risk of this type of investment. Thus, the problem of assessment is relevant in the venture investment innovative projects risks. First of all, it should be noted that the risks in the construction industry and have considerable specificity heterogeneity. Real options are an important tool with venture investment at all stages. It can be widely used in innovative projects in construction for accurate risk assessment.

*Keywords:* risk in venture investment, methods of quantitative risk's assessment, real options method, models of the Black-Scholes and the binomial.

## **Introduction**

One of the main factor which holds back the activity of using venture capital in innovative projects in the construction is a high risk of this type of investment, in addition to this factor can named the unstable economic situation, the lack of regulatory framework, lack of qualified personnel. In connection with this the problem of assessment risks in innovative projects is relevant if using venture investment. Analysis of existing methods for quantitative risk analysis made by the authors shows that the risk assessment of the innovative project using venture investment, it is necessary to assess all of the existing methods and choose the one that would take into account all the specifics of venture investment, and in addition can be used for the construction industry where the risk factor (uncertainty), is large, and the degree of the study of this problem is insufficient. This is due to the fact that the most innovative projects in construction are realized at the expense of traditional sources investing- this is bank loan.

## **Methodology of Research**

The real options is the main progressive method of analysis evaluation of innovative projects in the conditions of high uncertainty and risk. The important advantage of using the method of real options is the possibility of the adoption of flexible management decisions under conditions of high uncertainty for making the financing of innovative projects in construction. What is particularly important in the case of venture projects in the early stages, where the level of such uncertainties and the risk is extremely high. In addition, the real options method takes into account a greater number of factors: the period during the retained investment opportunity, the uncertainty of future revenue, the current value of future cash flows. Analysis of the possibilities of practical application the real options method showed the feasibility of the two main models of optional to assess innovative projects in the construction and validation of an effective strategy for stepwise investment venture projects:

1. Black-Scholes model (Black Scholes options pricing model, BSOPM,
2. binomial model (Binomial options pricing model, BOPM).

The Black-Scholes model of real options is based on the similarity with the european koll- option, and it is assumed that the time of the project are fixed, in reality, this may not be the same. In addition, the model is best used to assess the real options with the only one source of uncertainty and fixed date of performance.

The main advantage of BOPM model is the ability to track changes in the price of the basic asset at the time, which allows to evaluate not only the european options (with a fixed date of performance), and american options, include a model of an unstable dispersion, to take into account changes in the exercise price, which can not reflect a using the Black-Scholes model. On the one hand, the binomial model allows to visualize the possible scenarios of development of the project, which facilitates the interpretation of results and making -decision, on the other hand, requires more calculations.

## Findings/Results

Application of the real option method is useful when there is a high degree of uncertainty of results of the project, the possibility to make flexible decisions when new information and the negative value of NPV (net present value) appear on the project. Analysis of real options is particularly useful in assessing the value of venture investment in construction, the commercial viability of which is very difficult to prove in the development phase.

## Conclusions

1. The method of real option is an important tool for innovative project management using venture investment at all stages.
2. Its application in practice may provide a more accurate assessment of risk analysis in the construction of innovative projects, and in general, can be a catalyst for innovative development of the economy.

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# Capacity of Professional Specialists to Improve Management of Large - Scale Housing in Latvia

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## Abstract

The issue of residential housing management organization (depending on the selected residential house administration form) is relevant both from a residential house apartment owner's point of view (if the apartment owners choose to manage the house themselves) and from a house manager's point of view (if the residential house management is entrusted to a professional manager). This is because housing management requires knowledge, experience, financial resources and the manager must not only comply with the law requirements, but also he has to please the interests of apartment owners.

*Keywords:* residential housing manager, Residential buildings Management models, professional competence, education,

## Introduction

To manage a residential apartment in Latvia, the manager needs to have appropriate professional education, which according to the law is at least the fourth grade of professional qualification level. The importance of the study is due to the fact that the Latvian law requires an obligatory professional education for the housing manager to perform his duties, which can be obtained in a number of state educational institutions. During the management process house owners can choose their preferred housing management model, but the current managers register does not provide comprehensive information on professional managers. The state system does not work properly, now it does not list all educated housing managers or interns that are working in the house management field.

## Methodology of Research

The aim of the article is to explore the residential housing management models and the level of required managers' qualification for them to comply with the management processes.

Task of the article is to make a research on academic literature, legal requirements of housing managers' competence clarify management models and participants, research educational statistics of Latvian managers' qualification. The paper adopts statistical, qualitative and analytical research methods.

## Findings/Results

It is necessary create a unified and systematic property manager registration system in Latvia given the opportunity to obtain comprehensive information on professional managers in order to evaluate their professional conduct, competence and integrity.

## Conclusions

Housing management register is an informational list, whose main task is to provide updated information on persons engaged or wish to engage in residential housing management in compliance with criteria written in the housing management law. However, the study revealed that the register does not contain complete information about the persons who have obtained professional education and offer their management services. It does not give home owners to obtain quality information about the manager in order to evaluate his professional activities and integrity. In addition, the legislation does not provide any sanctions for cases where managers do not register in the system even if they manage only one property.

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# Property Insurance in Real Estate Management

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## Abstract

In the world we have 3 major types of real estate property. They are divided into groups: vacant land, residential properties and commercial properties. Buildings is the major importance of national economy, real estate market, residential housing, construction industry and others industries. Also the major importance of real estate management is risk management, and one of the part of risk management – property insurance. A part of risk management is determination of risk versus reward. **Risk Transfer** - the most prevalent way of dealing with risk is to purchase insurance to transfer the risk to the insurer.

The main sense in property insurance is building recovery value, also what kind of risks will cover insurance, for the property. It could be “named perils coverage” (A property insurance term referring to policies that provide coverage only for loss caused by the perils specifically listed as covered) or “all risks coverage” (Property insurance covering loss arising from any fortuitous cause except those that are specifically excluded). This is in contrast to named perils coverage, which applies only to loss arising out of causes that are listed as covered.

The research focus sets property insurance elements and factors influencing them. The significance of the topic is set by the economy and industry in Latvia sustainable risk management model in constructing, property management and insurance industries in accordance with probably future losses on property.

The comparison, data analysis and logical access methods have been used in the study and the recommendations on the improvement of the situation have been developed.

*Keywords:* Named perils coverage, all risks coverage, all risks insurance, named risk insurance, real estate market, property insurance.

## Introduction

All risks coverage is the major importance in the management of real estate in the focus of property insurance. Management of real estate has the ownership responsibility imposed on real estate long-term existence, ensuring maintenance of the property and the processes related to real estate management. Real estate management is an issue for Latvia where a large percentage of real estate constitutes the housing fund. The problem is in the insurance coverage (Named perils coverage or all risks coverage) calculating of the recovery value of the buildings for property insurance. In Latvia is no united system for property insurance, it is not obligate for property owners (except if property owners have a mortgage loan) and legislation guidelines of calculating recovery value for buildings. The relevance of the study is determined by the fact that the solving the problem insurance coverage (Named perils coverage or all risks coverage), developing united system for real estate management, construction industry, insurance and regulation basis affect also the country's socio-economic development.

## Methodology of Research

The objective of the study is property insurance is one of many parts of the risk management solution in real estate management for the detection of the problems in the context of sustainable development and improvement of the situation. The main tasks of the study are: the theoretical and scientific aspects of the research, management system development and operation, process influencing factors, including economic factors, data analysis, conclusions and recommendations. The comparison, statistical data analysis, data analysis and logical access methods have been used in the study.

## Findings/Results

The several following proposals are put forward for the improvement of the situation: the state should undertake an active role in this process of the solving the problem of property insurance, developing united system (buildings recovery value) for real estate management, construction industry and insurance. Developing system of obligate property insurance in Latvia.

## Conclusions

The results of the study show that property insurance is the main part of risk management of property management is a multi-step process, which requires a comprehensive approach and close attention to a number of the existing problems in the country. Some factors, such as the access to finance, structured legal environment and information feedback - all make a direct impact. All the above mentioned aspects have a direct impact on the national and regional economy of the country and the development of it.

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# Perception of Standard Multi-Storey Residential Building Owners on the Technical Condition of Buildings, Energy Efficiency of Buildings and Building Value Increase in the Period of Development from 2005 to 2016; Perception Case Study in the Sociological Surveys

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## Abstract

Generally known is that in any society individual has to five basic needs - food, clothing, health care, compulsory education and habitation. Without the residential warm, safe and affordable rooms is difficult to imagine human existence. In Latvia, as well as it's in the capital Riga a significant portion of the housing is used in a standard apartment houses, so it could be considered that society most widespread housing type of property is an apartment property.

Most of this sector property is built until 1991, which affects both in its technical condition and old-fashioned layout and its use can traditions. In connection with the fact that the housing stock has become obsolete and requires a renewal processes both to improve the quality of life of citizens and building technical advancement, it is necessary, attracting a variety of sources of financing to carry out renovations.

However, before proceeding to major building renovation projects, we are faced with a rather large the opposition to the restoration work, thus need to take a standard residential building owners comprehension a study on technical condition of buildings and their understanding of the building renovation issues.

In 2016 the project "Climate impacts, adaptation to climate change and flexibility in the socio-economic assessment of the value of apartment blocks in Riga and Latvian" ("Riga apartment houses neighborhoods Sustainable Development") in the course was conducted in apartment buildings live a survey with the aim to explore the apartment owners understanding of their own residence - apartment buildings and architecture, technical equipment, engineering, operations and maintenance of the need for environmental and health issues. A similar study was conducted in 2005. In turn, this study resulted in a typical apartment building owners understanding of the technical condition of buildings, energy performance of buildings and building value increase development comparison period from 2005 to 2016, the change in level.

*Keywords:* standard multi-storey residential building, renovation of the building

## Introduction

European Union and on a global scale in the construction industry undergoing profound structural changes: changing perception of construction industry as a whole and a new and stricter requirements area of environment protection accepting energy efficiency, increased attention is being paid to the cultural and historical heritage and the adaptation to the needs of modern society (Stāmure, Kamola & Geipele, 2015)

Before starting the building renovation projects, we are faced with a rather large the opposition to the restoration work, thus need to take a standard apartment building owners comprehension research on technical condition of buildings and their understanding of the building renovation issues. (Geipele, Geipele, Slava & Stamure, 2012)

So In 2016 the project "Climate impacts, adaptation to climate change and flexibility in the socio-economic assessment of the value of apartment blocks in Riga and Latvian" ("Riga apartment houses neighborhoods Sustainable Development") in the course was conducted in apartment buildings live a survey with the aim to explore the apartment owners understanding of their own residence - apartment buildings and architecture, technical equipment, engineering, operations and maintenance of the need for environmental and health issues.

## Methodology of Research

For research surveys of target groups were defined permanent residents of Riga City aged 18 to 74 years. Riga City has the largest population, as well as all current standard series of residential buildings in which the inhabitants of apartments.

The survey was used quota sampling in determining the number of respondents in this project set the Riga neighborhood standard building groups of buildings. The specific standard of the respondent the standard building group of buildings or district was selected by random stratified sampling principles. The study surveys the process as a whole was realized in 3007 interviews.

To carry out survey questionnaires were prepared in Latvian and Russian languages. Interviews conducted by highly qualified and specially trained interviewers.

As the survey method was used to direct (face-to-face) of respondents places of residence, depending on the of the respondent preference using the questionnaire in Latvian and Russian languages.

Any research results always there is some statistical error probability. These differences, which belong to the statistical error range or smaller than what can be considered as minor. The maximum possible statistical error of the results at the 3007 respondents in a large sample is +/- 1.8%, which corresponds to the study.

Surveys from Riga standard building districts, in accordance with the draft laid down zoning divided into 10 areas according to the project specification.

### **Findings/Results**

Latvian climates housing is one of the main basic necessities. However, the prevailing view tradition urban apartment house owners of apartments in the environment is that of an apartment house total situation is not their responsibility. The responsibility of a third party. Although the apartment houses privatization is completed before more than ten years, I think momentum is maintained from the time when the apartment and the house in general was not a family property.

The apartment and the apartment house co-ownership share in most cases the families housed in the largest property, the greatest material resource. It would be understandable if the housing as resource conservation, as well as its use in preservation is dedicated to the family budget. However, the 2016 survey results show that this issue is not understood only part of the respondents "recognizes" this concept and an even smaller part of the ready to invest in the home state of the market, use and maintain the value of depreciation faults. (Law On Administration of Residential Houses, 2010)

The second issue related to housing, is both its running costs, starting with the economy of resources at the level of the apartment and the whole house level, as well as home and its surrounding aesthetic appearance or creation of "home environment as an object retention" (Oša, Auders & Krauze, 2010). On that point also apartment owners of more developed understanding of the necessary utility costs as a result. Almost every survey participant answered in the affirmative on energy and water savings, as each apartment has a corresponding counter. It should be noted that in comparison with a similar survey in 2005 results of the 2016 survey respondents as the main energy efficiency measure, the decrease in consumption of thermal energy for heating.

This change of views has been shaped as a consequence of thermal energy price increase during the period from 2009 to 2013. Partially apartment owners an idea of the thermal economy of the possibilities created by the Latvian marketed and promoted apartment building energy efficiency project results.

### **Conclusions**

Apartment owners and users of their apartment house legal and technical support essentially probes according Societal traditions and their level of education. Partially answer to this question follows from the survey results, the respondents raised questions about the number of years lived in the apartment, respondent's age and level of education. It would be inappropriate to ask of each respondent's professional knowledge of the housing structure.

Objective of Latvian law and regulations of housing is to sustainably organize housing preservation and to provide each residential house with a special trained professional manager. However, a decision on the maintenance of an apartment house adopts its owner (community of apartment owners). Also the 2016 survey results show that more than 80% of apartment owners as the main manager is considered not to house sanitary care is only one of several mandatory to carry out management activities.

If a residential house manager implemented the mandatory specifications management activities and set up the planned administration documents (management plan of work, House case, the financial statements and planned repair plan), then these documents or their summaries must be submitted to the apartment owners. In this way, parallel to the manager to direct management work to promote awareness of apartment owners of residential buildings technical condition and management of the content.

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## Building Insulation and Process Management Issues

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### Abstract

Considering consistent, predictable and inevitable thermal energy price increase, in the near future Latvia will have to deal with energy efficiency policy objectives in accordance with the government to adopt the European Union's directives on the energy performance of buildings, as well as programs, plans and legislative provisions are implemented at the local level with the aim of reducing energy consumption in buildings and create the required database. It is necessary for the future management of processes starting with investment and construction management and achieving the planned performance. In order to improve both energy production and supply and consumption efficiency should be used other European countries experience, in this field promote efficiency topic popularization, explaining to the population the need of importation as well as implementing energy efficient measures. Also by executing energy efficient measures with already well-proven technical solutions, not to forget about the application of innovative technologies, alternative energy sources introduction and scientific research.

*Keywords* - reconstruction, insulation, development, investment programs

### Introduction

Reconstruction of residential buildings is one of the most important directions of the housing problem solutions. This solution provides the opportunity not only to extend the life cycle of the building, but also greatly improve house quality, equip building with modern engineer equipment, improve architectural expression of the building and increase their energy efficiency.

Particular focus in the building reconstruction process has to be done on construction materials and work execution methods of eligible ecological requirements. In reconstruction technology has to be included disposal of dismantled elements and re-use, as well as work execution methods which excludes dust generation, material dispersion, increased noise and vibrations at different periods constructed buildings. It requires an individual approach to the development of methods and reconstruction technologies.

### Methodology of Research

The aim of research is the examination of the Building insulations and process management aspects for Latvian municipalities and population for the detection of the urgent problems and finding solutions for this area reliability growth while solution choices for improving construction and maintenance effectiveness and efficiency. In this case, which every year become increasingly topical of the European co-financing programs administration for building insulation and determine the actual energy efficiency improvement measures savings with CCFI data analysing and implementation as a part of projects (impact of the measures on the environment, including climate change) and the environmental impact of technical and economic assessment.

An increased focus on the indoor climate, in accordance with standard BS EN 15251: 20076 energy certification of the building is irrelevant without the indoor climate certification. Therefore, according to this standard, only finding the optimal balance between building microclimate indicators and building energy efficiency can be provided economically energy efficiency improvement measures implementation and compliance with the growing public demands for healthy living environment and comfort, as well as a proposal for the development.

### Findings/Results

All over the world, including the European Union (EU) is facing unprecedented challenges which are posed by the need for energy resources and the increased dependence on fossil fuel imports, as well as the need to limit climate change. European Parliament and Council directive 2012/27/EU for every efficiency number 1 identified, that this way is a valuable remedy to address these challenges. By increasing energy efficiency measures is possible to improve energy supply security, reduce primary energy consumption and energy imports, and in profitable way reduce greenhouse gas (GHG) emissions.

Looking at the overall energy balance of the European Union, nearly 40% of final energy consumption and 36% of GHG emissions come from homes, offices, shops and other buildings. Has been identified that buildings energy efficiency has the second largest untapped and profitable energy consumption potential after energetics sector. In addition, energy efficiency in buildings has important additional benefits, including employment improvement, energy poverty prevention, better health, greater energy security and industrial competitiveness. To avoid such economically baseless project realization, in direction 2012/27/ES about energy efficiency is said that energy audit reports should be based on energy efficiency improvement measures in the life-cycle cost analysis, rather than on simple payback periods.

Based on the analysis of the currently publicly available information, it can be concluded that with energy efficiency programs support Latvian is insulated 815 multi store residential buildings. Latvian is built and managed approximately 330.6 thousand apartment houses, which will be necessary to carry out the reconstruction work where most important measurements – how to keep energy and CO2 emissions savings with construction costs per m2.

### Conclusions

The reasons for high energy consumption are well known, and energy wastage generated effects can affect the near future to achieve maximum energy efficiency - it is necessary to compose a set of complex actions in design solution using correct data. Life Cycle Assessment is a systematic product or process performance analysis throughout their life cycle, including in materials extraction, production, that using for the all process stages - the disposal and recycling of this product. Whether it is cost effective or not to start applying additional insulation, depends on the fixed costs per m2, the starting point regarding U-value and the costs of saved energy. The study demonstrates that once the cost savings for heating and cooling energy exceed the total investment costs for insulation measures, the optimum U-value (mainly determined by the contribution of insulation) is, in any given location, identical for different insulation applications as long as no technical limitations occur. U-value optimum only depends on investment costs for the incremental centimetres of insulation and on the corresponding additional energy-cost-savings.

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# Main Arguments Applied for Restricting International Real Property Transactions

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## Abstract

Economic openness in countries differs between liberal, open economies which usually allow land ownership by foreigners and limited, closed-to-foreigners economies which include restrictions of land ownership by foreigners. The general arguments for establishing such restrictions (limits) are political, social, economic, and cultural interests, however these are overall reasons. The assignment of this paper is to research these arguments more thoroughly by analysing writings on these subjects and to create a frequency table reflecting the findings. To accomplish this, the main question to be answered is: what are the main arguments used to restrict international real property transactions or alien, i.e. foreign, land ownership? Materials used: 24 scientific papers to carry out qualitative content analysis, and additional pertinent bibliographies.

*Keywords:* International real property transactions, Land ownership restrictions, Land foreignization

## Introduction

There exists a wide range of factors which either limit or promote international real property transactions – political, economic, legal, psychological, etc. Countries implement certain policies which either promote or hinder international real estate or land investments. It is viewed that land alienation to foreigners enhances foreign investment and economic development, however, some countries tend to limit such transactions. The assignment of this paper is to identify and then explore the arguments used for the restricting international real property transactions.

## Methodology of Research

The primary method used in the research was qualitative content analysis of scientific literature regarding this topic. Materials used were: 24 scientific papers to carry out qualitative content analysis, and additional pertinent bibliographies. In addition historical, empirical and comparative analysis of the factors which influence international real property transactions were examined.

## Findings and Results

In performing a more thorough analysis of 24 scientific papers 24 arguments were identified. Of these, 14 can be identified as 'generally used categories', 5 as too broad, and 5 as rarely used. Because general arguments for alien (foreign) land ownership restrictions – political, economic, legal, etc. are too broad, additional detailed research is required. The identified arguments for the restrictions of real property alienation to foreigners can be the basis to substantially limit international real property transactions.

## Conclusions

From the research it can be inferred:

1. The arguments concerning restrictions or limitations regarding international real property transactions or foreign land ownership in general are quite extensive;
2. In order to determine the arguments for restrictions regarding international real property transactions, the general characterization of them, i.e. political, economic, legal, etc. is insufficient. Because these general characterizations are too broad, more detailed research is required to determine the arguments for restrictions;
3. Any of these detailed arguments can be a sufficient reason for substantially restricting international real property transactions.

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# The Competitiveness of the Region, Taking into Account Environmental Constraints

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## Abstract

The article deals with topical problems of economic development of regions, increasing their level of competitiveness. The formation of a holistic view of potential opportunities in the region, a detailed study of the existing problems will contribute to the strengthening of the position of the Republic of Buryatia not only at the level of the Russian Federation, but also at the level of the world economy.

Keywords: regional Economics, economic development, competitiveness of the region, environmental constraints, innovative development

## Introduction

Modern trends of economic development are characterized by increased attention to problems at the regional level. The development of the region due to various socio-economic factors, including the location of production and industry characteristics. In addition, the most important factors influencing the level of economic development can be attributed to environmental constraints, which can be considered as a deterrent or, conversely, stimulating the development. The competitiveness of the region often comes down to the ability of its to sustainable development, that is, the ability to produce more wealth than competitors, to create conditions for the growth of indicator of the quality of life of the population and have the ability to pay for the funds received. To assess the competitiveness of regions or countries is difficult. You need to determine what to take for a basis of evaluation. Since the region is a system of socio-economic space, with a production structure of all forms of ownership, communities, workplaces and governments, that competition is possible at the level of each of these elements.

Also, according to Paul Krugman, the use of the concept of competitiveness to the economy unnecessarily, since none of the countries does not become bankrupt in case of failure (as is the case with companies). On the contrary, porter argues that countries gain a competitive advantage if you can create conditions so that enterprises and industries have become competitive on a global scale.

The development of the competitiveness of the region and the country as a whole is structured around the following four stages (levels): competition on the basis of production factors, competition based on investment — competition based on innovation competition based on wealth. The first three stages provide economic growth, the latter causes stagnation and decline.

Competitive advantage of the region is provided by:

- in the first stage — due to the factors of production: natural resources, favorable conditions for the production of goods, skilled labor (provided by one determinant);
- in the second stage — on the basis of aggressive investment (mostly national companies), in education, technologies, licenses (provided by three determinants);
- in the third stage — through the creation of new products, production processes, organizational decisions and other innovations;
- in the fourth stage — at the expense of already created wealth and is based on all determinants which have not been fully used.

In this case, the factors determining the competitiveness of the region are the state of the financial system, the level of industrial production, quality of life, infrastructure development, social environment, political situation and the role of the public sector in the regulation of the economy. In General, the strength of influence of particular factors is determined by their inclusion into the categories internal or external. Internal factors: resources of different kinds (natural, economic, human), that is, that this either historically, or is a natural heritage; external - that affects the region from the outside, starting from global level to country level. The structure of competitiveness of each region varies greatly, as no nation can be competitive in all or even in most industries. Ultimately, the region can achieve success in certain industries, because their internal conditions are appropriate, the most dynamic and promising.

For the Republic of Buryatia, competitiveness refers to harmonious relationship in the development of all sectors of the economy subject to environmental constraints. The main cause of conflict is the presence of a natural world heritage site – lake Baikal. According to the report of the company "Strategy partners Group"

"On the competitiveness of Russia". Regions to improve the performance of the Republic of Buryatia took 18-th place in the ranking of international competitiveness of Russian regions of the 30 most developed Russian regions. The rating was published in the report on the XI International investment forum "Sochi – 2012" at the session of Sberbank of Russia. In the ranking compiled by the Eurasian Institute of competitiveness, the Russian regions are compared on five criteria: national factors, underlying conditions, portfolio clusters, business climate, efficiency and strategic focus of the administration. Overall economic performance of the Buryatia Republic noted in particular, the growth of foreign direct investment, a significant growth in per capita gross regional product, employment change, and so on. However, the rating does not measure the level of welfare, and shows the potential that can be used for economic development.

In our opinion, competitiveness of the Republic of Buryatia depends on the following interrelated elements:

- first of all, this is the industry competitiveness of the region. Characteristic climatic and territorial characteristics determine the development of industries, agriculture and manufacturing. One of the factors contributing to the development of agriculture, is the state support of agricultural producers, including peasant farms, which is carried out in the framework of realization of Republican target programs such as "Development of the agroindustrial complex and rural territories in the Republic of Buryatia in 2011 - 2017 and until 2020", "Development of processing industry of the agroindustrial complex of the Republic of Buryatia for the years 2011 – 2015 (resolution of the Government of the Republic of Buryatia from 10.08.2011 No. 420); "Development of dairy cattle breeding and increase of milk production in the Republic of Buryatia for the years 2012-2014" (decision of the Government of the Republic of Buryatia of 30.03.2012 No. 174); "Production and processing of pork in the Republic of Buryatia for the years 2012-2014" (decision of the Government of the Republic of Buryatia from 30.03.2012 № 173), "The Government of the Republic of Buryatia from 10.08.2011 No. 420); "Development of dairy cattle breeding and increase of milk production in the Republic of Buryatia for the years 2012-2014" (decision of the Government of the Republic of Buryatia of 30.03.2012 No. 174); "Production and processing of pork in the Republic of Buryatia for the years 2012-2014" (decision of the Government of the Republic of Buryatia from 30.03.2012 № 173), "The Preservation and development of smaller villages in the Republic of Buryatia for 2012 to 2015" (decree of the Government of the Republic of Buryatia of 20.12.2011 No. 680, etc.

These programs are aimed at accelerating the development of priority agricultural sub-sectors:- accelerated development of animal husbandry for the development of livestock breeding, artificial insemination, improvement of pedigree qualities of cattle, optimization of livestock feeding, the introduction of new technologies; - crop development rate to allow the population and visitors of the Republic of Buryatia organic food, and animal feed. Development industry trade due to the presence of the international airport of the regional site of TRANS-Siberian railroad, the Baikal-Amur mainline, as well as boundary position of the Republic (having a common border with Mongolia, the proximity of crossings across the Russian-Chinese border, and the countries of North-East Asia). This creates the necessary conditions for the organization of transit of goods and transport services to existing and newly created industries and affect the General economic condition of the region (enables increase of foreign trade turnover).

- secondly, the competitiveness of individual segments of the territory The competitiveness of municipal areas and the competitiveness of the economic zones (including free zones). In particular, it is necessary to analyze the competitive advantages of each district, to determine the specificity of the directions of their development and to develop a program to increase their competitiveness.

-third, the competitiveness of regional management, which in itself is a direct impact on the economy of the region.

Based on the foregoing, we can formulate some methodological recommendations and suggestions:1. It should be based on thorough analysis to determine the factors of strengths and weaknesses which determine the level of competitiveness of the Republic of Buryatia taking into account its specific features. This variable, which can be used as a tool for determining the specific values of the level of competitiveness, should be as independent as possible of fluctuations of the economic cycle2. In determining the level of competitiveness, it is important to take into account the scenarios for strategic character development. It is important to note that under all possible scenarios of development of competitiveness of the country must proceed from the fact that environmental constraints do not only impose duties and costs, but they can be significantly beneficial.3. It is also necessary to determine the development potential of competitiveness: investment in the first place, then innovation (the use of mechanisms of venture financing of innovation) and business (using the tools of public-private partnerships).4. As one of the promising areas of economic well-being of the Republic of Buryatia and improve competitiveness includes the development of the tourism industry with specification in medical tourism. Background of the organization and the lack of jobs for this

niche in the tourist market will contribute to the overall fulfillment of the tasks of Russia's economic policy, implementation of programs of creation of special economic zone of tourist-recreational type and the possibility of use of recreational potential of especially protected natural territories of the Republic. These components will provide an opportunity to determine how, in conditions of strict environmental restrictions, the Republic of Buryatia will be able to improve their competitiveness.

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**SUBSECTION**

**“URBAN AND REGIONAL DEVELOPMENT“**

## Regional Disproportions in Bulgaria

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### Abstract

In the article are presented methods for research of inequality at regional level. The regional disproportions are evaluated by using of the *Gini* coefficient and the Integral coefficient of inequality. The objects of study are the districts of Bulgaria, the NUTS 3 level according Eurostat, for the period from 2005 to 2014 year. The main used indicators are employees under labour contract, staff engaged in research and development, population, dwellings, foreign direct investments and etc. It has been observed a different tendency in indicators, increasing and decreasing of the gap between regions in Bulgaria.

*Keywords:* regional disproportion, structural inequality, the *Gini* coefficient, the Integral coefficient of inequality.

### Introduction

A balanced and sustainable regional development is a priority in the policy and the agenda of many Bulgarian governments. The state documents are full with data and figures but the analyses are simplified and focused mainly in the quotas of regions. There are no surveys about correspondence between the values of resources at regional level. *The Region Profiles*, published yearly since 2012 by Institute for Market Economics, presents types of regions according to the socio-economic condition and development of districts. The differences between regions in Bulgaria was assessed by the Index of human development (UNDP, 2002), the Regional Index of competitiveness (Ivanov, 2010, 2015). The methodology and methods for measurement of regional inequality are focus in researches of Yankova (Янкова, 2008). The complex assessment of regional disproportions was studied in Latvia (Judrupa & Senfelde, 2008, 2009; Ivanova, Kamola & Kamols, 2013 and etc.), the European Union (Annoni & Kozovska, 2010; Gardiner, Martin & Tyler, 2004 and etc.), Croatia (UNDP, 2008), the United Kingdom (Huggins, 2003) and etc. Many publications present regional inequalities in different economic and social aspects (Kirsanov et al, 2015; Tambovceva & Tambovcevs, 2015 and etc.).

The aim of study is a presentation and applying of standard statistical methods for assessment of the disproportions at regional level. The research tasks are to compare results of two measures – the *Gini* coefficient and the Integral coefficient of inequality, to analyze the disproportions at regional level and the dynamic for the period 2005-2014. The objects of research are the districts of Bulgaria which corresponds to the NUTS 3 level of Eurostat. The data sets are obtained from the National Statistical Institute of Bulgaria and analyzed and presented by Microsoft ® Office EXCEL.

### Methodology of Research

The regional disproportions are evaluated by comparing of the structure of sets of indicators. The *Gini* coefficient (Eq. 1) and the Integral coefficient of inequality (Eq. 2) are used.

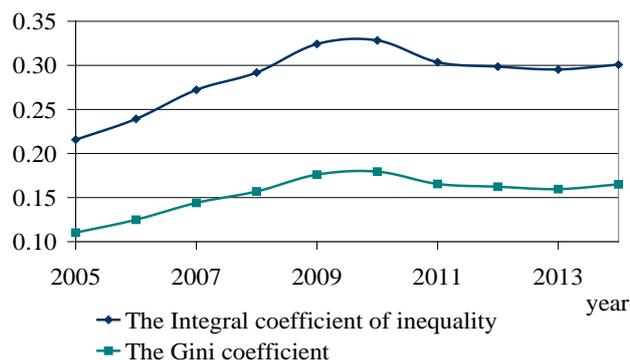
$$D_R = 1 - \sum_{i=1}^k v_{li} \cdot (C_{2i} + C_{2i-1}) \quad (1)$$

$$K_R = \sqrt{\frac{\sum_{i=1}^k (v_{2i} - v_{1i})^2}{\sum_{i=1}^k v_{1i}^2 + \sum_{i=1}^k v_{2i}^2}} \quad (2)$$

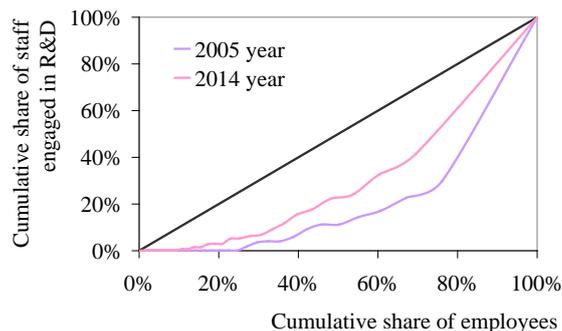
Values of coefficients close to '1' show significant inequality between the structures (distributions) of the two compared indicators. Each district is presented as a separate group which ignores some of features of the *Gini* coefficient. The *Lorenz* curve is used for simple showing of the gap and for presenting of the tendency and the best and the worst values of the *Gini* coefficient.

## Findings/Results

The regional disproportions in Bulgaria are evaluated by analyzing of indicators: employees under labour contract, staff engaged in research and development (R&D), population, dwellings, foreign direct investments (FDI), territory and etc. It was found that the structure of employees under labour contract in the districts in Bulgaria corresponds to the structure of population in them. The values of the *Gini* coefficient and the Integral coefficient of inequality are close to '0' (see Figure 1). The changes for the period 2005-2014 are insignificant. The results are similar for population and dwellings and for population and territory. In point of view by the parallel between employees under labour contract and staff engaged in R&D it was observed improvement. The regional disproportions decrease (see Figure 2). The inequality is high in 2005 year and low in 2014 year. The situation is the same for disproportions in structures of employees under labour contract and foreign direct investments (FDI).



**Figure 1.** The dynamics of regional disproportion between the structure of employees and the structure of population



**Figure 2.** The regional disproportion between the structure of employees and the structure of staff engaged in R&D

## Conclusions

The results of research show:

First, the proposed method for study of regions is applicable for regional researches. The used the *Gini* coefficient and the Integral coefficient of inequality give closes results. They give other point of view of regional disproportions and regional development. The analyses are enriched and added.

Second, it was found insignificant disproportions for employees under labour contract, population, territory and etc. and improvement of disproportions for employees under labour contract and foreign direct investments (FDI).

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# Economic Activity, Population Income and Prosperity – the Comparative Analysis of Regional Development in Latvia

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## Abstract

Regions are formed by interaction of four dimensions – physical location, residents, governance and economy. Moreover, this process is dynamic, i.e., the regions are transformed due to direct or indirect influence of the factors. At the basis of a region is a territory that people – depending on the available natural resources and advantages of its location – use for economic activity. To ensure some kind of order and defense of rights and freedom, usually a government system is created. But as the main input and also users of regional development results we can definitely consider people – inhabitants of certain region.

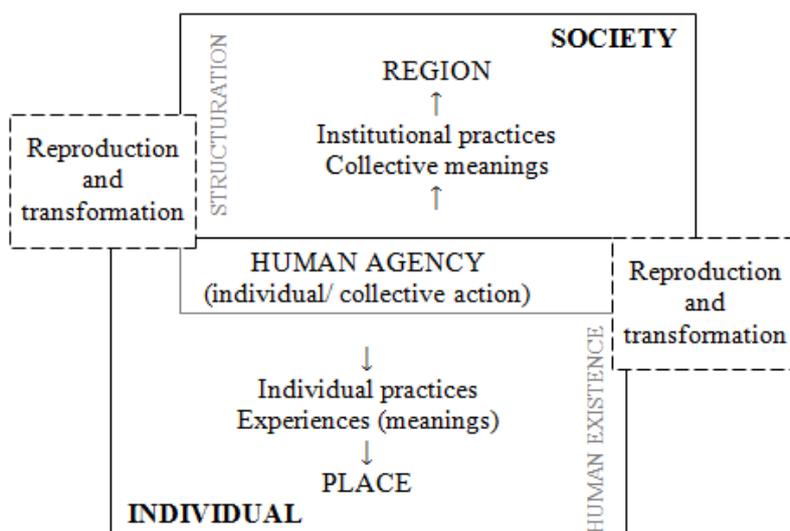
Using data provided by the Central Statistical Bureau of the Republic of Latvia, the article analyses six statistical regions of Latvia within the time period of 2008-2013. The aim of the research is to evaluate economic and social inequality of regional development in Latvia.

*Keywords:* regional development, income, GDP, Latvia.

## Introduction

Region is a specific part of the country's economic territory that has particular socio-economic, organizational, natural, cultural or other provisions, which separate it from other regions (Vahere-Abražune, 2013) It is possible to define three types of regions (Domosh, Neumann & Pri, 2010, 6-10) – formal region, functional region, vernacular region.

In Figure, process of emergence of regions and places is illustrated. As it can be seen, individuals are those, who create human agency and regions in their full meaning, such creating and forming society.



**Figure 1.** The emergence of regions and places (Paasi, 1986)

The main objective of each region, country and all global society should be to ensure sustainable development. In this research, sustainable development means harmonious and balanced development of all dimensions that determine regions – physical location (including nature), residents, governance and economy. As many aspects of these dimensions could be competitive or even mutually exclusive, especially if analyzed across regions, implementation of sustainable development is always a challenge.

In Latvia are negative or unwanted trends in such very important indicators as number of population, structure of GDP, quality of life and others, as stated in National Development Plan of Latvia for 2014-2020. (Cross – Sectoral Coordination Centre, 2012) Development problems at state level could be caused by problems at regional level. Focus of this research is to evaluate economic and social inequality of regional development in Latvia, as well as to establish the impact of economic activity on the level of income and welfare of region's residents.

## Methodology of Research

Using data provided by the Central Statistical Bureau of the Republic of Latvia, the article analyses six statistical regions of Latvia (NUTS III – Riga, Pierīga, Vidzeme, Kurzeme, Zemgale and Latgale region) within the time period of 2008-2013. Economic activity in the regions is described by means of GDP indicators, GDP structure, characterization of economically active statistical units and unemployment level. Population income and prosperity is described by means of gross wages and salaries, as well as by at-risk-of-poverty rate. As these are regions in one country, government system will not be included in analysis.

The research methods include comparison and correlation analysis.

## Findings/Results

It can be observed, that regions in Latvia are very different. The average indicator of Latvia is formed from very different regional indicators. The best situation in average in period under consideration is in Riga region (except unemployment rate), but the worst situation is in Latgale region.

In Table, results of correlation analysis are shown. Calculations of correlation coefficients were made by comparing situation in regions within one year, thus indicating whether different situation in regions from one aspect can be explained by difference in some other situation/ indicator.

**Table.** Coefficients of correlation, year 2013

(Authors calculations; data of the Central Statistical Bureau of the Republic of Latvia)

Indicator 1	Indicator 2	Coefficient of correlation
Share of GDP, %	GDP per capita, EUR	0,992
Average monthly wages and salaries, EUR	GDP per capita, EUR	0,935
Average monthly wages and salaries, EUR	At-risk-of-poverty rate, %	-0,964
GDP per capita, EUR	At-risk-of-poverty rate, %	-0,842

The results of analysis clearly show the great mutual correlation between social and economic situation in region.

## Conclusions

The study shows considerable disparities between the statistical regions in Latvia in terms of economic activity. These disparities, in their turn, affect the welfare of the population. In long term perspective, low level of income will have negative influence on economic activity in region and thereby result will become a factor. Taking into consideration all regional development problems in Latvia, results obtained in the study raise the awareness of the necessary changes in regional policy that are required for sustainable economic development. Highly expressed disparities and backwardness of some regions hinders successful and sustainable development of country, or even undermines it. In long term perspective, processes – decrease of economic activity in region and decrease of population prosperity can reinforce each other and thereby create very topical problem in Latvia – empty and inactive countryside.

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# Impact of the Crisis on Investment in the Latvian Economy: Investment Policy Challenges

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## Abstract

In nowadays a prerequisite of a successful economic development and increased competitiveness is implementation of proper productions assets and technologies, based on latest scientifically achievements, as well as development of infrastructure, which cannot be done without investments. An effective attraction of investments in national economy is a key factor, which will provide favorable conditions in order to perform structural changes to national economy, regional development and promotion of technical progress, that is why investments in public and private sector conduce development of national economy and will provide conditions to increase competitiveness of country in overall. The aim of research is to evaluate impact of the global crises on investment processes in, Latvia, thus revealing problems and challenges in this sector. In analyses there are used different qualitative and quantitative analysis methods, such as scientific literature and empirical research analysis, modeling tables, charts and schemes, calculations of average and relative values, grouping, comparisons and other. There are used Latvian and international scientific researches and publications on investments and its role on economic growth process, which are available in Central Statistical Bureau of the Republic of Latvia (the RL) and Eurostat data bases, reports from the Ministry of Economics of the RL, also the World Bank, the OECD and other international organizations researches and information available in internet. As a result of research there were defined directions of investment policy, essential obstacles which delays investment attraction in Latvia.

*Keywords:* investments, investment flow, foreign direct investments (FDI), investment policy.

## Introduction

Sudden reduction of amount of investments, also further slow growth of investment process in developed countries is one of characteristics of global finance crises. About investment processes weakening in the world imply also decrease of cross-border fund flows, which mainly is explained with instability in World economic, increasing geopolitical risks a political unpredictability. In 2011 Foreign Direct Investments (FDI) on average per year in Baltic States has been three times less than in pre-crisis years, while incoming amount of FDI in Latvia in period of 2013 till 2015 has been only half of amount of incoming FDI in years of rapid growth (Informatīvais ziņojums..., 2016). This impacted negatively overall amount of investments, as well as economic growth. Comparing 2015 and 2007 overall investment in EU was 9,2% less and was 19,6 % of GDP, which was in 2,2 percentage points lower level than in average in years 2004-2007 (Eurostat, 2016). In Latvia in 2015 investments was 23% of GDP and its amount was 2,7% more than in previous year (LR Ministry of Economics, 2016). In overall total activity of investors in last three years has been low and amount of investments in Latvia is still falls short of pre-crisis level. Remaining following trends in future might decrease capacity of production and competitiveness of Latvia in the World Market, this is why it is necessary to pay attention on factors, which restricts activity of investments and develop investment policy to prevent them.

## Methodology of Research and Results

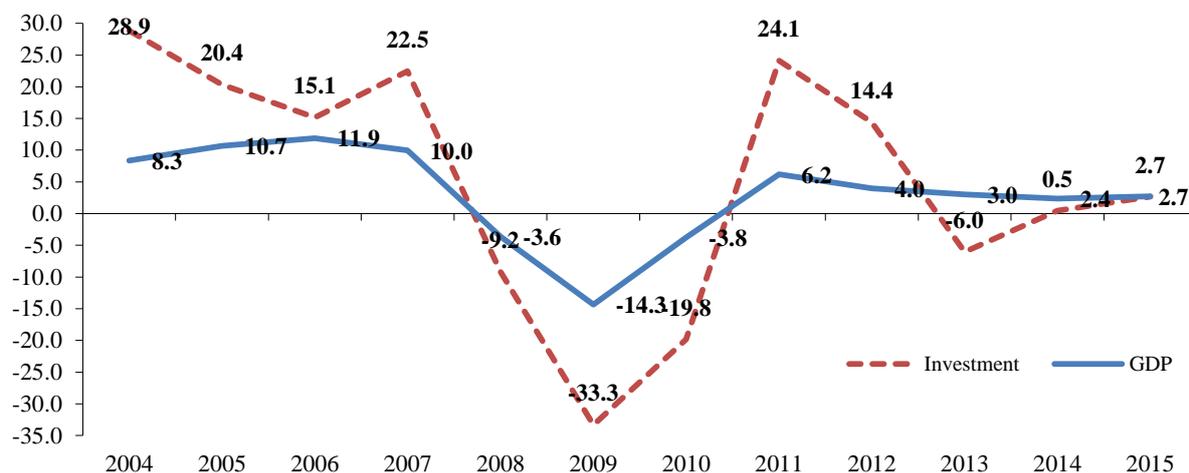
Based on theoretical knowledge, in research there has been carried out qualitative and quantitative analyses on dynamics and structure of investment amount and on its influencing factors. As results of research there has been identified essential obstacles, which restricts the investment process in Latvia. Both in theoretical (Clark<sup>1</sup>, Cobb–Douglas<sup>2</sup>, Harod-Domar<sup>3</sup>) and in empirical models, has been approved, that rapid economic growth is not possible without significant investments. I order to ensure stabile economic

<sup>1</sup> Latvijas ekonomikas konkurētspēja un investīciju nozīme tās veicināšanā, Monogrāfija E.Dubras redakcijā, LU Akadēmiskais apgāds, Rīga, 2009

<sup>2</sup> Titarenko D., Investīcijas kā Latvijas ekonomikas izaugsmes faktors, Rīga, Transporta un sakaru institūts, 2006

<sup>3</sup> IB-Economics HL Y2. Harod-Domar Growth Model, <https://ib-economics.wikispaces.com/Harrod-Domar+Growth+Model>

growth in a long period shall require investments in amount of 25-30% of GDP (Latvijas ekonomikas konkurētspēja un investīciju nozīme tās veicināšanā, 2009). According to some authors (D.Paula, D.Titarenko, D.Stikuts, A.Melihovs, O.Krasnopjorovs and others) contribution of investments to increasing GDP in last ten years in Latvia has been 46,5 up to 85%. From other side it is characteristic that investments are volatile in phases of business cycles (Екабсоне & Скрибане, 2015). In duration of business cycle investments could become as a very important factor, which has great impact on how deep will be economic downturn, while activation of investment process is an important prerequisite in change of business cycle. So investments are a factor of potential economic growth, as well as GDP fluctuations influencing factor (see Figure 1).



**Figure 1.** Investment changes in the economic cycle phases in Latvia 2004-2015 (investment and GDP growth over the previous year,%)

Source: The author concluded based on data from CSB databases

As collected data shows in image 1 in years of rapid growth (2005-2007) investments in Economy of Latvia increased up to 19% in average per year, which was twice more than GDP, while during finance crisis they decreased with the same speed (annually approx. 20% in average) and where almost third part of GDP decrease. Nowadays the dynamic of investments is still very unstable and in three times slower as it was before the Crisis, so the activation of investment process is key challenge of investment policy.

## Conclusions

1. Analysis of investments structure in Latvia shows, that the largest amount of investments is focused in different service sector, while competitiveness attraction of investment in industry is weak, which depends on fundamental differences in developments of these fields as well as return rate of investments.
2. The biggest decrease of investments during the Finance crisis was in field of construction, as a result overall investments in 2015 as only 2,2% (in 2007 it was 4,6%), which definitely has restricted development options in construction field.
3. Significant fluctuations of investment have been observed in field of manufacturing, which is related to changes of external demand, however its share has been resistant and it correspond with overall added value. More than 50% of investments in field of manufacture has been concentrated in food industry and timber, which according to technological intensity is in low or average low technology fields, so this impacts negatively return of investment.
4. In Latvian is characteristic significant differences in investment location due regional perspective, it is related to the various economic activity and the availability of infrastructure in the regions. Almost half of the total investment each year are invested in Riga region where are concentrated most important national economic development potential elements, as well as national significance infrastructure, relatively high investment activity is also observed near Riga and Kurzeme region (based in Ventspils and Liepaja), while the least investments come in Latgale and Vidzeme region.
5. By the decrease of foreign capital flows, there also has been changes in the role of foreign capital in domestic investment financing (from 2012 to 2015, foreign capital was 10% of domestic investment funds in average), which points to the fact that the dependence on foreign capital in Latvia has been

decreasing but overall liability to the outside world has remained significant (almost 150% of the Latvian GDP).

6. During the Crisis there were significant increase of the state role in overall investment process, its part in amount of overall investment has increased and in 2010 I, which is 8,5 percentage points more than in 2007. In 2015 the state investment part has been decreased up to 19,5 %, but still it is higher than before the Crisis. The dynamic of amount of State investment has been quite stable, which reduces the overall investment process fluctuations

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# Renewable Energy Efficiency for Regional Development: Case of Belgorod Region

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## Abstract

The article presents the results of original research, conducted to define most effective way of the Belgorod region development under lack of energy. Potential of renewable energy resources, such as solar and wind energy, and biomass energy was estimated. The most effective way for regional development, contributing to reducing the GRP energy intensity and environmental problems solution, is the recycling of the agricultural waste with biogas production.

*Keywords:* renewable energy, biogas, GRP, energy intensity.

## Introduction

The key role of renewable energy in sustainable development of regions is globally recognized, however, its implementation in Russia is inhibited due to sufficiency of hydrocarbon resources. In this regard, studies on renewable energy effectiveness are crucial to find solutions of environmental problems in Russia's regions and to promote principles of a green growth. Perspectives of renewable energy use we investigated through the case study of Belgorod region – one of the most developed regions of Russia. The study aimed to assess environmental and economical effectiveness of different kind of renewable energy sources and also to identify their role in strategic development of the region.

## Methodology of Research

As it is shown in a number of recent scientific works – both theoretical and applied – renewable energy use can be considered from point of view of not only environmental effectiveness, but also economical one (United Nations Division for Sustainable Development, 2013; Chernova, Korobkova & Kiselyova, 2010). This research was conducted using a variety of sources, such as scientific articles, statistical data, reports of industrial companies and agricultural farms, cartographic materials, space images and materials of own field researches. To assess a potential of solar and wind energies in the area we have analyzed the database of NASA (NASA, 2016). The conclusion on renewable energy sources efficiency was based on calculating of GRP energy intensity in cases of traditional and alternative energy systems.

## Results

Regions of Russia are extremely different by their natural conditions, total area, density of population and a level of economical development. Despite a “green” growth was proclaimed as a key trend in the Russian economy's modernization, the institutional preconditions for transition to a “green” economy are very weak in all the regions. That's why the natural conditions along with the type of regional economical development play often a role of key drivers of renewable energy implementation.

Belgorod region is only 0.2% of the total area of the country, however, it ranks 26th in the list of 85 Russian regions. The main sectors of regional economy are mining industry, developing on the resources of the world's richest Kursk magnetic anomaly, as well as agriculture, based on extremely rich humus soils – chernozem. The regional economy is characterized by a lack of domestic energy production: the region produces only 6.3% of the required volume, and the rest comes from the neighbouring regions where two Nuclear Power Plants (Kurskaya and Novovoronejskaya) are located. The current regional development has caused several environmental problems, such as air pollution from thermal power plants and transport in industrial cities (Stary Oskol and Gubkin cities), contamination of local rivers by agricultural waste, etc. Together with a shortage of energy they form a main challenge for future regional development.

To evaluate perspectives of renewable energy development in Belgorod region we have analyzed its natural prerequisites, such as the wind speed and the amount of solar energy. The area has sufficient resources to generate energy through these renewable sources: the amount of solar radiation varies within its boundaries from 1140 to 1200 kWh/m<sup>2</sup> per year, which is comparable with the southern regions of Russia,

where such stations are widely used. Wind resources are less promising, but also available to produce energy: the wind speed is about 5.2 m/s.

The next step was the analysis of statistical data to calculate the volume of organic waste biomass generated in the agricultural sector. Taking into account that renewable energy at all and biomass energy particularly is most often local by its nature (Ryden, 2012), we concluded that the biomass resources have the greatest potential as a renewable energy source in the research area. Being an agricultural region, Belgorod area has a great potential for use and recycling agricultural production wastes, and especially livestock, for energy purposes. Such facilities are already in operation in some farms of the region. During the research we considered a possibility to produce energy through bio-waste recycling on example of individual farms. Taking into account the region's share in the pork production (now exceeds 28% of the total), it could be a suitable decision to increase energy efficiency and to reduce traditional fuel consumption.

**Table 1.** Accumulation of organic waste from livestock in agricultural farms of Belgorod region

Type of livestock	Number	Mass of excrements, kg/head/day	Total mass, tons/day
Pigs	3 977 100	4.5	17 897
Poultry	51 320 200	0.3	15 396
Cows	93 100	35	3 258
Other cattle	133 600	21	2 806

The total amount of waste from farms in the Belgorod region is about 12.5 mln. tons of high-calorie mass per year. Taking into account the different moisture, this volume is enough for biogas production in the amount of about 250 thousand m<sup>3</sup> per year.

Reducing energy intensity of the regional economy is one of the main criterion of energy efficiency at the way towards green economy. Recycling of all animal waste at the biogas stations in Belgorod region will let to produce about 2 bln. kW·h per year. Even if from 25 to 50 % of this energy goes to cover the demand of the plant, the total output of electricity will be about 1 bln. kW·h per year or enough to cover the electricity needs in all the farms of the region (721,1 million kW·h). At the same time the total GRP energy consumption, while maintaining the volume of production, will decline on 4,2% (from 24 to 23 kWh per 1000 RR). Development of biogas production will also contribute to improvement of quality of live through creation of new working places (for ~ 25 persons at every biogas station); small business development (transportation, construction materials) and municipal budget increase, etc.

### Conclusions

The assessment of biogas production potential in the region has showed that it can be considered as the most effective way to reduce fossil fuels consumption and to cover energy demand at the agricultural sector. Development of renewable energy will also contribute to environmental problems solution and raising the standard of living of the local population.

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# Environmental Quality and Economic Performance in Developing Countries

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## Abstract

This research finds that there is positive and statistically significant relationship between economic performance and environmental quality. The energy use (kg of oil equivalent per capita) is statistically significant and negatively correlated with environmental performance. An increase in GDP per capita on 100 USD improves EPI in absolute scale on 0,1. There is no inverted U-shape relationships in economic performance and EPI for developing countries

*Keywords:* environmental quality, developing countries, economic activities.

## Introduction

The challenges of sustainable development highlight the importance of climate change and environmental quality. Promotion of environmental quality is an important strategic goal in most countries of the world. Developing countries face special challenges in this area because, first of all, these countries have to deal with the economic problems they are facing. Increasing concern about the environmental quality has turned researchers and policymakers' attention to the determinants of environmental quality. In the case of developing countries, economic performance plays a significant role.

The relationship between economic growth and pollution has been a focus of research by economists for many years. According to Yevdokimov et al. (2011), there are two basic competing views with respect to this relationship: the first one states that economic growth is harmful to the environment due to ineffective use of resources while the second one states that technological progress and economic growth improve environmental quality. The basis for the analysis of the relationship between economic development and environmental quality is an inverted U-shape relationship between pollution and per capita income.

The results of Bilgili (2016) supported an inverted U-shape relationship for the panel of 17 OECD countries over the period 1977–2010 and indicated that GDP per capita and GDP per capita squared have the impacts on CO<sub>2</sub> emissions positively and negatively, respectively, and that renewable energy consumption yields negative impact on CO<sub>2</sub> emissions. The panel FMOLS and panel DOLS estimations were employed. The authors highlight the importance of energy use from renewable sources and importance of improvement of renewable energy technologies as they are able to contribute to combating global warming problems.

## Methodology of Research

The non-linear relationship between the indicators of environmental pollution and per capita income is usually specified in a reduced form such as:

$$y_{it} = a_i + \beta_1 x_{it} + \beta_2 x_{it}^2 + \beta_3 z_{it} + \varepsilon_{it} \quad (1)$$

where  $i=1, \dots, N$  countries,  $t=1, \dots, T$  years;  $y$  is dependent variable of environmental quality;  $x$  – independent variable of income;  $z$  – other variables that may affect  $y$ ;  $a$  – constant term;  $\beta_i$  – estimated coefficients of the explanatory variables;  $\varepsilon$  – error term. The inverted U-shape relationship is confirmed if  $\beta_1 > 0$ ,  $\beta_2 < 0$ , which leads to inverse quadratic relationship between *GDP per capita* and *EPI*. If the above mentioned conditions are hold we have an inverted parabola (inverted U-shape relationships). The turning point for *GDP per capita* after which the *EPI* should start to improve, is calculated as:

$$\frac{\partial EPI_{it}}{\partial Y_{it}} = \beta_1 + 2\beta_2 Y_{it} = 0, Y_{it} = \frac{\beta_1}{2\beta_2} \quad (2)$$

## Findings/Results

Many researchers have investigated the relationship between environmental pollution and economic growth and have used carbon dioxide emissions (CO<sub>2</sub> emissions) indicator as

environmental pollution indicator. But this indicator or other pollution indicators alone cannot represent the environmental quality. Therefore, in this research, the Environmental performance index (EPI) is used as indicator of environmental quality. The Environmental performance index (EPI) evaluates countries' environmental quality and shows countries' performance on high-priority environmental issues in two areas: protection of human health and protection of ecosystems.

The selection of the sample countries is based on the availability of data. The panel data of 15 developing countries for the period 2000–2010 are used in the econometric analysis of this study. The countries included in this research are as follows: 7 countries of Emerging and Developing Europe (Bulgaria, Croatia, Hungary, Poland, Romania, Serbia, Turkey), and 8 Commonwealth and Independent states (CIS) countries (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyz Republic, Russia, Tajikistan, Ukraine). The statistical empirical data processing was performed using STATA software package. The research results for economic performance and environmental situation are presented in Table 1.

**Table 1.** Regression results for economic performance and environmental situation

Random-effects GLS regression Group variable (i): id R-sq: within = 0.4867 between = 0.4286 overall = 0.4238 Random effects $u_i \sim$ Gaussian corr( $u_i, X$ ) = 0 (assumed)			Number of obs = 164 Number of groups = 15 Obs per group: min = 10 avg = 10.9 max = 11 Wald chi2(5) = 144.26 Prob > chi2 = 0.0000			
EPI	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
GDP per capita	.0012031	.0001643	7.32	0.000	.000881	.0015252
R&D expend.	.0258862	1.042656	0.02	0.980	-2.017682	2.069454
Energy use	-.0022282	.0004832	-4.61	0.000	-.0031752	-.0012812
Pop. density	.0305197	.0354025	0.86	0.389	-.038868	.0999073
Urban pop.	.4482649	.1029426	4.35	0.000	.246501	.6500288
Trade	.0004141	.0068459	0.06	0.952	-.0130036	.0138318
cons	18.6887	6.290254	2.97	0.003	6.360028	31.01737

The obtained results show a positive and statistically significant relationship between economic performance and environmental quality. An increase in GDP per capita on 100 USD improves EPI in absolute scale on 0,1. Gross domestic expenditure on R&D, population density and trade appeared to be insignificant. While energy use (kg of oil equivalent per capita) are statistically significant and negatively correlated with environmental performance, and 100 kg of oil equivalent per capita reduces EPI in absolute scale on 0,2. There is no inverted U-shape relationships and the EKC specification in economic performance and EPI for developing countries. One of the policy implications based on EPI is to stimulate economic development (growth) with simultaneous reduction of oil consumption.

## Conclusions

The conducted empirical research shows that there is a positive and statistically significant relationship between economic performance and environmental quality while energy use (kg of oil equivalent per capita) is statistically significant but negatively correlated with environmental performance.

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