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APPLICATION OF IS-MP-IA MODEL AND TAYLOR RULE TO CESEE ECONOMIES

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Abstract. In this paper, the extended framework of the IS-MP-IA model has been tested. Since the appearance of the Romer's (2000) model, a bulk of studies with its extensions have been published. Perhaps, the most notable amongst them were those proposed by Hsing (2004, 2013) and Giese and Wagner (2006) – which are integral part of this paper. The application of the extended Romer (2000) model to selected Central Eastern and South Eastern Europe (CESEE) countries (Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Macedonia, Moldova, Romania, Russian Federation, Slovak Republic, Slovenia and Ukraine) shows that on an average, higher world output and lower world interest rate and inflation have positive effect on real output. A lower government consumption to gross domestic product (GDP) ratio also increases the real output. However, the insignificant government consumption implies that the Ricardian equivalence might hold in these economies. Hence, fiscal prudence is needed, and the conventional approach of real currency depreciation, in order to stimulate exports and raise real output, is not recommendable for the selected CESEE countries. The results from this paper can be useful for the policymakers and the academia. They prove the theoretical and empirical value of the Romer's IS-MP-IA model. From a methodological point of view, we use generalised method of moments (GMM) estimator for dynamic panel data models, that is, first-differenced GMM.

Keywords: extended IS-MP-IA, Taylor rule, inflation targeting, monetary policy function, Ricardian equivalence, first-differenced GMM.

Type of the paper: Empirical study.

JEL Classification: E52, E62, F41.

Introduction

The aim of the research is to investigate the relevance of the Romer's (2000) *IS-MP-IA* model on a panel of countries from Central Eastern and South Eastern Europe (CESEE): Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Macedonia, Moldova, Romania, Russian Federation, Slovak Republic, Slovenia and Ukraine, for the time period 1993–2013.

As noted in the predictions of the theoretical model, the hypotheses are set as follows: First, the higher world output, lower world interest rate and lower expected inflation positively affect the output of the countries in the sample. Second, the conventional approach of real currency depreciation does not hold for the sampled countries. In order to test these hypotheses, an econometric technique is being used.

We are starting with some specifics of the countries encompassed in our panel:

Albania in the previous two decades achieved macroeconomic stability, fiscal discipline and public debt reduction (Shijaku, Gjokuta 2013). Public debt, as percentage of gross domestic product (GDP), has shown declining from 35% in 1990s to 29% in 2010. Since July 1992, in order to avoid costly adjustments for possible exchange rate misalignments that characterise pegged exchange rate regimes, Albania has adopted free-floating exchange rate regime (Ljuci, Vika 2011).

During the referenced period, Bulgaria has experienced macroeconomic imbalances especially related with the high stock of external liabilities and weak labour markets (European Commission, Bulgaria 2014). After crisis, the growth in this country has remained low and Bulgaria has experienced slow

recovery. Inflation rate has remained low, too. Some studies about the effectiveness of fiscal policy in Bulgaria showed low fiscal multiplier, which does not exceed 0.4 points (Markova, Deyanov 2013). Bulgarian currency is pegged to euro, and fixed exchange rate regime is being practiced.

Croatia has been mired in recession since 2009 (European Commission, Croatia 2014). In the period 2009–2014, the Croatian GDP has been reduced by 12%, and only in the past two years very slow recovery had happened. The decline in real GDP was induced by the sharp decline in domestic investments, particularly in construction industry. Unemployment rate in 2013 was above 17% (almost twofold increase since 2008). Pro-cyclical fiscal policies in 'boom years' were followed by loose policies, when the economy was facing downturn. The nominal debt also has increased and had reached 64.9% of GDP at the end of 2013. Unlike Bulgaria, fiscal policy elasticities have reached higher magnitudes, but an increase in government spending has resulted with crowding-out effect in the majority of Croatian industries (Tkalec, Vizek 2009). Since 1994, Croatia has been in a system of *de facto* currency board with quasi-fixed exchange rate.

In the past two decades in the Czech Republic, certain macroeconomic improvements have been made. The expansion of the monetary and fiscal policy has increased the inflow of foreign direct investment, which contributed to the dynamics of economic growth (Czesaný 2010). After years of fiscal loosening, debt had realised an upward trend from 18% of GDP in 2000 to 29% in 2004. In 2012, public debt in Czech Republic had reached almost 45% of GDP. It has been followed by structural consolidation and substantial economic reforms (IMF, Czech Republic 2013). Since 1994, Czech Republic adopted floating exchange rate regime. As of 1997, inflation targeting framework, when managing exchange rate, has been adopted in Czech Republic.

Estonia has joined euro in January 2011. The budget deficit in 2013 was very low (1% of GDP), but the unemployment rate (especially in the long term) has remained high and with an upward trend. Estonia had 'recorded' problem only with the inflation rate, which, in accordance to Maastricht criteria, should have been no more than 1.5 percentage points above the average rate of the three EU member states with the lowest inflation over the previous year (Kopicka *et al.* 2007).

Hungary has experienced double dip recession in 2012. GDP growth has returned positive after one year later, but still the recovery seems to be very slow (in the post-recession period, GDP growth is estimated to 1.1%) (European Commission, Hungary 2014). Public debt is high but steady, and it accounts 80% of the Hungarian GDP. The official currency is pegged to euro as an anchor (crawling band), and the currency target zone is ±15% (Ibolya 2003).

Macroeconomic policy in Macedonia aims at achieving long-term sustainable growth, increasing the competitiveness of the economy and employment (Ministry of finance of the Republic of Macedonia 2015). Global economic crisis in Macedonia was reflected in 2009, primarily through the fall in exports. Budget deficit is held on a moderate level of 2.7% of GDP (Ministry of finance of the Republic of Macedonia 2011), but after a period of loosened fiscal policy, it has been expanded to 4.2% of GDP in 2013. Public debt is around 34% of GDP in 2014 and exhibits an upward trend. Macedonia has adopted fixed exchange rate regime.

According to IMF (IMF, Moldova 2014), in 2014, Moldova had achieved fiscal consolidation. However, the need for structural reforms is still being strongly emphasised. The overall budget deficit has been reduced from 8.4% of GDP in 2009 to 3.9% in 2012, but in 2014, it deteriorated by increasing to 5.5% of Moldavian GDP. Inflation is in the target range, which is accomplished by a successful monetary policy. Economic activity in Moldova rose by 8.9% in 2013, but afterwards, the economy experienced deceleration in the economic rise by 2.25%. Moldova tries to maintain low inflation and a flexible exchange rate regime.

In Romania, before the economic crises, high rates of economic growth were recorded. Then, this country has experienced a sharp growth decline with negative rates. In 2009, mostly because of the fall of investment, the economic growth reached −5%. After 2011, the Romanian economy recovered from the recession but the growth rates remained relatively low (around 3% annually) (European Commission, Romania 2015). Before and during the crisis, Romania had budget deficit of 8% of GDP, but in the past couple of years (up to the 2014), it succeed to manage to 1.8% of GDP. In 2012, public

debt was 37.3% of GDP. The exchange rate regime of the national currency is a managed float, accompanied with an inflation targeting – as a nominal anchor of the monetary policy.

In Russia, high economic growth rates were recorded in the period 1999–2006 (average growth rate reached 6.7%), (Ignatiev 2007). In 2005 and 2006, Russia had experienced a significant amount of budget surplus – by 7.5% and 7.4%, respectively. According to official Russian statistics, the federal budget deficit was 8% in 1993. In 1998, Russia entered into the financial crisis. This crisis followed the Asian financial crisis from 1997. In august 1998, Russian national currency was devalued, and Russian government floated the exchange rate. Also during this period, Russian government defaulted on the domestic debt. Chronic tax shortfall led to increased borrowing requirements (Mcauley 2000). Government debt from 1995 to 1998 rose from 50% to 75% from GDP. Also the decrease in oil and non-ferrous metal prices influenced Russian economy with heavily deep negative impact. The unemployment rate has reached its peak in 2003, and the level was 8.6%. During the start of the global financial crisis 2007–2008, Russia's unemployment rate was 6.1% and 6.3%, respectively. Russia in 2014 ended dollar/euro currency peg and adopted free-float regime.

The recent global and financial crisis has caused Slovakia, similar to many transition countries, to suffer declining economic activities. Slovak share index had declined by 56.7% from 2008 to 2010 (Hsing 2013). In 2006, public debt as percentage of GDP was 38.2%, fiscal deficit was 3.0%, inflation was 3.6% and long-term interest rate was 3.5% (Festic, Romih 2008). Slovakia had approached ERM II in November 2005 (any currency in ERM II is allowed to float within a range of ±15% with respect to a central rate against the euro). From 2002 to 2014, Slovakia had recorded average economic growth of 4.3%. Average inflation for the same period was around 3%, whilst the average unemployment rate was 11.8%. Current account deficit peaked at 7% of GDP in 2008.

The biggest decline in Slovenian real GDP was recorded in 2009 (−7.9% in comparison to 2008). Also negative growth rates were recorded in 2012 (−2.5%), 2013 (−1.6%) and 2014 (−0.1%) (European Commission 2014). The debt to GDP ratio in Slovenia rose from 22% in 2008 to 54% in 2012. Since January 2007, Slovenia issues its own euro coins, like other countries in the Euro-zone. Slovenia has adopted free-floating exchange rate regime.

Ukraine suffered a mild recession in 1999, when industrial production growth fell by 0.2% and rose to 12.4% in 2004. In the same period, consolidated budget balance gradually had increased from −1.5% to −3.1%, and the inflation fell from 19.2% to 12.3%. Unemployment rate was 8.6% in 2004 (Aslund 2005). In Ukraine, still unresolved conflict (in Eastern Ukraine from the end of January 2014) had taken its toll in terms of industrial production and financial markets. The large exchange rate depreciation since early 2014 raised public debt to GDP ratio (Lagarde 2015) and provoked contraction to economic activity (which has been estimated to 6.9% in 2014). In order to support gradual fiscal and external sustainability, IMF has proposed flexible exchange rate regime for this country.

The results obtained from the country-specific data prove the theoretical and empirical value of the Romer's IS-MP-IA model for the selected CESEE economies.

Literature review

Hicks, who himself developed the model in 1937, offered an explanation to the problem of combining *IS* with *LM* curve. However, the mainstream *IS-LM* model has been a subject of criticism for many years, especially when combined with the *AD-AS* model – which links the aggregate demand to price level.

In the spirit of modern macroeconomics, which requires a link between demand, output and inflation rate, Romer (2000) has proposed the *IS-MP-IA* model, in which the basic feature was the replacement of the LM curve with the interest rate, imposed by the Central Bank.

Bofinger, Mayer and Wollmerhäuser's (2006) paper develops more comprehensive framework in terms of the supply side. This paper introduces monetary policy rules (e.g. Taylor Rule) as well as the Central Bank credibility issue.

In Carlin and Soskice (2006), the treatment of the interest rate is close to the one proposed by Woodword (2003). Monetary policy, in this paper, is modelled as a monetary rule, *IS* curve remains as in the conventional *IS-MP-IA* model, but Romer's 'inflation adjustment' is replaced by an 'inertia-augmented Phillips curve'. The inertia-augmented Philips curve derives from a combination of Calvo pricing and monopolistic competition.

Giese and Wagner (2006) paper also discusses the *IS-MP-IA* model and its application in the modern macroeconomic analysis, putting special emphasise on the impact of supply and demand shocks. More precisely, Giese and Wagner used graphical analysis framework for the new neoclassical synthesis to explain and interpret the behaviour of the new neoclassical model under shocks.

Finally, the extensions of Romer (2000) model have been made by Hsing (2004, 2013) and Hsing and Hsieh (2009). Some ideas and modifications of these extensions are applied in this paper. By applying the Romer's (2000) *IS-MP-IA* model, along with its Hsing (2004), Hsing and Hsieh (2009) and Giese and Wagner (2006) extensions, we are trying to understand the fundamental macroeconomic relationships in CESEE countries.

Methodology

The baseline *IS-MP-IA* model is presented by the following three equations (this is a slightly different version than the one proposed by Giese and Wagner (2006). The only difference appears in the *IS* relation, where an income shock is introduced):

$$IS: y_{it} = y_{i,t+1} - a_1(r_{it} - r_{it}^*) + \eta_{it} \quad (1)$$

$$MP: r_{it} = r_{i0} + \sigma_1\pi_{it} + \sigma_2(y_{it} - y_i^*) \quad (2)$$

$$IA: \pi_{it} = \beta\pi_{i,t+1} + \varphi(y_{it} - y_i^*) + \varepsilon_{it} \quad (3)$$

where *IS* represents investment–saving relation, *MP* denotes monetary policy and *IA* is inflation adjustment. In the previous three identities, the following rules apply: $a_1 > 0$; $\sigma_{1,2} > 0$; $\varphi > 0$, discount factor $0 < \beta < 1$. In the *IA* identity, ε_{it} is the inflationary shock. In the *IS* identity, r_{it}^* is the equilibrium interest rate, whilst η_{it} represents an income shock. In the *MP* identity, r_{i0} is the interest rate at the beginning of the period. In all three identities, y_{it} denotes the level of output, r_{it} is the real interest rate, π_{it} is the inflation and y_{it}^* is the natural level of output achieved without 'sticky prices'. If we simplify and assume that the aggregate expenditures are equal to the output, we get

$$y_{it} = \mathrm{E}(y_{it}, r_{it}, g_{it}, \tau_{it}) \quad (4)$$

In the previous identity, $r_{it} = (i_{it} - \pi_{it}{}^*)$ represents the real interest rate – where i_{it} is a nominal interest rate and π_{it}^* is expected inflation – g_{it} represents government consumption, τ_{it} represents taxes and E is the expected value of the variables in brackets.

In the literature, the augmentation of the Romer (2000) model was presented in the work of Hsing and Hsieh (2009), in which the applied extended monetary policy function follows this interest rate rule:

$$r_{it} = r(\pi_{it} - \pi_{it}^*, y_{it} - y_i^*, e_{it} - e_{it}^*, r^w) \quad (5)$$

where r^w represents world interest rate, e_{it} represents real effective exchange rate and e_{it}^* is the expected real effective exchange rate.

For the inflation adjustment, Hsing and Hsieh (2009) proposed the following identity:

$$\pi_{it} = \pi_{it}^* + \alpha(y_{it} - y_i^*) + e^{nominal} + \varepsilon_{it} \quad (6)$$

where $e^{nominal}$ is the nominal effective exchange rate and ε_{it} is the inflationary shock. The inflationary shock can be put in terms of target inflation rates. Hence, if Central Bank chooses lower inflation target, $\pi_{i1} < \pi_{i0}^*$, this sets inflationary shock to be $\varepsilon_{it} = -(\alpha - 1)(\pi_{i1} - \pi_{i0}^*)$.

In addition, variable that augments the Romer (2000) model is the real effective exchange rate:

$$e_{it} = f(r_{it} - r^w, e_{it}^*) \tag{7}$$

Furthermore, it is well known that the Central Banks are, in general, risk averse. Therefore, when deriving the monetary policy rule, they include in the function a risk aversion towards inflation, and try to maximise (Carlin, Soskice 2005):

$$L = \frac{1}{2}[(y_{it} - y_i^*)^2 + \beta(\pi_{it} - \pi_{it}^*)^2] \tag{8}$$

subject to the Philips curve: $\pi_{it} = \pi_{i,t-1} + \alpha(y_{it} - y_i^*)$.

The monetary policy rule here is set as

$$y_{it} - y_i^* = -\alpha\beta(\pi_{it} - \pi_{it}^*) \tag{9}$$

Previous expression implies that the slope of monetary policy rule curve is $\gamma = \frac{1}{\alpha\beta}$, which reflects both, the slope of the Philips curve as well as the inflation aversion of Central Banks. Now, following Carlin and Soskice (2005), in its Taylor Rule form, the monetary policy rule becomes

$$r_{i0} - r_{it}^* = \frac{1}{(\alpha+\gamma)a}[(\pi_{it} - \pi_{it}^*)) + \alpha(y_{it} - y_i^*)] \tag{10}$$

where r_{i0} is the interest rate at the beginning of the period, whilst r_{it}^* is the equilibrium interest rate, that is, the equilibrium interest rate on a short term. Here, the Central Bank inflation aversion is reflected through the coefficient $\frac{1}{(\alpha+\gamma)a}$. In the Taylor rule, the weights on the two deviations are equal to 0.5, which are set empirically on the basis of the behaviour of the US Federal Reserve.

Econometric model and results

Following Patra and Kapur (2010) and Goodhart and Hofman (2005), we use generalised method of moments (GMM) methodology. The first-differenced, that is, Arellano–Bond (A-B) dynamic GMM model that is applied in this paper takes the following form:

$$\begin{aligned} logy_{it} = \beta_0 + \beta_1 logy_{i,t-1} + \beta_2 logy_{i,t}^w + \beta_3 logr_{i,t}^w + \beta_4 logc_{it} + \beta_5 logg_{it} + \\ +\beta_6 loge_{it} + \beta_7 log\pi_{it} + \beta_8 logp_{it} + \beta_9 logk_{it} + u_{it} \end{aligned} \tag{11}$$

where

$logy_{it}$ is the logarithm of real output (in billions of US dollars 2005 = 100);
$logg_{it}$ is the logarithm of government consumption (in billions US dollars 2005 = 100);
$logy_{i,t}^w$ is the logarithm of world output;
$loge_{it}$ is the logarithm of exchange rate; when lagged once, this represents expected inflation, that is, expected real effective exchange rate;
$logr_{i,t}^w$ is the logarithm of world interest rate (US Federal funds rate is subtracted by the Producer Price Index (PPI) in US manufacturing, which proxies for US inflation);
$log\pi_{it}$ is the logarithm of inflation; when lagged once, this represents expected inflation;
$logc_{it}$ is the logarithm of household consumption (in billions US dollars 2005 = 100);
$logp_{it}$ is the logarithm of population (in thousands);
$logk_{it}$ is the logarithm of physical capital (in billions US dollars 2005 = 100)
u_{it} is the error term

Here, $u_{it} = v_i + \varepsilon_{it}$. To remove the fixed effects v_i, we use the following first-differenced algebraic transformation:

$\Delta u_{it} = \Delta v_i + \Delta \varepsilon_{it}$ so $u_{it} - u_{i,t-1} = (v_i - v_i) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) = \varepsilon_{i,t} - \varepsilon_{i,t-1}$

In general, with the predetermined regressors, one can set the following instruments matrix:

$$W_i = \begin{pmatrix} y_{i1,}x'_{i1}, x'_{i2} & \cdots & 0 \\ \vdots & y_{i1,}y_{i2,}x'_{i1}, x'_{i2}, x'_{i3} & \vdots \\ 0 & \cdots & y_{i1..,}y_{i,t-2}, \ldots, x'_{i1}.., x'_{i,t-1} \end{pmatrix} \quad (12)$$

where W is the matrix that contains all instruments of a country i.

Validity of the instruments is proven using the Sargan test of over-identifying restrictions, where the null hypothesis is that the over-identified restrictions are valid. As an addition, the A-B test of autocorrelation, which examines the hypothesis that there is no second-order autocorrelation in the first-differenced residuals, is applied.

The sample for the regressions includes two periods: from 1993 to 2003 and from 2004 to 2013. The reason behind this sample division is to account for transition and post-socialist period, immanent for most of the countries in the sample. The second sub-sample, from 2004 to 2013, is used to take into account the economic crises that started in 2008 and was ongoing to 2013, as well as to take into account the macroeconomic policies that were adopted by these countries during their European Union integration. We use data from the Penn World Tables and the World Bank.

Table 1. Two sample regression models (First-differenced GMM approach) (Source: author's estimation)

Regression for the time period 1993–2003					**Regression for the time period 2004–2013**			
	Coefficient	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Log of real GDP lagged once	0.040	0.079	0.055	0.007	0.014	0.465	−0.006	0.775
Log of world output level	1.114	0.000	0.496	0.000	0.971	0.000	0.726	0.000
World interest rate	−0.003	0.002	−0.001	0.012	−0.002	0.259	−0.001	0.300
Government consumption	−0.021	0.020	−0.014	0.196	−0.007	0.550	−0.004	0.755
Household consumption			0.507	0.000			0.284	0.002
Log of expected exchange rate	0.108	0.072	0.100	0.070	0.215	0.019	0.144	0.033
Log of expected inflation	−0.065	0.000	−0.046	0.000	−0.062	0.004	−0.059	0.001
Log of population	−1.499	0.000	−1.035	0.012	−2.137	0.000	−1.771	0.000
Gross capital formation level	6.12E-13	0.000	−7.9E-14	0.735	1.17E-13	0.003	1.87E-13	0.635
Constant	20.5	0.000	15.8	0.015	31.8	0.000	26.92	0.000
(A-B) test order 1	z = −2.2747	0.023	z = −2.1894	0.029	z = −2.6684	0.008	z = −2.6685	0.008
(A-B) test order 2	z =−0.3439	0.731	z = −1.0753	0.282	z = 1.3999	0.162	z= 1.4000	0162
Sargan test	χ2(44) = 45.48	0.410	χ2(44) = 47.73	0.324	χ2(35)= 44.43	0.1318	χ2(35)= 37.10	0.372
Number of panels	13		13		13		13	
Number of observations	88		88		77		78	
Observations per panel (average)	6.84		6.67		5.92		5.92	
Number of instruments	53		54		44		45	

Note: The estimation method is panel first-differenced generalised method of moments (GMM), with robust standard errors – White period weights from final iteration. Dependent variable: Logarithm of real GDP

From Table 1, one can see that the world output is positive and significant when related to the logarithm of output of the countries in the sample. World interest rate is negatively and significantly associated with the output in the first sub-sample from 1994 to 2003 but is negative and insignificant in the second sub-sample from 2003 to 2013, which might be result of the financial and economic crises, when the monetary policy is, in general, ineffective. Expected inflation is negative and significant in all models, whilst the expected exchange rate is positively and significantly associated with the output of the countries. This proves that the conventional wisdom to pursue currency depreciation to stimulate the economy may not work for the CESEE countries. Government consumption is negative and significant in the period 1993–2003. This can be indicator for the need of fiscal austerity. However, when the household consumption is included, the coefficient of government consumption becomes insignificant, which proves that the Ricardian equivalence may be applicable (We assume that the debt is zero, and all the government consumption is financed through taxes). In the second sub-sample, the coefficient of the government consumption variable becomes insignificant, which is further proving of possible applicability of the Ricardian equivalence to this set of countries. The sign of population variable, which is used as a proxy for a country size, is negative and significant, whilst the sign on gross-capital formation is positive and significant, which is not a case when the household consumption variable is included.

Basically, our findings hold important implications for policymaking in CESEE countries. First, the negative effect of a higher expected inflation rate on real output indicates that the Central Banks of CESEE countries should continue to focus on maintaining price stability. Second, the estimated negative coefficient of fiscal policy (proxy variable is government consumption expenditure) confirms fiscal policy ineffectiveness. The relatively small size of the government spending multiplier suggests that the governments should place little reliance on the use of expansionary fiscal policy. Third, the depreciation of the real effective exchange rates of the countries in the sample is not a good strategy. Real effective exchange rate appreciation on a contrary proves to be better recommendation for policymakers in these set of countries. Of course, these economies cannot influence the world output, as well as the world interest rate, but both variables do have significant effect on their output.

Finally, it can be useful to mention that the desired conditions of the A-B test of autocorrelation are satisfied. More precisely, in the A-B test of autocorrelation of order 1, z values must be negative, that is, < 0 , and statistically significant. In the test for the second order of the autocorrelation, z-score should be positive, that is, $z > 0$, and it must be insignificant. On the other hand, the Sargan test proves that one cannot reject the null hypothesis that over-identifying restrictions are valid, which proves the validity of instruments. This is supported with the high p-values reported in the results for the test.

Conclusion

This paper has applied the extended *IS-MP-IA* model to investigate possible impacts of changes in exogenous variables on CESEE economies, with a real effective exchange rate taken into account. This is important because countries in the sample have different exchange rate regimes, so it seems that weighted average of the value of country's currency relative to the currencies of their biggest trading partners is far better solution. Yet currency depreciation is not suitable policy for the two separate time periods (from 1993 to 2003 and from 2004 to 2013). In the period of economic crisis, turns out that currency depreciation might produce contractionary effects.

Empirical results show that on an average, lower expected inflation rate, lower government consumption, depreciation of the currencies, lower federal funds rate and greater world output is expected to increase output in the CESEE economies. An extended Romer (2000) model showed that an increase in the household consumption, on an average, would lead to higher output. Also, population reduction is positively associated with the increase in output, as well as the increase in the employment-to-population ratio. The importance of gross capital formation is especially emphasised in the periods of economic crises. Therefore, we can conclude that the augmented *IS-MP-IA* model – which takes into account international trade in the IS function, the world interest rate in the MP

function and the exchange rate in the IA function – enables one to better understand macroeconomic relationships that influence CESEE economies.

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COMBINING ENVIRONMENTAL AND SPATIAL DISCOUNT RATES FOR VALUATION OF ASSETS ACCORDING TO INTERNATIONAL FINANCIAL REPORTING STANDARDS

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Abstract. Application of discount rate in finance and accounting is founded on the concept of time value of money. Discounted cash flow model is widely used for asset valuation under the International Financial Reporting Standards (in abbreviation, IFRS). The discount rate applied in valuation models normally is the best rate of return that investors would earn alternative investments. With emergence of ecological economics as a separate branch of economics, the concept of ecological (or in other words, environmental discount rate) has been elaborated. Muller (2013) in his paper 'The Discounting Confusion: an Ecological Economics Perspective', argues that traditional discounting can undermine long-term sustainability of the economy. In his work, Frank G. Muller considered adjusting the traditional discount rate in order to arrive at an environmental discount rate, which would help to ensure the sustainability of the economy. Hannon (2001) and Perrings (2001) in their paper 'An Introduction to Spatial Discounting' consider another variation of the discount rate – spatial discount rate. Spatial discount rate represents the rate at which the diffusion of environmental effects of economic activities is discounted over space. By February 2016, neither the application of environmental nor spatial discount rates under IFRS has been considered. The purpose of this paper is to analyse the implications that environmental and spatial discounting would have for the application of discounted cash flow model according to IFRS. The research methods applied are methods of economic analysis and synthesis.

Keywords: discount rate; assets; valuation; International Financial Reporting Standards.

Type of the paper: Theoretical paper

JEL Classification: M41, Q50

Introduction

The World economy that existed until 20th century can be denoted by term 'empty World economics'. In 'empty World economics,' natural resources were abundant and human-made capital was scarce. For this reason, historically human-made capital was treated as limiting factor in economic decision-making, and economic decisions were made to maximise the productivity of human-made capital as well as to increase its supply (Constanza *et al.*1997). Human-made capital normally is created from natural capital, and the opposite, that is, creation of natural capital from human-made capital, is not feasible. Historically, before 20th century, because of the perceived abundance natural resources, the growth of human-made capital as well as its products was perceived as boundless and limited only by human effort and preferences. High perceived growth rates of human-made capital and its products allowed for the application of high discount rates for valuation of investments.

Starting from 20th century, evolution of the human economy passed from an era, in which human-made capital was the limiting factor in economic development, to an era, in which remaining natural capital has become the limiting factor. This era was named as 'full World economics.' With an advent of 'full World economics', economic policy had to be designed to increase the productivity of natural capital and its total amount rather than to increase the human made capital and its accumulation (Constanza *et al.*1997). With restated aim of economic policy, also the discount rates, which are used for valuation of investments, have to correspond to productivity of natural capital rather than that of human-made capital.

During transition to ‘empty World economics’ to ‘full World economics’, a new field of economic science ‘ecological economics’ emerged. The traditional concept of discount rate was modified to adapt to postulates of ecological economics; and the concept of environmental or ecological discount rate was elaborated. Furthermore, a concept of spatial discount rate was derived from the environmental discount rate by considering the diffusion of environmental effects across space.

The authority to make decisions regarding allocation of resources, both natural and man-made rests with various economic agents – private investors, lenders and other providers of finance to companies, state and municipal regulators and international organisations. Private initiative of investors is generally recognised in market economies, whilst the government with its legislative authority sets boundaries beyond which it is illegal for private investors to venture. In Latvia and other EU countries, the state legislation also sets limits to the use of natural resources and to infliction of damage on the environment. The environmental protection policies adopted by the state have also been widely studied by academic scientists.

Major information that investors and other providers of finance to companies require for making decisions regarding the allocation of resources is included in financial statements of the companies. All companies that quote their securities in the EU-regulated markets must prepare their consolidated financial statements according to the IFRS. Furthermore, the U.S. securities’ market regulator also permits those foreign companies, which list their securities on the U.S.-regulated market to report under IFRS. The IFRS requirements for valuation of assets have a direct influence on reported asset values and ultimately on the resource allocation decisions taken by investors, lenders and other finance providers.

The discounted cash flow model is required for the estimation of value-in-use of assets that are tested for impairment under IFRS and is an alternative for the estimation of fair values of those financial assets, investment property, property, plant and equipment, biological asset and agricultural produce items that do not have quoted market prices from an active market available. The discount rate applied for the valuation of assets is relevant for choices made by private investors and creditors regarding allocation of natural resources and the resulting productivity of natural capital. Still, even in the era of ‘full World economics’, there is a lack of research concerning the implications that the choice of discount rate under IFRS would have for the treatment of natural capital. Despite the quite extensive, though mainly theoretical studies on ecological discounting by ecological economists, there is no research on the economic support for the implementation of ecological discount rate in IFRS. The author of this paper has not encountered studies on the implementation of spatial discount rate in IFRS either. Owing to topicality of studies on both ecological and spatial discount rates and because of the lacking research on the economic support for the introduction of these discount rates in IFRS, the author considers the study on the implications of application of combined ecological and spatial discount rates for asset valuation under IFRS to be topical.

The aim of research is to analyse the implications that environmental and spatial discounting would have for the application of discounted cash flow model according to IFRS.

Research hypothesis are formed gathering economic support for the application of combined environmental and spatial discount rates for asset valuation in the financial statements, which have been prepared following the IFRS. According to research hypothesis, the incorporation of environmental discount rate in the discounted cash flow model guaranteed that financial statements do not violate the underlying assumption of going concern and the concept of physical capital maintenance.

Methods of economic analysis and synthesis have been applied.

The research results confirm the hypothesis concerning the incorporation of environmental discount rate in the discounted cash flow model. Adjustment of applied discount rate in order for it to correspond with the environmental rate is crucial for physical capital maintenance. There is no support, however, for use of spatial discount rate for valuation of assets reported in financial statements, which have been prepared according to the IFRS. Spatial discount rate reflects geographical preferences expressed by certain individual or a group of individuals at a certain place of

residence and do not represent the preferences of a truly international profile of investors, lenders and other parties, which may influence and are affected by natural resource allocation decisions made by companies.

Literature Review

In this literature review, the relevant the asset valuation and discount rate requirements set by the IFRS, prominent literature sources on traditional view of discount rate as well as literature on ecological and spatial discounting are summarised.

The concept of discount rate is implicit in the definition of property's value provided by classical American economist Irving Fisher in 1906. According to Irving Fisher, the value of a piece of property is reflected by the present value of the cash flows that are expected to be received from this property in the future and that are discounted at the opportunity cost of capital (Fisher 1906). A notion that value of money decreases over time forms economic support for discounting.

Discounting arises because people value future consumption less than present consumption. To compare future consumption with present consumption, a discount rate is used to convert the value of future consumption to present value. The discount rate is, therefore, a tool for trading goods and services across time (Fisher 1930).

Eckel, Fortin and Fischer (2003) in their paper 'The Choice of Discount Rate for External Reporting Purposes: Considerations for Standard Setting' mentioned the following rates, which may be applied as discount rates:

- risk-free interest rate;
- a sum of risk free rate and a risk premium;
- market rates of individual assets and liabilities;
- rates which are stipulated in the contracts for assets and liabilities;
- rates which are characteristic of particular company – cost of equity, cost of capital, opportunity costs of investments;
- interest rates specified in legislation (if available) (Eckel *et al.* 2003).

The Conceptual Framework for Financial Reporting issued by the International Accounting Standards Board recognises present value as a potential measurement base for assets and liabilities. According to the Framework, assets are carried at the present discounted value of the future net cash inflows that the item is expected to generate in the normal course of business. Liabilities are carried at the present discounted value of the future net cash outflows that are expected to be required to settle the liabilities in the normal course of business (International Accounting Standards Board 2010). To arrive at present values of assets and liabilities, the respective cash flows are commonly discounted at marginal opportunity cost of capital.

The IAS 36 'Impairment of Assets' stipulates that for the purpose of asset's value-in-use estimation, the discount rate applied should be a pre-tax rate that reflects

- the time value of money, and
- the risks specific to the asset for which the future cash flow estimates have not been adjusted (International Accounting Standards Board 2001).

Research in ecological economics also encompassed studies of the impact that discounting has on the environment and development of a new concept 'ecological discount rate'. Fisher (1930), Hannon (1973), Muller (2013), Farley (2004), Daly (2004), Carpenter (2005), Brock (2005) and Ludwig (2005) have contributed to the development of the concept and measurement of ecological discount rate (also called 'environmental discount rate').

In 1930, Fisher discovered parallel between economics and biology. The role played by discount rate in economics is analogous to that of the intrinsic rate of natural increase in the computation of reproductive value in population biology (Fisher 1930).

In 1973, Bruce Hannon published 'The Structure of Ecosystems'. He developed an input–output framework for the ecosystem where the net output (the gross domestic product (GDP) of the ecosystem) was its net exports, inventory change, respiration and new biocapital formation. Respiration is analogous with household and government consumption of the economic definition.

Extending the economic analogy further into ecology, Bruce Hannon showed how an ecological discount rate could be calculated; in a way, this was nature's time preference rate. Under the proper conditions, the natural discount rate of an individual or a species can be approximated by its rate of respiration energy, the rate of heat release per unit of biomass energy. This natural discount rate captures both the idea of inevitable entropy creation of living organisms and the duration of captured energy in their biomass. In this sense, it is a measure of specific unit of biomass has to the ecosystem (Hannon 1973).

Muller (2013) argued that traditional view on discounting is based on presumption that economic growth is feasible. According to him as well as Farley (2004) and Daly (2004), this presumption is likely to be faulty.

If perpetual economic growth is feasible in the World, the use of a rate of discount of zero causes substantial disadvantages for early generations, because according to a growth model that maximises intergenerational utility integral, these early generations are obliged to excessive saving that allows later generations to live in affluence and luxury. Consequently, the concept of utility discounting, considering decreasing marginal utility of income, corrects the alleged injustice and disadvantages of early generations to consume (Hampicke 2000). The presumption that future generations will be more affluent than their predecessors because of the economic growth serves as a justification for discounting. In reality, however, instead of enjoying a life in abundance, they may rather experience environmental disaster, loss of biodiversity and lack of essential natural resources. (Muller 2013).

In reality, however, economic growth might not accede to the marginal opportunity cost of capital, because few natural resource stocks can sustain growth rates equal to this traditional measure of discount rate (Daly, Farley 2004).

Muller (2013) pointed out to the fact that in cases when no sufficient economic growth is feasible in practice, application of inflated discount rates is jeopardising the sustainability of economy. If the underlying assumption of future economic growth turns out to be faulty, the discounting may actually accelerate the process of destroying the livelihood of future generations to support at least their basic needs. (Muller 2013)

Carpenter (2005), Ludwig (2005) and Brock (2005) called for lowered discount rate to maintain sustainability. In their opinion, discounting of future benefits at lower rates improves the sustainability of an economy (Carpenter *et al.* 2005)

In literature, spatial version of discount rate has been studied less extensively than ecological discount rate. During the literature review, the author of this paper has encountered one significant work that lays the foundation to the concept of spatial discount rate – scientific paper by Charles Perrings and Bruce Hannon 'An Introduction to Spatial Discounting', published in 2001.

According to Perrings (2001) and Hannon (2001), research on the valuation of environmental externalities shows that decision makers tend to discount not only over time but across space. Just as time discounting has implications for intergenerational equity, geographical or spatial discounting has implications for intragenerational equity. Similarly, just as positive time discount rates are warranted by positive net rates of growth of the capital stock, positive spatial discount rates may be warranted by the fact that environmental (or other external) effects of economic activity are diffused at positive rates (Perrings, Hannon 2001).

It is not surprising that high spatial discount rates have the potential to prejudice the well-being of distant members of the present generation in the same way that high time discount rates prejudice the well-being of members of future generations. Time discount rates above the warranted rate of regeneration or assimilation imply a myopic approach to the management of environmental resources that is potentially dangerous and is certainly inequitable (in intergenerational terms). In the same way,

spatial discount rates above the natural rate of diffusion imply a parochial approach to the management of environmental resources that is equally inequitable (in intragenerational terms). Nevertheless, high spatial discount rates may be warranted by high rates of diffusion (or decay) of environmental effects (Perrings, Hannon 2001).

Methodology

The main research method applied in arriving at research results in this paper is the method of economic analysis. The economic analysis is performed by comparing the theories developed by authors who have completed studies on discount rate previously and whose research results are presented in section 'Literature Review'. For the purpose of comparing the theories, the concepts and models presented by other authors are disintegrated into distinct elements, if feasible. The construction of logical relationships that synthesise the elements of theories developed by other authors and presumptions made by the author of this paper is used as continuation economic analysis.

Results

The author supports the view of Farley (2004) and Daly (2004) that few natural resource stocks can sustain growth rates equal to this discount rate, if measured by opportunity cost of capital in finance.

In the opinion of the author, the production of natural ecosystems is intended to cover the consumption requirements that are needed for the reproduction of the ecosystems. Thus, without human intervention, except for minor disturbances, natural ecosystems to not grow in their biomass, but reproduce themselves cyclically over time with the amount of biomass remaining about the same.

To draw an analogy with between biology and economics, the biomass can be viewed as capital stock. The products of the plants – seeds, gums and others – are analogous to the products of capital stock in human economics. Furthermore, in natural ecosystems, the biomass of living plants itself becomes a product of these plants required for their reproduction, as plants die and their biomass serves as a humus to the soil. In this respect, natural ecosystems and economic systems do not always resemble, because in economic systems, capital stock does not always becomes an input to the production of goods.

According to Fisher (1930), in biology, discount rate is the intrinsic rate of natural increase in the computation of reproductive value in population biology. Whilst different levels of natural increase are possible in real life depending on the conditions that exist in the ecosystem, there is average, normal level of production by the ecosystem and that is the level of production, which is necessary for the reproduction of the ecosystem. The current author regards the rate of ecosystem's production, which ensures the complete reproduction of the ecosystem, as the ecosystem's discount rate.

The concept of growth in economics has to be elaborated on. The author views economic growth as increase in utility obtained from consumption by future generations over their predecessors. In the opinion of author, it is possible to achieve growth in two ways – as a result of increased quantity of consumption and as a result of improved quality of the products being consumed.

The growth in quantity of production generally is possible at the expense of the natural stock, whilst growth in quality is possible without sacrificing the natural resources, just by creative recombination of the already available production resources. The growth in quality is a merit of inventor's talent. The discount rates that reflect the utility increases because of the recombination of existing resources are not limited; and the author of this paper also favours their implementation in the IFRS.

Another topical issue to consider is the accounting for damage that enterprises inflict on the environment. In the opinion of the author of this paper, the impact that the use of company's assets are expected to have on an environment both in near as well as in distant future should be taken account into account, as the value-in-use of company's assets is determined. Even, if the damage that company's activities inflict on environment cannot be measured in monetary terms, an attempt should be made to incorporate the environmental damage in the model used for the valuation of company's

assets. Those assets that are likely to have a negative impact on the environment should be carried at lower values than assets, which pose no threat to the environment.

If the future sustainability of environment is not to be jeopardised, it is important that environmental damage to be observed in distant future is not attributed much less weight than deterioration of the environment that is expected in the near future. This is also a way to guarantee that the well-being of future generations is not sacrificed at the expense of current population. Attribution of similar weights to events occurring in distant and in near-future calls for application of lower discount rate, as assets are measured according to discounted cash flow model following the IFRS. This lower discount rate corresponds to the ecological discount rate.

Though environmental pollution originates at one certain geographic location, it often spreads out to other geographic locations.

Circular, cyclical flow of substances and chemical elements has been observed in the World, and it is driven by Solar energy. Major circulation of substances occurs along with the water cycle that has been depicted in Figure 1.

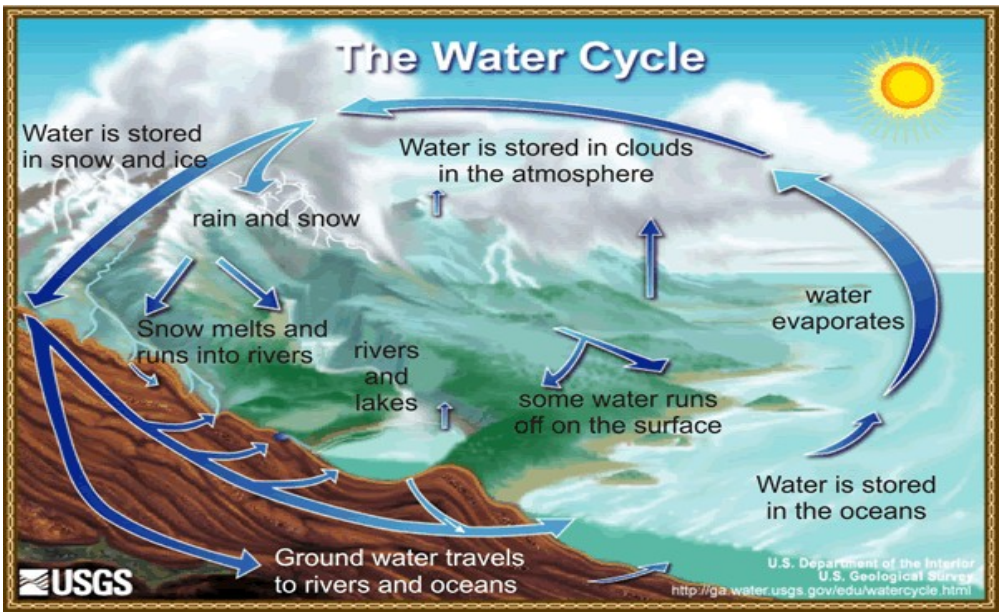

Fig. 1. The cycle of water circulation in an ecosystem (Source: U.S. Department of the Inferior, 2016)

Some pollution, if originated in the water, may spread along with water cycle, as depicted in Figure 1. Air pollutants may diffuse along with movement of air masses. The diffusion of pollution because of circulation of substances forms the theoretical support for spatial discount rate.

The spatial discount rate represents geographical preference that concerned parties have for consumption and receiving economic benefits in one geographic location over another. Clean environment, in this respect, may also be viewed as an economic benefit, to which utility is attached. Thus, the spatial discount rate may represent the preference that economic agents express on enjoying clean environment in one geographic location over another.

In practice, in modern-day international corporate relations, spatial discount rate may matter for assessment of environmental pollution. The author of this paper would expect that the investors who represent the developed countries of their residence, when assessing the value of companies' assets, would place a lower weight on environmental pollution occurring in developing countries in Asia where the production actually takes place than to the same pollution, if that would occur in their developed countries of residence. This leads to sacrifice of environmental quality in China and in other

Asian developing countries, which specialise on the production of goods, at the expense of environmental quality in the United States, which is the major residence of corporate investors.

Over time, however, the effects of pollution tend to diffuse all over the World. Therefore, if environmental quality to be enjoyed by future generations is not placed much less weight than that of present generations, the impact that spatial discount rate has on valuation of assets should be eliminated. Furthermore, the IFRS are intended for a global profile of investors, lenders and other providers of finance without emphasis to any particular country or region where these providers of finance may take residence and without preference for clean environment in one geographic location over another. In this respect, spatial discount rate should be irrelevant for the valuation of assets under IFRS.

Conclusions

In order to maintain the sustainability of environment, the incorporation of environmental discount rate in the discounted cash flow model is necessary. There is no support, however, for the use of spatial discount rate for the valuation of assets reported in financial statements, which have been prepared according to the IFRS. Spatial discount rate reflects geographical preferences expressed by certain individual or a group of individuals at a certain place of residence and do not represent the preferences of a truly international profile of investors, lenders and other parties, which may influence and are affected by natural resource allocation decisions made by companies.

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COMMUNICATION ABOUT A BUSINESS MODEL WITHIN AN ORGANISATION IN THE OPINION OF CZECHS AND POLISH

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Abstract. Business models are nowadays a popular topic in management science. The concept of ontology of business models in particular is used in numerous scientific works within this scope. The issue of shared understanding of a business model within an organisation is becoming essential in this regard. Therefore, this work presents the opinions of young Czechs and Polish studying on faculties of management on the issue of the subject matter of a business model in the dimensions of the way it is communicated within an organisation. The study has been conducted with the aid of a survey. Hundred and twenty persons altogether have given their answers, of which 50% were Polish and the other 50% were Czechs. The existence of statistically important correlation between independent variables ('nationality', 'seniority') and opinions concerning particular dimensions of communicating about business models within an organisation (dependent variables) has been proven. The existence of these correlations (despite their very low level) in the light of a generally formulated research problem may constitute a premise for conducting further studies on the issue of cultural conditionings of communicating about this problem as well as the way it is practised in Polish and Czech enterprises.

Keywords: business; model; opinion; communication; organisation.

Type of the paper: Empirical study

JEL Classification: M10, M14.

Introduction

In recent years, the issues of business models have become one of the most popular subjects of publications within the scope of management sciences, which may be proven by two facts. First of all, the number of publications on this issue and secondly, the number of citings of these publications (Komańda 2014). The reasons for such popularity should be, above all, sought within the development of e-business that simultaneously induced the necessity for describing new forms of running a commercial activity and, as a result, made devising of a new method of their description possible. The use of IT infrastructure as a basis for the activity conducted by e-business enabled to adopt the concept of ontology in the description of these forms of business, and, based on it, the description of business models themselves (Osterwalder *et al.* 2005). Popularisation of methods based on the ontological approach (e.g. e^3value (Gordijn *et al.* 2006), BMO (Osterwalder 2004)) as a consequence resulted in devising tools of business model management in the form of IT programmes supporting managers of enterprises in the decision-making process.

The use of a ready tool for business model management or independent attempt to describe the model requires broad understanding of its essence within the enterprise itself, method for its description and, as a result, elements of this model. The research objective of the presented work is, therefore, to define the significance of the communication process for the purposes of setting up ontology of a business model of an enterprise. It should be emphasised that the role of this process has been referred to key aspects of a business model ontology. Simultaneously, whilst analysing the issues of communication process, one should also raise the issue of cultural differences influencing, amongst other things, its efficiency. Thus, the main research hypothesis (H) is as follows: there is a correlation between nationality and the perception of necessity for communicating about the building components of a business model ontology within an enterprise.

In order to verify the hypothesis made, a research tool in the form of a survey had been devised, which was made available to the respondents from Czech and Poland. The respondents were students at management faculties. They were students of the Brno University of Technology (Czech) and the University of Economics in Katowice (Poland). Selecting such group of respondents was a deliberate procedure; however, it means that the results of the conducted analysis may only be referred to the surveyed group of respondents. The analysis of results of the research procedure enabled, above all, to determine that there is a statistically significant weak correlation between the necessity for communicating (in the opinion of respondents) about two key aspects of business model ontology of an enterprise (dependent variables) and the nationality of respondents (independent variable). Those distinguished aspects of creating a business model are conceptualisation of a business model as a bridge between a strategy and operational activity of an enterprise and presenting a business model as a machine scheme. Because of the age of the respondents who were only about to begin their professional activity or who had a relatively short seniority, the decision was made to broaden the analysis by this factor. It means that seniority was assumed as another independent variable. It enabled to establish a statistically significant and also weak correlation with the following dependent variables: accepted terminology and presenting of a business model as a machine scheme. The obtained results of the analysis enable to assume that it is worth conducting further, deepened and representative studies on cultural conditionings of communicating about business model ontology in the conditions of Polish and Czech enterprises.

Literature Review

Whilst referring to the issue of presenting the form of a business model, it should be emphasised that a conceptual category which it refers to whilst taking such measure should be established. As it is pointed out in the literature on the subject, one may avail oneself of one of the three possible categories of defining business models that are in hierarchical relations with one another (on higher levels metamodels are to be distinguished (Gordijn, Akkermans 2003) also known as reference models (Hamel 2001)). First of all, business models may be defined as concepts the description of which includes all their types existing in the economic reality. Second, one may focus on the description of various abstract features of business models (for this purpose, a particular classification is used); the consequence is a description of business models of particular features. And third, one may focus on matter-of-factly existing aspects (or their conceptualisation) of business models of particular enterprises (Osterwalder *et al.* 2005).

The cited authors point out that each of these approaches has its justification, each of them may turn out to be fruitful and may be useful in the description of business models. According to them, they may also be completed out of simple definitions or a more complex series of elements and establishing relations between them. The metamodel approach (i.e. their hierarchisation) uses the concepts of reference models characteristic for a given market and assumes an infinite number of business models characteristic for particular enterprises. From this point of view, models become a shared, formal and openly expressed conceptualisation. Simultaneously, expressing this conceptualisation undergoes further specifications that may lead to distinguishment of sub-metamodels on the road of further classifications (which use the similarity criterion) (Lambert 2006).

A characteristic phenomenon for the perspective of the issue of business models with respect to metamodels (reference models) is also the use of the notion of the business model ontology (George, Bock 2011). In this approach, ontology is based on a specific understanding of the following notions: conceptualisation connected with presenting ‘'the model’ as business logic (also known as business logic triangle, which includes strategy, business model and business processes (Osterwalder, Pigneur 2004); conceptualisation divisibility/universality, which is created on the basis of ontological liability (common interpretation of the business model by the interested parties that is built on the basis of the accepted terminology); technicality, that is presenting a business model as a ‘'machine scheme'’; openness understood not only as a way in which people understand this model but also as documentation by which it is described (Gordijn *et al.* 2005). Creating a business model ontology in the above-mentioned dimensions is definitely connected with the process of communication that includes, inter alia, communication with employees of an enterprise, creating an organisational

database and knowledge and communicating in the conditions of emergency and implementation of changes (Cornelissen 2014). As a consequence, one should also refer to the issue of prospective cultural differences in the dimension of international comparisons of this very problem (Moran *et al.* 2014).

From this perspective, a business model ontology is a rigidly established conceptual framework that enables to divide a common comprehension of what is significant (what expresses the essence, or the gist) and should be communicated amongst people and realised within sub-systems of an enterprise, especially in the context of actually realised processes (Aguilar-Saven 2004). The ontology, therefore, brings into use 'a general view/theory' (reference model) instead of a particular, specific and developed structure of elements that create the whole, which, as it is often emphasised, is not even fully known to managers of an enterprise (Fensel *et al.* 2001). The confirmation of this observation may also be found in other theses that state that a business model is not a description of a complicated social system, that is, an enterprise, which includes all its actors, relations and processes. A business model from this perspective is treated as a conceptual and architectural (i.e. in accordance with the assumed ontological assumptions) implementation of a strategy that becomes a foundation for the implementation of business processes (Petrovic *et al.* 2001). What is more, nowadays, business models are perceived as a holistic way of analysing the activity of enterprises without the necessity to refer to the existing set of clients, cooperators and competitors. Therefore, they are a consequence of presentation of a key idea for running a business as a peculiar idea prescinding from the real situational context (thus, in this respect, they constitute a metamodel). It contributes to the possibility of broadmindedness of key decision-makers regarding innovativeness within a business model of an enterprise, first, in a general manner, the consequences of which are improvements of particular aspects of running a business in a practical dimension (Amit, Zott 2012), that is on the level of a given enterprise.

Methodology

The conducted intent of the research was assumedly of explorative nature and concerned the issue of cultural differences in the context of opinions regarding the necessity for communicating about business model ontology within an enterprise. The choice of Polish and Czech nationalities for the purposes of the research is justified by significant cultural differences that exist between them and that are described in the results of studies on cultural differences published on Hofstede Center's website. The very fact of these cultural differences exists, despite the affiliation of both nationalities to the group of Slavic nations and their direct geographical proximity in the region of Central and Eastern Europe.

The selection of respondents with regard to the nature of the research was deliberate and consisted in selecting students of management departments for the participation in the research (non-probability sampling method, convenience sample). This selection of respondents arose from, above all, a general nature of the question posed in the used research tool, which took the form of a survey questionnaire. Thus, it enabled to receive a response from a homogeneous group of people in terms of the direction of studies who might have understood research intentions and intuitively responded to the questions they were shown. Another factor in the selection of such a group of respondents was an ease-reaching.

Table 1. Distribution of respondents according to their nationality and level of studies (Source: author's compilation)

Current level of studies	Nationality		Total
	Czechs	Poles	
Bachelor	30	32	62
Master	29	28	57
Doctoral	1	0	1
Total	60	60	120

Altogether 120 persons responded. Half of them were students of the Faculty of Management at the University of Economics in Katowice (Poland), the other half were students of the Faculty of Management at the Brno University of Technology (Czech). The number of respondents on the account of nationality and current level of studies is shown in Table 1.

Owing to the fact that amongst the respondents were young persons beginning their professional life or being about to take up their first employment, they were asked to assess their seniority taking into account all prospective forms of employment. Table 2 shows distribution of respondents on account of nationality, level of studies and seniority.

Table 2. Distribution of respondents by nationality, level of studies and seniority (Source: author's compilation)

Nationality/Level of studies			Seniority			Total
			Never worked	Worked not more than 1 year	Worked at least 1 year	
Czechs	Current level of studies	Bachelor	15	6	9	30
		Master	8	9	12	29
		Doctoral	0	0	1	1
	Total		23	15	22	60
Poles	Current level of studies	Bachelor	7	10	15	32
		Master	3	4	21	28
	Total		10	14	36	60
Total	Current level of studies	Bachelor	22	16	24	62
		Master	11	13	33	57
		Doctoral	0	0	1	1
	Total		33	29	58	120

The verification of the stated hypothesis (H) required writing it in the form of detailed hypotheses. Their formula was taken from key component issues regarding understanding of a business model ontology of an enterprise (Gordijn *et al.* 2005). Therefore, the consecutive hypotheses are as follows:

H1: There is a correlation between nationality and opinion about the necessity for communicating about a business model as conceptualisation of a bridge between a strategy of an enterprise and operational level.

H2: There is a correlation between nationality and opinion about the necessity for creating a commonly accepted terminology describing a business model by the communication process within an enterprise.

H3: There is a correlation between nationality and opinion about the necessity for propagating the image of a business model as a machine scheme by the communication process.

H4: There is a correlation between nationality and opinion regarding the necessity for creating and propagating within an enterprise documentation describing a business model by the communication process.

One question corresponded to each of the hypotheses. The respondents were supposed to reply by choosing the value from 1 to 5, where the lowest value in the opinion of a respondent meant absolute lack of necessity of a chosen aspect of the communication process for creating a business model ontology within an enterprise, whereas the highest value reflected the opposite attitude, that is, the opinion about absolute necessity. Owing to the fact that ordinal variables (respondents' opinions) and nominal variables (nationality) were used, Goodman and Kruskal's tau measure of correlation was used for the verification of the hypotheses (Górniak, Wachnicki 2013). Calculations were made with the aid of the statistical programme PS Imago.

Results

The respondents were asked whether particular aspects of understanding of a business model as a conceptual framework for the description of the essence of the conducted activity should constitute the subject of communicating within an enterprise. In response to the question regarding the necessity for communicating about a business model as a conceptualisation of the bridge between a strategy of an enterprise and level of realisation of processes, the main differences in distributions of respondents' indications because of their nationality concern three options of answers. The answer option ‘I have no opinion’ was chosen by 29 persons in case of Poles (7 persons amongst Czechs). The answer option ‘I rather agree’ was chosen by 30 Czechs and 22 Poles. Whilst, the answer option ‘I agree’ was marked by 14 Czechs and 1 Pole. The response determinant on the side of the indications of Poles was ‘I have no opinion’ (29 indications), and in case of Czechs, ‘I rather agree’ (30 indications). In case of both nationalities, one may also point out the existence of two ‘I don't agree’ answers, respectively. The answers of the respondents are presented in the Fig. 1,

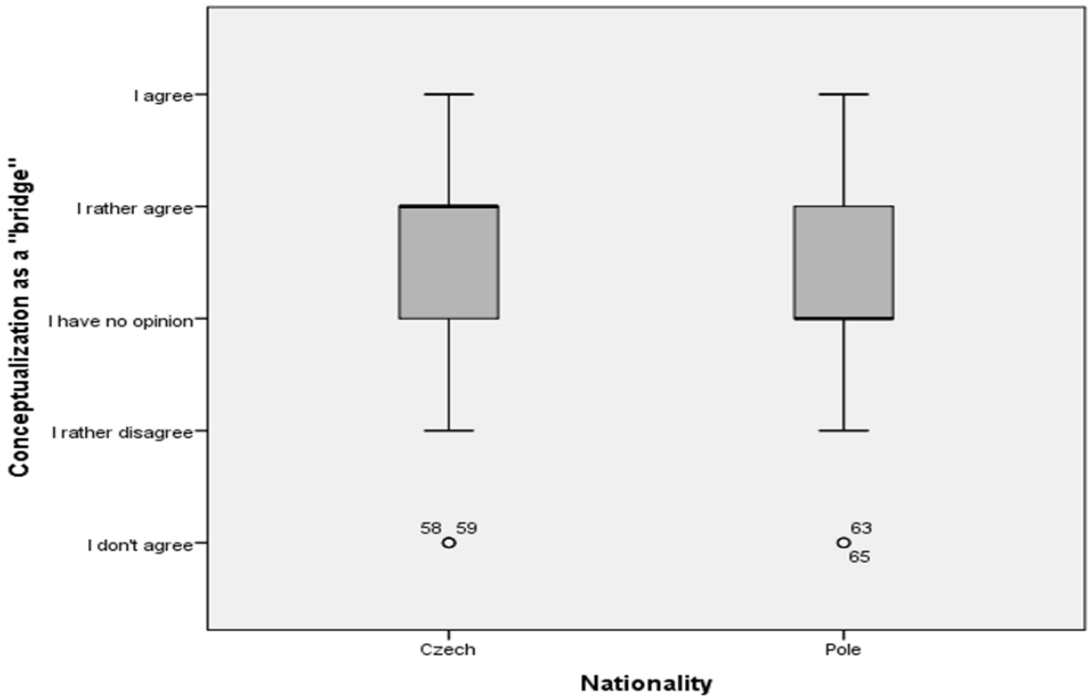

Fig. 1. Distribution of answers for variables ‘conceptualisation as a bridge’ and ‘nationality’ (Source: author’s compilation generated by PS Imago)

Distribution of responses to the question regarding the necessity for creating by the communication process within an enterprise-accepted terminology describing a business model indicates that the most popular answer option amongst respondents was ‘I rather agree’: 53 indications altogether (23 Czechs and 30 Poles). These are simultaneously the dominants in both groups of respondents. In case of indications of persons of the Czech, nationality responses concentrated on three middle answer options (‘'I rather disagree'’, ‘I have no opinion’, ‘I rather agree’ – 53 indications altogether). In turn, Poles chose the answer options ‘I rather agree’, ‘I agree, and ‘I have no opinion’ 53 times altogether. The answers of the respondents are presented in the Fig. 2.

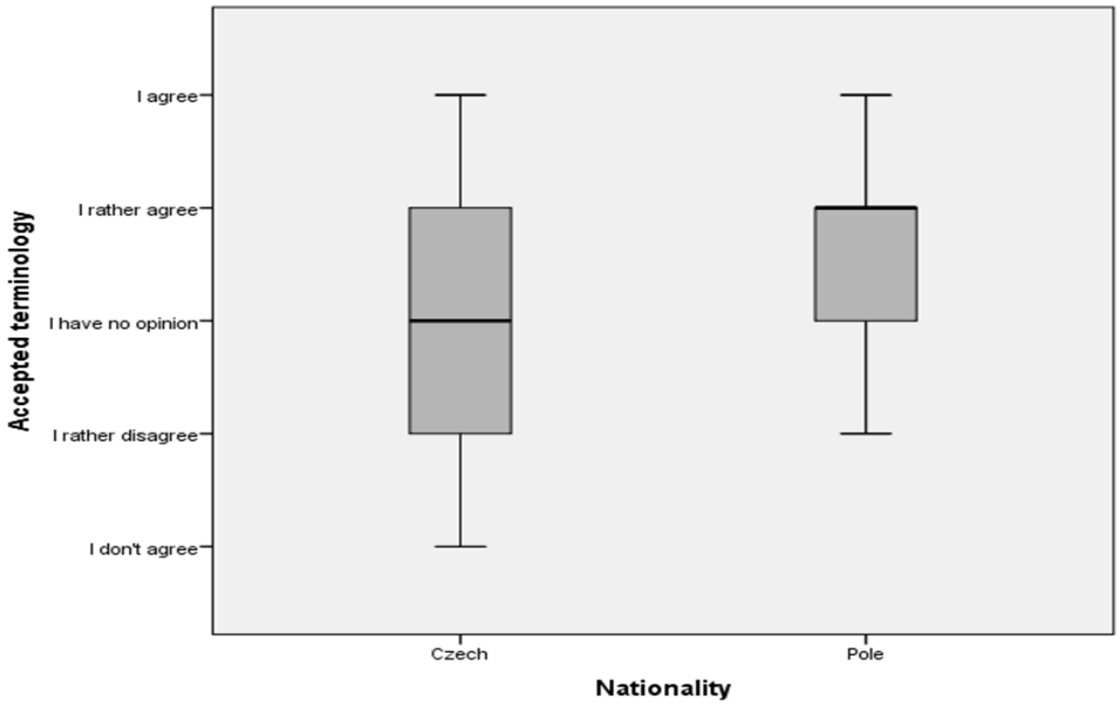

Fig. 2. Distribution of answers for variables 'accepted terminology' and 'nationality' (Source: author's compilation generated by PS Imago)

In case of the expressed opinions about the necessity for propagating by the communication process, the image of a business model as a machine scheme Poles more often than Czechs chose the following answer options: 'I agree' (15 indications) and 'I rather agree' (29 indications – the dominant). Czechs gave 11 and 18 indications to these questions, respectively. In their case, the dominant was the answer option 'I have no opinion'. This answer option was indicated by 20 Czechs (see Fig. 3).

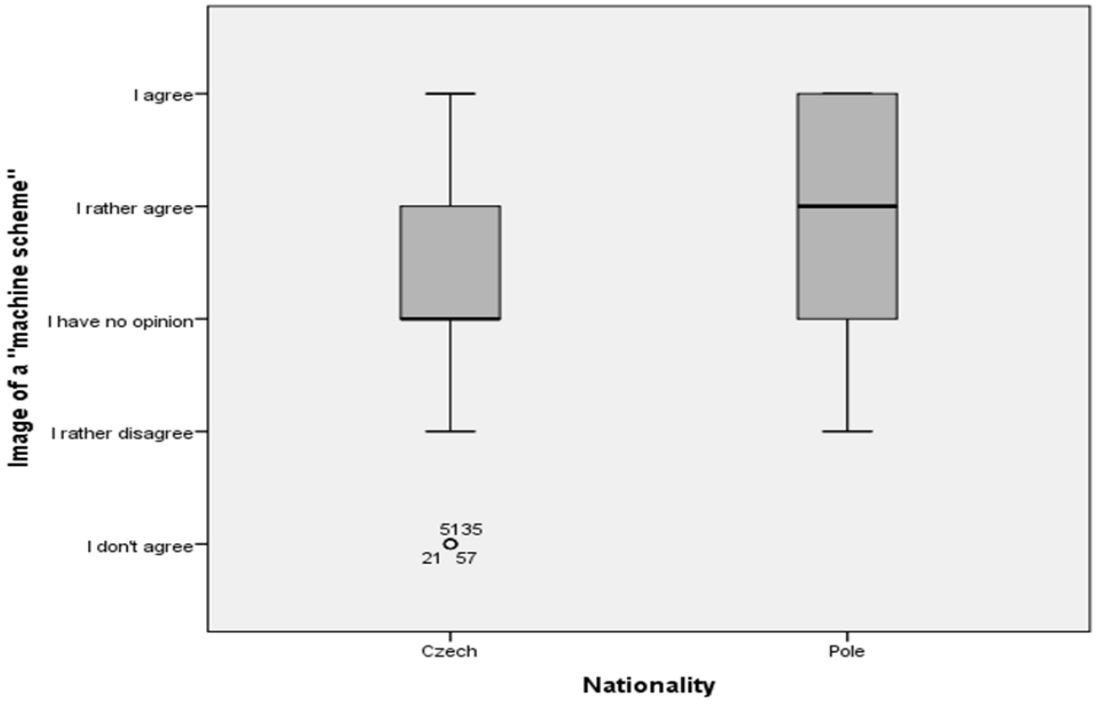

Fig. 3. Distribution of answers for variables 'image of a machine scheme' and 'nationality' (Source: author's compilation generated by PS Imago)

The opinions expressed in the last question that concerned the necessity for creating and disseminating of documentation describing a business model of an enterprise by the communication process in both groups of respondents were almost identical. Prospective differences in the distribution of answers between groups of respondents amount to two indications maximally. The dominant in both groups of respondents was the answer option 'I rather agree'. Poles indicated it 23 times, whereas Czechs 24 times (see Fig. 4).

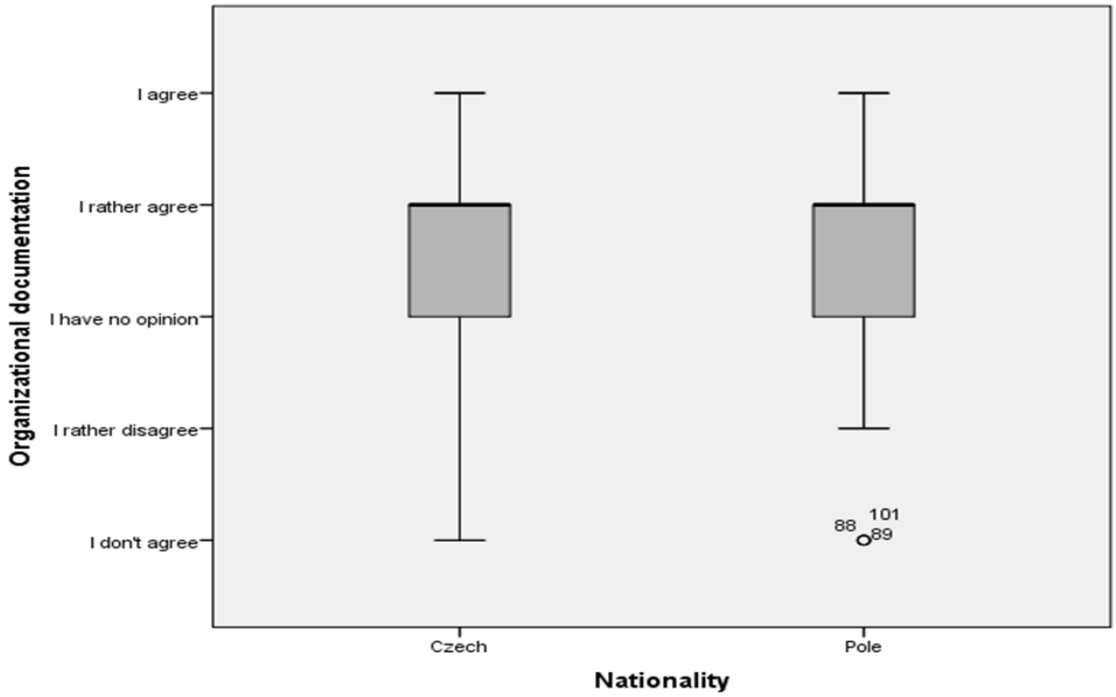

Fig. 4. Distribution of answers for variables 'organisational documentation' and 'nationality' (Source: author's compilation generated by PS Imago)

On the basis of the presented distribution of responses, Goodman and Kruskal tau correlation coefficient has been calculated between the independent variable 'nationality' and four dependent variables for which the distribution of responses has been shown. The results have been presented in Table 3.

Table 3. Goodman and Kruskal tau correlation coefficient between independent variable 'nationality' and dependent variables (Source: author's compilation generated by PS Imago)

Dependent variable	Value	Significance*	Hypothesis	Status
Conceptualisation as a bridge	.072	.000	H1	Accepted
Accapted terminology	.016	.110	H2	Rejected
Image of a machine scheme	.021	.039	H3	Accepted
Organisational documentation	.001	.992	H4	Rejected

* Based on approximation of chi-square distribution.

Goodman and Kruskal tau correlation coefficient is in the range <0;1>. It means that in two cases, a weak but statistically significant relationship between variables has been indicated. The assumed hypotheses were, therefore, confirmed for these cases (Table 3).

The analysis was completed by the prospective study on the existence of correlation between independent variable 'seniority' and four dependent variables being discussed. Unfortunately, as results from Table 2, there is over-representativeness of a group of persons who 'never worked' in case of Czechs in relation to Poles, and in case of Poles in relation to Czechs, there is over-

representativeness of ‘worked at least 1 year’ group. Therefore, it was decided that the analysis of existence of consentience of respondents' opinions regarding particular should be made concomitantly for both groups of respondents and that the results of the analysis should be treated in a supplementary way for the discussions presented in this work.

Table 4. Goodman and Kruskal tau correlation coefficient between independent variable ‘seniority’ and dependent variables (Source: author’s compilation generated by PS Imago)

Dependent variable	Value	Significance*
Conceptualisation as a bridge	.019	.324
Accapted terminology	.035	.034
Image of a machine scheme	.036	.028
Organisational documentation	.019	.336

* Based on approximation of chi-square distribution.

In this case, the existence of a statistically significant correlation for two dependent variables with an independent variable, namely, seniority, could have been confirmed. Again, the variable ‘image of a machine scheme’ as well as the variable ‘accepted terminology’ appeared amongst them. In both the cases, the strength of the relation is also weak. In case of the first statistically significant correlation (for the variable ‘accepted terminology’), 56 persons altogether amongst respondents of indicated seniority, which constituted 46.67% of all the respondents, rather agreed or agreed with the issue. The indicated correlation for the second variable (‘image of a machine scheme’) in the opinion of respondents who possess work experience achieved a similar level of acceptance. In case of answer options ‘I agree’ or ‘I rather agree’, the number of responses amounted to 54, which constituted 45% of all indications.

Conclusions

The results of studies concerning national cultures based on G. Hofstede's method (value for six dimensions of culture) point out that Poles in the cultural sphere are characterised by fundamental ambivalence. On the one hand, they accept hierarchical relations, have emotional need for the existence of values and are not open to non-standard actions and way of thinking. On the other hand, however, Poles are a society of individualists who have a tendency to be cynics, pessimists and who think that social norms limit them. It is emphasised that this ambivalence in the features of national cultures makes relations built with Poles often very fragile, but if they are built and sustained in an appropriate manner, they may turn out to be very fruitful (The Hofstede Centre 2010b). Czechs, on the other hand, treat a particular social hierarchy, including the one within an organisation, as a natural thing. They expect to be informed about what they are supposed to do, and in their opinion, a supervisor should be a friendly authoritarian. Employer–employee relationships are based on mutual benefits, whereas decisions regarding employment or professional promotion should be connected with merits. Managers should be firm and determined, treat their subordinates equally and manage them in an individual manner, whereas work is aimed at the results achieved. Czechs have also an emotional need for rules. The key difference between Poles and Czechs, however, lies in the dimension referred to as ‘long-term orientation’. Czechs are, therefore, in this dimension described as a pragmatic society, which means that they think that the truth depends on the context of place and time. They are prone to adapting traditions to contemporary conditionings or manifest a tendency to save and invest. Poles, in turn, are a normative society that attempts to function in the conditions of the so-called absolute truth. They respect tradition, have a low tendency to save and think about the future. They are orientated towards achieving short-term goals (The Hofstede Centre 2010a).

The first accepted hypothesis concerned the existence of a correlation between nationality and opinion about the necessity for communicating about a business model as a conceptualisation of a bridge between a strategy of an enterprise and operational level. Whilst analysing the distribution of responses, it may be stated that in both groups of respondents, the opinions were convergent; however, they differed within the scope of the value of dominants. In case of the researched opinions within the

group of Czechs, there was a greater acceptance of this issue. If the assumption is made that conceptualisation of a business model as a bridge connecting a strategy of an enterprise with operational level is related to bringing the sense to what is being done within an enterprise, it may be stated that from the perspective of the need for order, rules and orientation towards achieving goals a greater acceptance on the side of Czechs as well as general acceptance in both groups of respondents should not come as a surprise.

The second accepted hypothesis concerned the existence of a correlation between nationality and opinion about the necessity for propagating the image of a business model as a machine scheme by the communication process. In this case, the distribution of responses shows that there was a greater acceptance of this issue in the opinion of respondents expressed by Poles who participated in the study. It may seem rather surprising because, according to studies, Czechs manifest a tendency to appreciate a systematic and structured approach (Wursten, Fadrhonc 2012). On the other hand, such result may also signify that on the side of Poles, there was a strong expression of the necessity for the existence of rules and standard action. As a result of generally worded questions of the study, it is currently impossible to determine what the reason for the result achieved was.

However, it indicates a possibility to conduct further deepened studies within this scope. Winning a representative sample of respondents as well as using a structure of questions expressing cultural differences, especially within the scope of a relation towards hierarchical relationships, standards of action and motivational factors may contribute to revealing of stronger relations between nationality (Czechs/Poles) and opinion regarding creating of a business model ontology by the communication process within an enterprise.

Another interesting thing is, though only slightly outlined in the work, the issue of the existence of a correlation between components of creating a business model by the communication process within an enterprise and seniority of studied respondents. In this case, it is worth mentioning that a statistically significant correlation between seniority and necessity for creating a commonly accepted terminology describing a business model of an enterprise. From the perspective of experience gained in the course of the realisation of scientific projects within the scope of business models, the author of this work may confirm that one of the main issues he would come across within enterprises was lack of shared understanding of key aspects indispensable for the description of this model within an organisation as well as linguistic terms that describe it. Prospective confirmation of the obtained result in further studies could point out that members of an organisation themselves as well, along with professional development, begin to notice such problem.

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EVALUATION OF DIGITAL SHADOW ECONOMY PREVENTION MEASURES

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Abstract. Although during the past few years the scopes of shadow economy in Lithuania have slightly decreased, different forms of this phenomenon, in particular digital shadow activities, still generate a significant part of the overall value added. As no constant estimations of the scope of digital shadow economy have been made in Lithuania, alleviation of this problem is based on consequence fighting rather than reason elimination. Digital shadow economy poses a significant challenge for law enforcement agencies concerning its investigation and prevention. Hence, it is purposeful to research both theoretical and practical aspects of digital shadow economy prevention in order to identify the measures that could be used for the efficient reduction of the scope of this phenomenon. The aim of this research is to identify the measures of digital shadow economy prevention and compare the attitudes of governmental institutions and consumers towards the efficiency of these measures. The results of the empirical research showed that both consumers and experts agree that the level of tax morale has to be raised not only by using the measures of self-education but also by introducing long-term educational programmes; second, public authorities should ensure business friendly environment, actively implement the principles of justice and officially acknowledge and announce the concept of digital shadow economy; finally, for more efficient detection of the cases of digital shadow activities, it is necessary to reinforce current labour resources that should be specially trained to be able to disclose revenue hiding and tax evasion schemes, employed in e-trade.

Keywords: shadow economy, digital shadow economy, prevention measures.

Type of the paper: Theoretical paper.

JEL Classification: E26.

Introduction

In spite of the abundance of the scientific research and application of the measures developed for shadow economy prevention and legal business promotion, both advanced and developing countries are still facing the problem of shadow economy. With reference to Schneider (2015), the average size of shadow economy in 31 European countries composed 18 percent of gross domestic product (GDP). Although during the past few years the scopes of shadow economy in Lithuania have slightly decreased (from 28 percent of GDP in 2010 to 25.8 percent of GDP in 2015 (Schneider 2015)), different forms of this phenomenon, in particular digital shadow activities, still generate a significant part of the overall value added. Despite the fact that shadow economy remains a topical issue in Lithuanian labour market, the market of excisable goods and other economic spheres (Lithuanian Free Market Institute 2014), transfer of business activities to electronic space alongside with increasing volumes of e-trade determine the need to establish which share of shadow economy has been transferred to remote (electronic) platforms. Nevertheless, no constant statistics of the scopes and types of digital shadow economy have still been recorded, which determines a relatively vague perception of how digital shadow economy should be prevented at all. According to Smith (2015), the network of illegal digital activities is flexible and changing. Hence, digital shadow economy poses a significant challenge for law enforcement agencies concerning its investigation and prevention (Swire, 2009; Holt *et al.* 2010 and others), and alleviation of this problem is based on consequence fighting rather than reason elimination. Thus far, scientific research on the issue of digital shadow economy

has been basically limited with the studies on differences between traditional and digital shadow economy (Smith, 2015), the determinants of digital shadow consumption (Mello 2013; Camarero *et al.* 2014; Vida *et al*. 2012; Taylor 2012; Arli *et al.* 2015 and others) and behaviour of illegal service providers online (Williams *et al.* 2010; Vlachos *et al.* 2011; Holz *et al.* 2012; Yip *et al.* 2012 and others). However, the problematics of prevention of this phenomenon have hardly been covered. Owing to the reasons explicated earlier, it is purposeful to research both theoretical and practical aspects of digital shadow economy prevention in order to identify the measures that could be used for the efficient reduction of the scope of this phenomenon.

The aim of this article is to identify the measures of digital shadow economy prevention and compare the attitudes of governmental institutions and consumers towards the efficiency of these measures. For the fulfilment of the defined aim, the following objectives have been raised: (1) on the basis of the analysis of the measures, proposed for the prevention of traditional shadow economy and illegal activities in cyber space, to systematise the theoretical measures of digital shadow economy prevention; and (2) to perform the comparative analysis of the identified digital shadow economy prevention measures.

The methods of the research include scientific literature analysis, governmental institution (Government of the Republic of Lithuania, Lithuanian State Tax Inspectorate, the Parliament of the Republic of Lithuania, Lithuanian Department of Statistics, the Bank of Lithuania, the Customs of Lithuania, the Chamber of Auditors, Lithuanian Free Market Institute) and consumer survey, snowball sampling.

Literature review

The issues that complicate the investigation and prevention of illegal activities in cyber space cover the lack of a standard definition of this phenomenon (Wall, Williams 2007; Bossler, Holt 2012), little public attention in comparison to traditional forms of shadow economy (Swire, 2009; Smith, 2015), difficulties with the investigation of invisible online activities (Taylor *et al.* 2010; Mayayise, Osunmakinde 2014), inabilities of the authorised institutions to acquire and maintain the necessary IT technologies (Senjo 2004; Taylor 2010; Bossler, Holt 2012), difficulties in training and retaining skilled officers (Bossler, Holt 2012; Smith 2015), lack of managerial and line officer support whilst investigating digital shadow economy cases (Bossler, Holt 2012) and so on.

With reference to the report of Lithuanian Free Market Institute (2014), the set of the measures, developed for the prevention of shadow economy, can be referred to as a control plan because it is created for the institutions of law enforcement and finance control. Such attitude reduces the efficiency of shadow economy prevention because any control mechanism may work efficiently only within the range of available resources. However, in spite of exploitation of the available resources, the scopes of shadow economy may rise and not decrease in case the agents are driven by strong economic motives to get involved in shadow activities. Although Lithuanian public institutions devote much effort to prevent shadow operations, the scopes of shadow economy in the country still remain comparatively high, which proposes that shadow economy prevention is more efficient when it is directed towards the elimination of the determinants rather than towards the development of control measures. The analysis of the scientific literature has enabled to systematise the measures, proposed for prevention of traditional shadow economy and illegal activities in cyber space.

Table 1. Theoretical measures of digital shadow economy prevention (Source: prepared by the authors)

Measure	Description	Scientific source(s), year
Economic measures		
Tax reduction for legal economic activities	Tax (labour force, excise, VAT, etc.) reduction would enable to increase economic and business subjects' income and profits, this way demotivating them to perform shadow activities	Russel 2010; Manolas *et al.* 2013; Lithuanian Free Market Institute 2014; Schneider 201
Reduction of	Facilitation of labour relations and fixed-term employment	Mroz 2011; Manolas *et*

economic activity regulation	contracts, reduction of minimal monthly wages and employment contract termination costs as well as introduction of easily available forms of legal economic activities would discourage participation in shadow economy, that is, it would act as a contrast to overregulation that promotes participation in shadow economy	*al.* 2013; Lithuanian Free Market Institute 2014
Shadow economy risk and cost increase	Increase in the risk of illegal-operation-related costs (fines, seizure of goods, losses of breach of contract, bribes paid for responsibility avoidance) makes shadow activities less profitable	Russel 2010; Lithuanian Free Market Institute 2014
Increase of population's income and life standards	Higher income increases populations' life standards in the country and thus reduces the attractiveness of shadow business	Russe 2010; Mroz 2011; Manolas *et al.* 2013; Schneider 2015
Institutional measures		
Establishment of institutional framework	Building of an extensive network of public sector organisations, private firms and non-governmental organisations (NGO) would raise public awareness of online networking security issues	Holz *et al.* 2012; Vlachos *et al.* 2011; Yip *et al.* 2012
Establishment of the Internet police	Establishment of an authorised institution, empowered and trained to deal cybercrime, would solve the problem of police staff incompetence dealing with this kind of crimes	Bossler, Holt 2012
Improvement of cooperation amongst institutional entities	Improvement of communication between the public authorities, representatives of the administrative board and law enforcement agencies would promote operational cooperation between institutional entities and contribute to alleviation of the problem of digital shadow economy	Holz *et al.* 2012; Williams *et al.* 2010; Vlachos *et al.* 2011
Provision of technical expertise on the identification of illegal digital transactions	Provision of technical expertise on the identification of illegal transactions online to any interested public organisation, business enterprise or physical entity would contribute to reduction of the number of digital shadow transactions	Vlachos *et al.* 2011
Increased funding for training of law enforcement agencies	Increased funding for training would help to raise the competence of authorised officials in digital shadow issues	Bossler, Holt 2012
Employment of digital mercenaries	Employing digital mercenaries, public institutions, especially police forces, could easier detect the cases of digital shadow economy and impose penalties for misbehaving subjects	Smith 2015
Legal measures		
Enactment of the laws to facilitate joint operations between the public and private sectors	Enactment of the laws to facilitate joint operations between the public and private sectors would enhance private entities' involvement in the detection of the cases of digital shadow activities	Brener 2008; Taylor *et al.* 2010; Yip *et al.* 2012, Bossler, Holt 2012
Enactment of the laws on the penalties for illegal activities online	Enactment of the laws on the punishments for illegal activities online would cause both sellers' and consumers' fear to make illegal digital transactions	Brener, 2008; Taylor et al., 2010; Williams et al., 2010; Bossler, Holt, 2012; Schneider, 2015
Enactment of the laws on the increased prosecution for illegal activities online	Enactment of the laws on the increased prosecution for illegal activities online would motivate potential subjects of digital shadow economy to refrain from illegal digital business	Bossler, Holt 2012
International co-operation between cybercrime investigation	International co-operation between cybercrime investigation authorities would contribute to the prevention of digital shadow activities in the global scale.	Bossler, Holt 2012

authorities		
Technical measures		
Facilitation of information transfer between public authorities and private entities	Creation and introduction of an efficient information transfer software between public authorities and private entities would facilitate the process of informing authorised institutions about the cases of digital shadow activities and would accelerate the actions taken to stop these activities	Mayayise, Osunmakinde 2014
Engagement of digital activity records	Engagement of digital activity records would enable to trace and prove the cases of illegal actions and transactions online	Smith 2015
Establishment of e-commerce assurance models	Establishment of e-commerce assurance models bolsters the trust of online consumers in credibility of particular Web sites as the sources of their purchases	Kim *et al.* 2008; Mayayise, Osunmakinde 2014
Informational measures		
Raise of public awareness of online networking security issues	Establishment of educational institutes as well as engagement of social advertisement would enable to raise public awareness of online networking security issues and thus would contribute to the decrease of the number of illegal digital transactions	Williams *et al.* 2010; Vlachos *et al.* 2011; Bossler, Holt 2012
Distribution of educational material	Distribution of educational material for teachers, children, home users, small and medium-sized business enterprises through at minimum costs would raise public awareness of online networking security issues and promote the society to report any suspicious behaviour or transaction online	Vlachos *et al.* 2011
Social measures		
Introduction of digital awareness and response to threats (DART) initiative	Introduction of DART initiative would enable penetration of information and communication technologies (ICT) to the population, would contribute to the reduction of the number of inexperienced computer users and would help to direct the digital shadow economy prevention efforts to the most appropriate entities	Vlachos *et al.* 2011
Increase of public self-consciousness	Formation of negative societal attitudes towards illegal trade and undeclared purchases online would contribute to the reduction of the scope of digital shadow transactions	Williams *et al.* 2010; Yip *et al*. 2012; Bossler Holt, 2012

The data presented in Table 1 shows that the main groups of the measures, proposed for prevention of shadow activities in cyber space, may cover economic, institutional, legal, technical, informational and social issues.

The group of economic measures is targeted at the fight with shadow economy determinants. In this case, facilitation of taxation and regulation of legal economic activities makes them more appealing in comparison to shadow economy operations, that is, the initial motives of shadow economy are eliminated. Shadow activities generate profits behind compliance to legal regulations, that is, profits can be earned escaping a part of costs that would be borne whilst acting legally (e.g. not all required contributions are paid and quality requirements or compulsory standards are neglected). In this way, the so-called 'legality costs' are saved (Lithuanian Free Market Institute 2014). Nevertheless, profitability of shadow activities is influenced not only by the escape of particular legal regulations but also by specific costs of shadow economy. Apart from the common costs, shadow economy participants risk bearing illegal-operation-related costs such as fines, seizure of goods, losses of breach of contract and bribes paid for responsibility avoidance (Russel 2010; Lithuanian Free Market Institute 2014). Hence, the measures that increase the specific costs of shadow economy (e.g. efficient activities of law enforcement institutions, implementation of strict punishments for the involvement in shadow businesses and reduction of corruption rate in public institutions) can be introduced for shadow economy prevention, as they enable to reduce the attractiveness and payback of this business form.

The level of economic development of the country also has a significant impact on the scope of shadow economy. In accordance with the level of labour productivity and population's average income, tax rates and regulation intensity can influence the scopes of shadow economy to varying

degrees (Manolas *et al.* 2013). Advanced countries with low unemployment rates, high wages and considerable life standards usually experience lower risks of population's involvement in shadow economies, determined by high tax rates and intensive regulation (Russel 2010; Mroz 2011; Manolas *et al.* 2013). Hence, promotion of economic growth, investment attraction, labour productivity and average wages is considered as an efficient measure of shadow economy prevention.

In the group of institutional measures, the researchers highlight the significance of establishment of institutional framework, establishment of the Internet police, improvement of co-operation amongst institutional entities, provision of technical expertise on identification of illegal digital transactions, increased funding for training of law enforcement agencies and employment of digital mercenaries. With reference to Vlachos *et al.* (2011), establishment of an appropriate institutional network means building an extensive network of public and private organisations that would work in the direction of raising public awareness of online networking security issues, this way helping to protect inexperienced Internet network users from involvement in illegal transactions online. Establishment of the Internet police would enable to have and engage a department of specially trained and skilled officers, officially empowered to deal with the cases of illegal activities online. Presence of an officially established authorised institution not only would discourage potential subjects of digital shadow economy from digital shadow performance but also would enable to solve the problem of police staff incompetence dealing with cybercrime (Bossler, Holt 2012). Improvement of co-operation amongst institutional entities means direct communication and rapid exchange of the information on illegal digital activities between governing bodies and law enforcement agencies with the aim to accelerate both decision-making (Holz *et al.* 2012) and timely application of appropriate digital shadow economy suppression and prevention measures (Williams *et al*. 2010; Vlachos *et al.* 2011). Provision of any technical expertise required for the identification of illegal transactions online to interested public organisations, business enterprises and physical entities is considered to be a measure that could contribute to the reduction of the number of digital shadow transactions. According to Vlachos *et al.* (2011), this measure would be extremely efficient protecting two distinct digital shadow economy target groups – inexperienced home IT users and small- and medium-sized enterprises without any employed computer networking professionals – from unconscious involvement in digital shadow transactions, promoted by illegal sellers or service providers, operating online. Increased funding for training of law enforcement agencies as well as employment of digital mercenaries would help to improve authorised officials' networking operation skills, this way alleviating the problem of staff competence in digital shadow issues (Bossler, Holt 2012; Smith 2015).

In the group of legal measures, enactment of the laws to facilitate joint operations between the public and private sectors, enactment of the laws on the penalties for illegal activities online, enactment of the laws on the increased prosecution for illegal activities online and international co-operation between cybercrime investigation authorities can be considered the most efficient remedies developed for the prevention of digital shadow economy. The difficulties posed by digital shadow activities to law enforcement have been discussed by McQuade (2006), Hinduja (2007), Brenner (2008), Taylor et al. (2010) and others. Thus, enactment of the laws mentioned earlier would increase capabilities of law enforcement agencies to respond to digital shadow activities and cause the fear of liability for potential subjects of digital shadow economy. Considering the fact that the Internet allows digital shadow activities to transcend geographic boundaries (Bossler, Holt, 2012), international co-operation between cybercrime investigation authorities would contribute to the prevention of this kind of illegal misbehaviour online in the global scale.

It should be noted that the unique virtual nature of digital shadow economy requires the development of particular technical measures alongside with institutional and legal ones (McQuade 2006; Taylor *et al.* 2010; Mayayise, Osunmakinde, 2014). First of all, with reference to Mayayise and Osunmakinde (2014), creation of efficient information transfer software between public authorities and private entities would facilitate the process of informing authorised institutions about the cases of digital shadow activities and would accelerate the course of application of the punitive and preventative measures. Since, with reference to Smith (2015), illegal traders and other subjects, operating in digital shadow space, are inclined not to be caught after the execution of an illegal action or transaction, and make efforts to erase their electronic trail. Thus, engagement of digital activity records would enable

to trace the history of the activities performed and prove the cases of illegal online transactions in court. Finally, Mayayise and Osunmakinde (2014) proposed the development of e-commerce assurance models, which could have already been devised by some professional bodies, such as the American Institute of Certified Public Accountants (AICPA). The authors noted that e-commerce assurance models are aimed at provision of some form of self-regulation in the Internet Web sites. Hence, they bolster the trust of online consumers in credibility of particular Web sites as the sources of their purchases (Kim *et al.* 2008). Although, with reference to Mayayise and Osunmakinde (2014), e-commerce assurance models are often criticised because of their failure to take cognizance of the type of assurance, consumers require the particular level of perceived assurance concerning the online environment in which they operate.

In the group of informational measures, scientific literature points out the significance of raising public awareness of online networking security issues. For this purpose, establishment of educational institutes as well as engagement of social advertisement is proposed (Williams *et al.* 2010; Vlachos *et al.* 2011; Bossler, Holt 2012). Moreover, distribution of educational material (e.g. leaflets, multimedia CDs containing non-technical advice on IT and networking security, interactive knowledge computer games for teachers, children, home users, and small and medium business enterprises) has been found to increase public awareness of online networking security issues and promote the society to report any suspicious behaviour or transaction online (Vlachos *et al.* 2011).
Introduction of digital awareness and response to threats (DART) initiative and the efforts to increase public self-consciousness are introduced as urgent social measures, directed towards the reduction of the scopes of digital shadow economy. Vlachos *et al.* (2011), who analysed the landscape of cybercrime in Greece, suggested the introduction of digital awareness and response to threats (DART) initiative, which, with reference to Greek experience, enables penetration of information and communication technologies (ICT) to the population, reduces the number of inexperienced computer users and acts as an intermediary between public authorities and citizens on IT and online networking related issues, this way directing the efforts to the most appropriate entities, providing the necessary assistance if it is required. Increase of public self-consciousness refers to the formation of negative societal attitudes towards illegal trade and undeclared purchases online (Yip *et al.* 2012; Bossler, Holt 2012; Williams *et al.* 2010). For this purpose, the measures of social advertisement as well as imposition of severe penalties for digital underground economy subjects can be engaged.

Summarising, it can be stated that systematic attitudes combined with the complex of economic, institutional, legal, technical, informational and social measures may efficiently contribute to the reduction of the scopes of digital shadow economy. Currently, the target problem calls for the promotion of country's economic advancement, the establishment of an extensive institutional framework, appropriate training of the authorised staff, enactment of the laws on more severe penalties and increased prosecution for illegal underground activities, international co-operation between cybercrime investigation authorities, engagement of technical measures to ensure networking safety, raise of public awareness of online networking security issues, introduction of digital awareness and response threats initiatives and increased public self-consciousness.

Methodology

In order to fulfil the aim of the research, that is, to identify the measures of digital shadow economy prevention and compare the attitudes of governmental institutions and consumers towards the efficiency of these measures, two qualitative methods – expert evaluation and snowball sampling – were combined. Initially, the questionnaire for consumer survey was prepared, leaning on the results of the scientific literature analysis. The questionnaire was designed in e-space; thus it was available to potential respondents by the Internet and smart phones. The results of the survey were processed engaging SSPS (Statistical Package for Social Sciences) and Microsoft Excel software. Estimating the size of the sample, it was presumed that there are 3000000*0,66~2000000 Internet users in Lithuania. To ensure 5 percent error rate, approximately 400 (384) respondents have to be surveyed for representative sample size. As 260 of the respondents were available for the survey, the error rate increased by 6.08 percent. The survey was carried out during the period of August–November, 2015, following the principles of 'snowball' data collection method. It was established (Duncan *et al.* 2003;

Vershinina, Rodionova, 2011) that performing the surveys of hidden populations (including participants of traditional or digital shadow economies), the basic problems faced by researchers cover accessibility of the target population and the size of the survey sample. Having performed the comparative analysis of traditional data collection methods, Duncan *et al.* (2003), Vershinina *et al.* (2009) and Vershinina and Rodionova (2011) found that engagement of methods such as personal interviews, online and phone interviews and (e-)mailing of questionnaires does not ensure an appropriate formation of the target sample because only the respondents who are accessible to a researcher during the period of the research are surveyed optimising the research costs. However, these respondents not necessarily represent the ones disposing the most qualitative data on the researched phenomenon.

In the second stage of the research, 22 experts representing Lithuanian State Tax Inspectorate, the Government of the Republic of Lithuania, the Parliament of the Republic of Lithuania, Lithuanian Department of Statistics, the Bank of Lithuania, the Customs of Lithuania, the Chamber of Auditors, Lithuanian Free Market Institute and other public authorities were surveyed. The experts were accessed directly (personal interviews) and indirectly (telephone, e-mail). They were asked to express their opinions on the statements that had been included in the pre-arranged questionnaire. Apart from qualities such as creativity, attitude towards the expertise, flexibility of thinking, reliability and self-criticism, scientific literature (Augustinaitis *et al.* 2009) highlights the importance of expert competence in this type of research. Hence, the authors focused on the qualitative rather than mass survey. The experts for the survey were selected considering their competence, duration of experience in their occupation field and the knowledge of the situation and problems determined by shadow economy in Lithuania.

The open question with a request to appoint the measures of digital shadow economy reduction was presented to both groups of survey participants – consumers and experts. The results of the survey have been introduced in the further section of this article.

Results

In order to identify the measures of digital shadow economy prevention from both consumers and experts' point of view, the answers of both groups of research participants on this issue (i.e. the answers to the open question) were systematised (see Tables 2 and 3).

Table 2. Evaluation of the measures of digital shadow economy prevention (compiled by the authors with reference to the results of the consumer empirical survey)

No.	Measure
1.	Well-developed legal framework, criminal and administrative responsibility, increased fines/more severe sanctions for both parties of an illegal digital transaction
2.	Availability of appropriate protection software, more intensive supervision and control, establishment of e-police department, sufficient number of supervising officers
3.	Publically announced and easily available information on illegal e-traders in e-space; public announcement on disclosure of illegal digital traders
4.	Improved system of public education
5.	Favourable/lower prices in legal markets
6.	Poor quality of a product/service
7.	Definition of digital shadow activities as illegal ones (currently, an official definition is not available)
8.	Negative responses of other consumers in the Internet

Table 3. Evaluation of the measures of digital shadow economy prevention (compiled by the authors with reference to the results of the expert empirical survey)

No.	Measure
1.	Improved interinstitutional and international co-operation
2.	Establishment of an interinstitutional work group to deal with the issues of e-trade control
3.	National registration of business entities with compulsory accreditation, that is, to pursue commercial

	activities, entrepreneurs have to be obliged to establish and register a juridical entity or declare their activity interests in the State Tax Inspectorate; domains of the Web sites that do not comply with legality standards have to be blocked
4.	Simplified process of control would, in substance, reduce the threat of unaccounted businesses arranged by unregistered market participants
5.	Raise of public tax morale and promotion of intolerance to shadow business (e.g. the lottery of bills or invoices that would involve official buyers or consumers could serve as an incentive for the latter to demand for the issuance of a purchase document from a product or service seller, etc.)
6.	Training of the professionals who would be able to disclose revenue hiding and tax evasion schemes, employed in e-trade
7.	Identification of the scope, structure (constituents and their topicality), intensity, nature and tendencies of the offences; assessment of risk; development of control measures (legal framework, administration, monitoring)

The data, presented in Tables 2 and 3, allows identifying three basic directions of digital shadow economy prevention:

1. Society education, tax morale raise starting from preschool pupils and ending with university graduates, promotion of public intolerance to shadow business;
2. Reinforcement of current labour resources and institutional staff capacities (for instance, establishment of an interinstitutional work group to deal with the issues of e-trade control, establishment of e-police department, staff training by combining the fields of IT and law, etc.);
3. Acknowledgement and public announcement of the official concept of digital shadow economy, improvement of the legal framework by defining responsibilities of both parties of a transaction for the performance of illegal activities online.

Conclusions

Communication without borders, development of e-trade, IT advantages and globalisation form the environment favourable to the expansion of digital shadow economy. For the efficient fight with this phenomenon, the appropriate measures that would enable to reduce the scope of digital shadow activities have to be developed. This study has revealed the main obstacles that complicate the detection and prevention of the cases of digital shadow activities. The results of the empirical research allow to formulate the following original conclusions: first, both consumers and experts agree that the level of tax morale has to be raised not only by using the measures of self-education but also by introducing long-term educational programmes, which would inculcate the public attitude that tax evasion as well as tolerance to such practice is, above all, offense against the State and future generations; second, public authorities should ensure business friendly environment, actively implement the principles of justice and officially acknowledge and announce the concept of digital shadow economy, which would enable to eliminate the aspect of unawareness in e-trade, that is, official acknowledgement of the concept of digital shadow economy would provide more clarity to both responsible officials and consumers on whether an online trader acts legally or illegally; finally, for more efficient detection of the cases of digital shadow activities, it is necessary to reinforce current labour resources that should be specially trained to be able to disclose revenue hiding and tax evasion schemes used in e-trade.

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EVALUATION OF EU COHESION POLICY IMPACT ON REGIONAL CONVERGENCE: DO CULTURE DIFFERENCES MATTER?

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Abstract. Attention to the harmonised economic growth by promoting regional economic convergence was paid in the 1960s, at the commencement of European economic integration. It served as a basis for initiation of programs intended to reduce disparities among regions. For the current programming period (2014–2020) over 350 billion euro was allocated to promote cohesion (more than 340 billion for 2007–2013 and about 213 billion for 2000–2006) and a considerable part of that funding went specially to promote regional convergence; therefore, the analysis of regional convergence in the EU countries is essential due to both economic and financial reasons. Regional policy can be considered successful if regional disparities are found to be decreasing; however, research on convergence/divergence issue has not provided any unambiguous conclusions. We aim to enrich this field of analysis by incorporating cultural dimension while analysing the factors influencing regional convergence. In order to identify a causal link between culture and economic outcomes, we define culture as the customary beliefs and values that ethnic, religious and social groups transmit almost unchanged from generation to generation. Our research hypothesis is that regional policy impact on regional convergence differs between groups of countries characterised by historically diverse cultural experience. Using panel data approach like FD and covering the two last programming periods along with a set of variables to control country-specific economic environment, we investigate whether the success of Cohesion policy has depended on cultural differences in the north, south, west and central-east groups of European countries.

Keywords: regional convergence; Cohesion policy; cultural differences; regression analysis.

Type of the paper: Empirical study

JEL Classification: R11, O47, C23.

Introduction

Trade and industrial development have stimulated the creation of a modern state; nevertheless, such a state serves not only to facilitate the national economic development but also to ensure wealth to its citizens. Therefore, it is natural that countries deal with the issue how to ensure equal growth possibilities for all regions in the country. This issue cannot be solved without taking into account the extent of economic territorial disparities and development process thereof. The identification of reasons and character of the above phenomenon is relevant since even slight regional economic disparities, which have been accumulated over a long period of time, may cause different levels of living standards within the country. These disparities have negative impact on further economic growth and increase in economic, social, cultural and political imbalance among the regions.

On the basis of the EU cohesion policy, programmes under implementation during the last programming period were allocated over 291 billion euro from the EU funds directly to promote regional economic convergence and, therefore, the analysis of regional convergence in EU countries is essential due to both economic and financial reasons. Regional policy can be considered successful if regional disparities are found to be decreasing; however, research on convergence/divergence issue has not provided any unambiguous conclusions.

In answering the question of what makes a policy successful, most economists emphasise the conditions that are necessary for economic development. Considerable cultural differences exist and

cultural diversity remains definitely significant among different countries and regions, so it is clear that culture may affect the influence of policy on economic outcomes. Thus, in this paper we are going to evaluate how a cultural difference influences the implementation of the EU Cohesion policy.

The listed reasons determine the relevance of research area and require reassessment of regional economic disparity causes, considering not only different national economic growth rates, integration level of the world economy as well as different production structures and investment rates but also cohesion policy through cultural differences. The aim of the research – on the basis of analysed scientific studies and results of application of introduced econometric model – is to evaluate the impact of the EU cohesion policy on regional convergence as well as the differences between the groups of countries with common culture.

The rest of the paper proceeds as follows: the next sections briefly review the related literature on regional economic convergence factors in terms of cultural aspect and the EU cohesion policy. Section 1 introduces a brief overview of EU cohesion policy periods. Section 2 reviews the studies on cohesion policy impact on regional convergence. Cultural aspects of policy impact on economic outcome are analysed in Section 3. Regional economic convergence factors are presented in Section 4. Econometric model constructed to evaluate the EU cohesion policy impact on regional convergence through culture channel in the short- and long-run, while controlling other convergence factors, is presented in Section 5. Section 6 discusses the results of method application in EU Member States. Finally, Section 7 closes the paper with the main conclusions.

Brief overview of the two last EU cohesion policy periods

Regional disparities have always been an important question throughout the existence of the EU. The main purpose of the European Cohesion policy is to decrease regional disparities within the European Union. The EU Regional Policy is designed on the basis of three main assumptions: (i) disparities exist between EU regions, (ii) structural policies are orientated to reduce disparities, and (iii) regional growth and convergence lead to cohesion. According to the regional policy adopted in 1999, the European Council agreed upon 'Agenda 2000', which reformed a number of EU policies and re-established four Structural Funds: i) The European Regional Development Fund (investment in infrastructure and employment), ii) The European Social Fund (supports programmes that aid the integration of the unemployed or otherwise disadvantaged groups in the labour market), iii) The Guidance Section of the European Agricultural Guidance and Guarantee Fund (supports farmers and finances programmes for the development of rural areas), iv) The Financial Instruments for Fisheries Guidance (supports restructure and modernises the fishing fleet).

The majority of Structural Funds are based on three Objectives (EC 2004a; Ederveen *et. al.* 2003; Boldrin, Canova 2001):

- Objective 1 is to help lagging regions catch up with the rest of Europe by providing basic infrastructure and encouraging business activity.
- Objective 2 is to help those regions facing the difficulties.
- Objective 3 is to modernise education and increase employment.

In the 2000–2006 programming period, the regional policy focused on the European regional disparity decreasing (Objective 1) and the regions that faced structural change (Objective 2) during that period (Nordregio 2009). For the programming period, 2007–2013, the reform of the regional policy was implemented by introducing the term territorial cohesion. The main target of the financial support was to reduce imbalances and disparities between the European regions under the convergence, competitiveness and cooperation (EC 2004, 2010a, 2010b). The priorities of 2007–2013 programming period: i) *convergence*: promote the conditions which ensure long-term economic growth leading to convergence of the least-developed Member States and regions; ii) *regional competitiveness and employment*: promote innovations, knowledge society, entrepreneurship and sustainable development; iii) *territorial cooperation*: cross-border and transnational cooperation, joint local and regional initiatives, interregional cooperation and exchange of experience (EC 2007; Nordregio 2009).

Review of studies on cohesion policy impact on regional convergence

Reduction in regional disparities is a major concern for regional policy in the EU. Often, regional economic disparities exacerbate existing ethnic, cultural, linguistic or religious differences.

The standard approach to evaluate the EU Cohesion policy impact on convergence is to apply a neo-classical theory. Structural Funds are then included in a linear regression, so EU funds support regions' economic development (Eggert *et al*. 2007). The majority of research that use the neo-classical economic growth find a positive impact of EU funds on growth of convergence (Gaspar, Leite 1994; Solanes, Dolores 2002; Cappelen *et al.* 2003; De La Fuente 2003; Farrel 2004; Beugelsdijk, Eijffinger 2005; Becker *et al.* 2009; Ramajo *et al.* 2008; Hagen, Mohl 2008). There is no consensus in the scientific literature on the policy impact. Other studies do not find that the EU support fosters higher rate of convergence in funded regions in comparison with non EU-funded regions (Canova, Boldrin 2001; Garcia-Mila, McGuire 2001; Barry 2003; Dall'erba, Gallo 2008). Multiple factors impact regional economic growth. Unobserved or omitted variables would lead to a biased estimate of the impact of Structural Funds. The most common result is that the impact of EU Cohesion Funds on the growth of convergence is determined by a variety of other factors starting from economic openness (Ederveen *et al*. 2003, 2006), structure of the national economy and R&D intensity (Fagerberg, Verspagen 1996; Bussoletti, Esposti 2004; Cappelen *et al.* 2003), decentralisation of fiscal policy (Ezcurra, Pascual 2008; Bähr 2008), institutional environment (De Freitag, Pereira, Torres 2003; Ederveen *et al.* 2006), lack of corruption (Beugelsdijk, Eijffinger 2005) and a stable macroeconomic environment. We aim to enrich studies in this field by modelling EU Cohesion policy impact on Members States region convergence through cultural channel.

Cultural aspects of policy impact on economic outcome

Economic theories provide different dimensions towards regional convergence stimulating and limiting factors. There is no common consent among regional convergence researchers as to what factors should be included in the impact assessment model, since this depends on: (i) subjective research purpose; (ii) theory concept application in the research and (iii) relevant data and data availability. While analysing factors important for regional convergence in EU Member States, Cohesion policy also should be considered.

A growing number of authors seem to agree that policy impact on economic outcomes will take more than dependable political and economic institutions.

The idea that culture is a determinant of economic outcomes was developed by economic historians like North (1981) and Landes (1998) – other contributions to economic history were discussed by Jones (2006). In order to identify a causal link between culture and economic outcomes, we define culture as those customary beliefs and values that ethnic, religious, and social groups transmit almost unchanged from generation to generation. On the one hand, the upper definition of culture restricts the potential channels of influence to two standard ones; beliefs like priors and values like preferences. Causality is likely to go both ways, from culture to economics and from economics to culture (Guiso *et al.* 2006). Therefore, while not comprehensive, this approach focuses on those dimensions of culture that can affect policy economic outcomes and allows identifying a causal effect from culture to policy effectiveness. On the other hand, it conveys that culture is not located in the minds and actions of individual people and that individuals are living in particular social systems (Schwartz 2014). Thus, from this perspective, culture is seen as an 'inherited ethical habit'as well as 'what is transmitted from one generation to the next, via teaching and imitation of knowledge, values, and other factors that influence behaviour' (Shixue 2003). Bisin, Verdier (2002) and Benabou, Tirole (2006) suggest that culture can be influenced by two forces: current social interactions and the cultural features of earlier generations (transmitted over time through education or other channels).

With few exceptions (e.g. Turkey, Greek Cyprus, Israel Jews), the noticeable sets of cultural groups emerge together in regions of the space. Therefore, by drawing boundary lines around these sets of groups on the spatial map one can discern cultural regions (Schwartz 2014). A culture area is a region of the world in which people share similar cultural traits (Brown 2001). According to cultural

similarities, in our research we divide EU Member States into four cultural areas: central-eastern (including Bulgaria, Czech Republic, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, Slovakia), northern (Estonia, Finland, Sweden), southern (Greece, Spain, Croatia, Italy, Malta, Portugal) and western (Belgium, Germany, Ireland, France, Netherlands, Austria, United Kingdom).

Analysis of regional convergence factors

The analysis of theories and scientific studies showed that different schools identify different factors and channels by which regional convergence is influenced. Causes of regional economic convergence were based on neoclassic economic ideas until the last decade of the twentieth century. Regional economic disparities were treated as a short-term imbalance subject to the adjustment by free market. Cumulative causation theory (Kaldor 1981; Martin, Sunley 1998; Cherodian, Thirlwall 2015) representing the demand-based approach served to counterbalance the neoclassic theory in the regional convergence research. Cumulative causation theory established the feedback linkage of production and efficiency and economic growth, substantiating that regional convergence has been predetermined by the latter. Cumulative causation approach might be considered as a predecessor to endogenous growth theory (De Long, Summers 1991; Mullen, Williams 1990; Ke, Bergman 1995; Romer 1990; Grossman, Helpman 1991) that promoted a breakthrough in convergence research in the 10th decade. The above theory as well as the Marxism (Watkins, Perry 1977; Castells 1972; Smith 1984) approach proved that disparities in regions are caused by the factors stimulating economic growth (especially human and public capital through research and development) determining regional divergence. Having conjoined the ideas of cumulative causation and economies of scale, a branch of the endogenous theory – new economic geography theory (Krugman 1991; 1993a,b; 1995a,b; Krugman, Venables 1995) – emphasises that economic openness level via transportation costs as well as agglomeration advantage, does determine economic activity de-concentration/concentration and regional convergence/divergence in a country. Industrial restructuring (Massey, Meegan 1982; Noyelle, Stanback Jr. 1983) and flexible specialisation (Piore, Sabel 1984; Saxenian 1994) theories representing structural trends in industry and service sectors contradict the above viewpoint and state that openness does not ensure that all the regions are able to take advantage of it or the promotion of convergence in a country.

According to the main discussed theoretical frameworks in the area of regional convergence, we will include in our analysis a set of variables that control the main factors that influence regional convergence along with Cohesion policy variable and culture channel.

Model for assessment of cohesion policy impact on regional convergence

Our aim is to evaluate what impact on regional convergence the EU cohesion policy has and particularly whether this impact differs between groups of countries with common culture. We also want to test whether this impact differs in the short- and long-run.

One of the main aspects of the analysis in this area is to determine an indicator that would be suitable for evaluating not only the level of regional differences within a country but also a rate of its change, that is, convergence or divergence. There are few alternative approaches used to verify convergence. The two main ones are called β-convergence and σ-convergence. An application of these approaches depends on the methodological framework of researches. The β-convergence, which takes its origin from the Baumol (1986) study of real convergence between countries, is based on neoclassical theory assumption of diminishing return and postulates that, initially, poorer countries tend to grow faster because investments there generate higher returns. This means that poorer countries are converging to initially richer ones because the latter do not grow so fast (catch-up effect). Because this type of convergence is tested using a linear regression model (GDP growth per capita is negatively dependent on initial economic level) and coefficient on slope characterises direction and speed of convergence it came to be known as β-convergence. This type of convergence found application in a number of studies (for example, Thirlwall, 2013; Próchniak, Witkowski, 2013; Shabari, Debasis, 2015 and others) primary dedicated to evaluating convergence between regions.

The σ-convergence concept is also based on the neoclassical theory of economic growth. The idea is that all countries converge to the same level of development or in other words to the same level of output. The σ-convergence can be defined as lowering of variance of real GDP per capita among countries in time. This type of convergence is also widely applied in regional convergence analysis (for example, Smętkowski, Wójcik, 2012; Andersson, Edgerton, Opper, 2013; Huang, Chand, 2015 and others).

For measuring the direction and speed of convergence in EU Member States we will use the latter approach because the former is more suitable for evaluating convergence in the long-run. Another argument is that one of the indexes (dispersion of regional GDP per capita) for evaluating σ-convergence is provided by Eurostat. We should point here that this index does not show convergence. Convergence is approximated by changes of this index. We have chosen to measure regional convergence at NUTS 3 level because small countries in the EU, like Lithuania, Latvia Estonia, Slovakia and few others have regions just at this level, and the whole country is treated as NUTS 2 level region. Cyprus and Luxembourg are not divided into regions and so will not be included in our analysis as well as Demark, which has not received dedicated financing from cohesion funds to promote regional convergence for the previous two analysed programing periods. Our analysis covers 25 EU Member States for the period from 2000 to 2013, that is, panel data (structure NxT).

A few widely used regression analysis approaches for panel data can be applied here – first difference (FD), fixed effects (FE) and random effects (RE). All of them have their own advantages and disadvantages.

When *T* is large, and especially when *N* is not very large (as in our case, *N*=25 and *T*=14), we express caution in using the fixed effects estimators because they are very sensitive to violations of the classical fixed effects assumptions when *N* is small and *T* is large. In particular, we use data on dispersion of regional GDP per capita and other macroeconomic indicators, which exhibit unit root processes due to general development and this leads to spurious regression problems. In this case, using differences is favourable.

The ideal random effects assumptions include all the fixed effects assumptions plus the additional requirement that unobserved EU member state effects are independent of all explanatory variables in all time periods. However, such an assumption is very hard to ground in our case and we think that unobserved effects are correlated with explanatory variables.

One of the ways to use panel data is to view that unobserved factors (in our case unobserved EU Member States heterogeneity) affecting the dependent variable (in our case regional convergence) are constant over time (population attitude to government policy or income disparities, geographical differences within country and etc.). Many other factors may not be exactly constant, but they might be roughly constant over a 14-year period – education level of labour force, institutional structure, structure of population age and so on. In order to produce a consistent estimator that represents the impact of the EU cohesion policy on regional convergence, we would have to assume that the unobserved effects of EU Member States are uncorrelated with the EU Cohesion policy. But this is not the case, constant factors which influence regional convergence (for example, institutional structure of countries government) correlate with the EU Cohesion policy. The resulting bias can be eliminated differencing the data across time and as unobserved effects are constant over time they will be 'differenced away.' Equation (1), which we call the first-differenced equation and will use in our empirical analysis, is:

$$\begin{aligned}\Delta\ln(D_{i,t})=\alpha+\delta_4\cdot dt2003_t+\ldots+\delta_{14}\cdot dt2013_t+\beta_{1,0}\cdot\Delta\ln(regpol_{i,t})+\beta_{1,1}\cdot\Delta\ln(regpol_{i,t-1})+\beta_{2,0}\cdot\Delta\ln(regpol_{i,t})\cdot centeast+\beta_{2,1}\cdot\Delta\ln(regpol_{i,t-1})\cdot centeast+\beta_{3,0}\cdot\Delta\ln(regpol_{i,t})\cdot south\\ +\beta_{3,1}\cdot\Delta\ln(regpol_{i,t-1})\cdot south+\beta_{4,0}\cdot\Delta\ln(regpol_{i,t})\cdot north+\beta_{4,1}\cdot\Delta\ln(regpol_{i,t-1})\cdot north\\ +c_{1,0}\cdot\Delta\ln(open_{i,t})+c_{1,1}\cdot\Delta\ln(open_{i,t-1})+c_{2,0}\cdot\Delta\ln(gdp_{i,t})+c_{2,1}\cdot\Delta\ln(gdp_{i,t-1})+c_{3,0}\cdot\Delta\ln(ind_{i,t})\\ +c_{3,1}\cdot\Delta\ln(ind_{i,t-1})+c_{4,0}\cdot\Delta\ln(serv_{i,t})+c_{4,1}\cdot\Delta\ln(serv_{i,t-1})+c_{5,0}\cdot\Delta\ln(r\&d_{i,t})+c_{5,0}\cdot\Delta\ln(r\&d_{i,t-1})+\Delta u_{i,t}\end{aligned} \quad (1)$$

Where:

$D_{i,t}$ - dispersion of regional GDP per capita by NUTS 3 regions (%) in a country *i* in year *t*. For a given country, the dispersion of regional GDP of the level 3 regions is defined as the sum of the absolute differences between regional and national GDP per capita, weighted with the regional share of population and expressed as a percent of the national GDP per capita. This variable for a period 2000–2011 was taken from Eurostat database and for years 2012 and 2013 was calculated by authors themselves using Eurostat provided regional GDP and population data. It is used to approximate regional disparities within a country at NUTS 3 level. $\Delta ln(D_{i,t})$ will approximate the rate of convergence if $\Delta\ln(D_{i,t})<0$ or divergence if $\Delta\ln(D_{i,t})>0$.

$regpol_{i,t}$ – variable which will be used to measure the regional policy in a country *i* in year *t*. For approximating regional policy, we will use two alternative indicators: (I) – usage *intensity* of structural funds dedicated to stimulate convergence. Indicator is calculated as a ratio (%) between structural fund expenditures in a country compared to its GDP. (II) – expenditures in euros from structural funds dedicated to stimulate convergence in a country.

$open_{i,t}$ – approximates economic openness of a country *i* in year *t*. In the analysis we will use countries' export and import-to-GDP ratio (%).

$gdp_{i,t}$ – is the gross domestic product at market prices in a country *i* in year *t* (millions of euros). $\Delta ln(gdp_{i,t})$ – approximates countries economic growth rates.

$ind_{i,t}$ – is the variable that shows the importance of industry sector (except construction) in a country *i* in year *t*. We approximate that variable in the model by value added in industry sector-to-GDP ratio (%).

$serv_{i,t}$ – is the variable that shows importance of service sector (except wholesale) in a country *i* in year *t*. We approximate that variable in the model by value added in service sector-to-GDP ratio (%).

$r\&d_{i,t}$ – expenditures on research and development-to-GDP ratio (%).

centeast – is a dummy variable equal to 1 for countries Bulgaria, Czech Republic, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, Slovakia, and 0 for all other countries.

south – is a dummy variable equal to 1 for Greece, Spain, Croatia, Italy, Malta, Portugal and 0 for all other countries.

north – is a dummy variable equal to 1 for Estonia, Finland, Sweden and 0 for all other countries.

In our analysis, Belgium, Germany, Ireland, France, Netherlands, Austria, United Kingdom will be benchmark group *west*.

$dt2003_t,...,2013_t$ – year dummy variables. Allowing the intercept (α) to change over time is important in our analysis. Secular trends in the EU will cause regional differences within a country in all Member States to change ($\delta_4,...,\delta_{14}$) perhaps markedly, over a year.

$\Delta u_{i,t}$ - idiosyncratic error or time-varying error. We must assume that this error is uncorrelated over time for the usual standard errors and test statistics to be valid. This assumption will be tested in such a way – if Δu_{it} follows a stable AR(1) model, then $\Delta u_{i,t}$ will be serially correlated. Only when Δu_{it} follows a random walk, $\Delta u_{i,t}$ will be serially uncorrelated. If there is no serial correlation in the errors, the usual methods for dealing with heteroskedasticity are valid. We can use the White test for heteroskedasticity, and we can also compute robust standard errors. In case of heteroscedasticity we will use weighted least squares (WLS) estimates with weights based on per-unit error variances.

All coefficients except betas on interaction terms will be interpreted as coefficients of elasticities. Coefficients on interaction terms will show regional policy impact differences between benchmark group (*west*) and respective group (*centeast*, *south* or *north*) and will be interpreted in percentage points.

i - denotes cross-sectional observation number (25 EU Member States)

t - denotes time period (14 time periods from 2000 to 2013).

Impact in the short-run will be estimated using coefficients on current period independent variables. Impact in the long-run will be estimated summing up coefficients on current and lagged independent variables.

Empirical analysis results and discussion

We find some statistical evidence of minimal negative serial correlation in the first-differenced errors. Unlike with positive serial correlation, the usual OLS standard errors may not greatly understate the correct standard errors when the errors are negatively correlated. Thus, the significance of the variables will probably not be affected. There is strong evidence of heteroskedasticity in the OLS equations. This allowed us to choose another method for model estimation. WLS along with heteroskedasticity-robust standard errors increases probability to get BLUE estimates, which, in our case, will be used for interpretation. Estimation results of model (1) are provided in Table 1.
(I) – Regional policy is approximated by *intensity* of structural funds to stimulate convergence.
(II) – Regional policy is approximated by *expenditures* of structural funds to stimulate convergence.
OLS – Estimates using Ordinary Least Squares. Standard error presented in brackets.
WLS – Estimates using Weighted Least Squares. Weights based on per-unit error variances. Heteroskedasticity-robust standard errors presented in brackets.

Table 1. Model estimation results (Source: author's compilation)

	(I)		(II)	
	OLS	WLS	OLS	WLS
α	−0.0084	−0.0076**	−0.0084	−0.0077**
	(0.011)	(0.004)	(0.011)	(0.004)
$dt2003_t$	−0.0150	−0.0160***	−0.0146	−0.0155***
	(0.015)	(0.004)	(0.015)	(0.004)
…				
$dt2013_t$	0.0084	0.0065	0.0088	0.0066
	(0.014)	(0.004)	(0.014)	(0.004)
$\Delta ln(regpol_{i,t})$	0.0531**	0.0496***	0.0506**	0.0456***
	(0.023)	(0.011)	(0.024)	(0.009)
$\Delta ln(regpol_{i,t-1})$	−0.0500	−0.0425***	−0.0662*	−0.0465**
	(0.031)	(0.013)	(0.035)	(0.021)
$\Delta ln(regpol_{i,t}) \times centeast$	−0.0465	−0.0459***	−0.0463	−0.0426***
	(0.031)	(0.013)	(0.033)	(0.011)
$\Delta ln(regpol_{i,t-1}) \times centeast$	0.0468	0.0342*	0.0723*	0.0491**
	(0.039)	(0.018)	(0.043)	(0.025)
$\Delta ln(regpol_{i,t}) \times south$	−0.0471*	−0.0422***	−0.0451	−0.0387***
	(0.028)	(0.014)	(0.029)	(0.013)
$\Delta ln(regpol_{i,t-1}) \times south$	0.0791**	0.0705***	0.0930**	0.0743***
	(0.039)	(0.016)	(0.044)	(0.025)
$\Delta ln(regpol_{i,t}) \times north$	−0.0881	−0.1032***	−0.0702	−0.0771***
	(0.062)	(0.027)	(0.057)	(0.022)
$\Delta ln(regpol_{i,t-1}) \times north$	0.0016	−0.0214	0.0434	0.0096
	(0.066)	(0.019)	(0.063)	(0.027)
$\Delta \ln(open_{i,t})$	−0.0998	−0.0955***	−0.0915	−0.0882***
	(0.065)	(0.026)	(0.064)	(0.025)
$\Delta \ln(open_{i,t-1})$	0.0917	0.0966***	0.0929	0.0986***
	(0.061)	(0.027)	(0.061)	(0.025)
$\Delta \ln(gdp_{i,t})$	0.0055	0.0298	0.0014	0.0324
	(0.133)	(0.056)	(0.133)	(0.057)
$\Delta \ln(gdp_{i,t-1})$	−0.1279	−0.1452**	−0.1309	−0.1601**
	(0.136)	(0.060)	(0.139)	(0.065)
$\Delta \ln(ind_{i,t})$	0.0640	0.0456	0.0605	0.0276
	(0.087)	(0.040)	(0.087)	(0.040)
$\Delta \ln(ind_{i,t-1})$	−0.105615	−0.0870**	−0.1091	−0.1019***
	(0.083)	(0.035)	(0.083)	(0.034)
$\Delta \ln(serv_{i,t})$	0.5879***	0.6373***	0.5770***	0.6090***
	(0.162)	(0.068)	(0.163)	(0.057)
$\Delta \ln(serv_{i,t-1})$	−0.1421	−0.1227*	−0.1478	−0.1444**
	(0.150)	(0.073)	(0.151)	(0.072)
$\Delta \ln(r\&d_{i,t})$	0.0164	−0.0024	0.0155	−0.0043

	(0.034)	(0.016)	(0.034)	(0.017)
$\Delta\ln(r\&d_{i,t-1})$	−0.0492	−0.0529***	−0.050	−0.0522***
	(0.036)	(0.012)	(0.036)	(0.011)
n	206			
Adj. R^2	0.102	0.470	0.094	0.552
Error AR(1)(p-value)	−0.1564(0.0587)		−0.1624(0.0510)	
White's test LM statistics(p-value)	83.383(0.0006)		84.905(0.0006)	
p-value on testing H0: $c_{1,0}+c_{1,1}=0$		0.97532		0.74477
p-value on testing H0: $\beta_{1,0}+\beta_{1,1}=0$		0.42129		0.9581
p-value on testing H0: $\beta_{1,0}+\beta_{2,0}=0$		0.57608		0.6177
p-value on testing H0: $\beta_{1,0}+\beta_{2,0}+\beta_{1,1}+\beta_{2,1}=0$		0.71248		0.61302
p-value on testing H0: $\beta_{1,0}+\beta_{3,0}=0$		0.37522		0.42071
p-value on testing H0: $\beta_{1,0}+\beta_{3,0}+\beta_{1,1}+\beta_{3,1}=0$		0.0065		0.0128
p-value on testing H0: $\beta_{1,0}+\beta_{4,0}=0$		0.0335		0.1223
p-value on testing H0: $\beta_{1,0}+\beta_{4,0}+\beta_{1,1}+\beta_{4,1}=0$		<0.0001		0.0045

*-significant at 90%, **-significant at 95%, *** - significant at 99%

We will begin the discussion about analysis results from insights about impact of independent variables included in the model to control the fact that regional disparities can be affected not only by regional policy but also by other factors that have variation in time and cannot be differenced away like time constant variables.

We find strong evidence that increasing economic openness has a positive impact on countries' regional convergence in the short-run, but no effect in the long-run. It seems that the short-run positive effect of a broader market is later outweighed by increasing competition that can be handled mostly by developed regions in country.

Economic growth has positive effect on regional GDP dispersion reduction only in the long-run and no effect in the short-run. One per cent of economic growth leads to 0,145–0,160% of regional convergence in the long-run. Here we have no evidence of cumulative causation pattern of growth and can give an empirical ground to EU policy of regional convergence through economic growth.

We also find long-run effect of the industry sector on regional convergence in EU Member States. Increasing share of industry sector in economy is inducing faster economic growth in lagging regions possibly due to territorial re-allocation of this sector, which is not in favour of metro regions characterised by higher cost of labour and other resources. We do not include the construction sector here, which tends more to concentrate in metro regions. Because the industry sector in most of the EU Member States has become decreasingly important for more than 20 years, we cannot depend on it as the main factor, which in future may induce the decrease of regional disparities.

On the contrary, the increasing share of the service sector in the economy has instant and negative impact on regional convergence. In fact, the magnitude of the impact is the largest when compared with all other factors we analyzed. We have just modest statistical evidence that in the long-run this effect will be smaller. This is not surprising, because sectors that are becoming more and more important in the economy, like information and communication, financial and insurance activities, professional, scientific and technical activities, arts, entertainment and recreation are much clustered in nature.

Expenditures on research and development have a positive but very small effect on regional convergence in the long-run. Increase in these expenditures by 10% would reduce regional disparities in the long-run by just about 0.52–0.53%.

The findings about EU Cohesion policy impact on Member States regional convergence differences in terms of culture are provided in Table 2. (I) – Regional policy is approximated by *intensity* of structural funds to stimulate convergence. (II) – Regional policy is approximated by *expenditures* of structural funds to stimulate convergence. *Coefficients are calculated multiplying them by (-1) for easier understanding and interpretation, because decrease of dependent variable (dispersion of regional GDP) is a signal for at least sigma-convergence.

Table 2. Regional policy effect on regional convergence in countries with different cultural identity (Source: author's compilation)

The group of countries	Convergence elasticity* on regional policy			
	Short-run		Long-run	
	(I)	(II)	(I)	(II)
West	−0.050	−0.046	0	0
Central-East	0	0	0	0
South	0	0	−0.035	−0.035
North	0.054	0	0.118	0.068

We found positive impact of the EU Cohesion policy on convergence only in Sweden, Finland and Estonia (group of northern countries). Identified effect in the long-run is higher in magnitude compared with short-run periods. In the latter period we find statistically significant influence of the EU Cohesion policy only if it is approximated by intensity of structural funds usage. We find no statistically significant evidence of policy impact on the group of central-eastern countries. This group consists of latest Member States. We can hypothesise that these countries do not have enough experience for effective usage of funds and the cultural environment is not suitable enough for that. In groups of western and southern countries, the EU Cohesion policy has significant impact but it is negative. This impact is estimated in western countries only in the short-run and in southern countries only in the long-run. We could explain these findings by saying that: (i) possibly funds in these countries were allocated to more developed regions and lagging regions did not receive enough of funds or (ii) positive effect of government interventions did not overcome negative effects of inefficiency created by these interventions.

These findings prompt some insights about the EU Cohesion policy: The EU becomes too diverse and Member States are too different with diverse culture backgrounds and a homogenous regional policy does not have positive effect on all of them. This policy is created and implemented taking into account that countries will seek to reduce regional differences by using structural funds in the most efficient way, but it is not the case. The cultural background of central and eastern countries created an environment in which government funds are treated as a possibility to implement personal aims, but not social ones. Therefore, it is not surprising that through corruption and ineffective allocation of funds, the EU Cohesion policy was not successful in these countries. On the contrary, the northern countries, which have strong cultural background of social responsibility, did not waste the opportunity to induce growth in lagging regions by using support from structural funds provided by the EU.

These findings imply that there is a necessity to overview methods for allocation and monitoring of EU Structural funds usage and to adapt these methods for country-specific cultural background in order to increase probability for a more successful Cohesion policy during the current programming period.

Conclusions

Regional disparities issue is one of the most important during all the existence of the EU because these disparities have a negative impact on further economic growth and increase economic, social, cultural and political imbalances among regions. The EU regional policy focuses on decreasing these disparities. Therefore, it is very important to evaluate whether the policy is successful and what determines its success. It was discussed that one of the determinants of successful implementation of the EU Cohesion policy could be the cultural differences between countries.

We develop a research model, which includes not only national economic growth rates, economic openness, expenditures on research and development and structure of economy but also the impact of Cohesion policy on dispersion of regional GDP per capita in NUTS 3 regions of a country through a cultural channel.

Summarizing our empirical findings obtained using a panel of 25 Member States covering two previous programming periods, we can conclude that openness of the economy has a positive average effect on regional convergence but only in the short-run. Economic growth, increasing share of industry sector in the economy and investment in R&D induces regional convergence in the long-run. Increasing share on service sector in the economy induces regional divergence in the short- and long-run.

Regarding the impact of the EU Cohesion policy on convergence through the cultural channel we found that the EU has become too much diverse and Member States are too different with diverse culture backgrounds and a homogenous regional policy does not have positive effect on all of them. Only in the group of northern countries, the effect of Cohesion policy on regional convergence is positive in the long-run and short-run. We found no statistically significant evidence of policy impact on the group of central-eastern countries. In the groups of western and southern countries, the EU Cohesion policy has significant impact but it is negative. This impact is estimated in western countries only in the short-run and in southern countries in the long-run.

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IDENTIFICATION OF INDICATORS' APPLICABILITY TO SETTLE BORROWERS' PROBABILITY OF DEFAULT

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Abstract. Borrowers default risk is one of the most relevant types of risk in commercial banking and its assessment is important to secure business profitability and avoid huge losses during economic turbulences. This leads to necessity to investigate topics related to assessment of borrowers' default probability and applicability of factors, which would enable to capture the newest trends of borrowers' markets. Leading economic indicators (in addition to financial and other economic indicators) are often suggested as forward-looking in scientific literature. However, there is still a discussion going on applicability of financial ratios and economic indicators. As the problem is relevant in theoretical view as well as for practitioners, this article aims to identify applicability of leading economic indicators for the estimation of default probability. Further, the qualitative criteria for factor selection were identified and used when using detailing, grouping and SWOT analysis methods. Based on current scientific literature analysis, this paper concludes that although leading economic indicators are able to capture forward-looking signals, they should be used with careful analysis of its drawbacks and in combination with financial factors in order to avoid overshooting effects. The limitation of the article is the analysis of factors based on rather theoretical analysis than estimation of quantitative criteria. This suggests that every time using leading economic indicators requires using empirical study of particular indicators' set.

Keywords: Borrowers' default probability; financial ratios; economic indicators; commercial banks.

Type of the paper: Theoretical paper

JEL Classification: G21, C52

Introduction

Default risk is one of the biggest and relevant risks to which most commercial banks are exposed to, and its constant assessment as part of risk management is essential not only to insure competitive returns for shareholders but also to be resilient to potential losses resulted because of financial turbulences. Taking into account the importance of default-related ratios, management of commercial banks as well as supervisory authorities underline necessity to review periodically these assessment tools to catch up to newest methods and economic tendencies. Development of modern informational technologies and increasing availability of information determines these trends.

Leading economic indicators are suggested as useful factors to capture newest economic trends for default modelling in recent scientific literature. Financial or other types of economic indicators, so called lagging and coinciding, may show only the past performance of borrowers resulting slower reaction to real economy environment changes. Therefore, increasing the number of empirical evidences on leading economic indicators is observed in scientific literature. However, default probability financial ratios and lagging or coinciding economic indicators are most commonly used and rarely include leading economic indicators in analysed researches. This fact and existing need of commercial banks and supervisory authorities form a demand of particular theoretical comparisons,

evidences and practical solutions for default modelling. In other words, theoretical researches, empirical tests and combination of these two required in order to use the leading economic indicators.

Researchers pay attention to the following important problems of default risk assessment. What are the most appropriate factors for estimations of default risk? What models of default risk assessment are commonly used and what is their applicability? What models of risk assessment are most commonly used and which of the factors are considered as most appropriate in estimation of default risk in credit portfolio? What are common problems in default risk assessment and what could be solutions for them? Worth noting, it is still being debated which factors might be most appropriate for the assessment of borrowers default risk. As the problem is relevant in theoretical view as well as for practitioners, this article aims to identify applicability of leading economic indicators in estimations of default probability.

The articles structure is as follows. Analysis of theoretical background of financial and economic indicators, identification of qualitative criteria for factor selection, comparison of factors' applicability, benefits and drawbacks. Research methods used in the article are detailing, grouping, SWOT and comparison methods. The hypothesis is that considering qualitative criteria identified in scientific literature, leading economic indicators have enough empirical evidences to be used as forward looking factors in borrowers' default probability models. Using relevant methods, this paper concludes that although leading economic indicators are applicable to capture forward-looking signals in such estimations, however, they should be used with careful analysis of methodologies and in combination with financial factors in order to avoid overshooting effects.

Literature Review

Nature of default probability modelling

Default risk is considered as financial risk in overall classification of risks, that is, consequences of the risk are relatively easier to asses in monetary terms (European Banking Authority 2015). To understand the nature of default risk more thoroughly, it is important to understand sources of this risk, which can be divided into two broad categories – quantitative and qualitative (Špicas, Nekrošiūtė 2012). Qualitative sources are those that involve more subjective assessment, for example, business, political and legal environment, reputation, competitiveness of the product and risk management. Whilst quantitative are more objectively estimated, such as collateral, trends of business sectors and default risk of borrowers. This article deals with financial quantitative default risk assessment.

Commercial banks could not know whether their capital is adequate to outweigh possible losses in the future without comprehensive assessment of default risk. This risk defined as actual threat from counterparty's insolvency, which can negatively affect business and result undesirable consequences for commercial bank value. Probability of default is major ratio in overall pyramid of assessment ratios of credit risk. In general, default risk assessment starts from disbursement of the credit to the client when commercial bank is overtaking the risk (probability not to get back lend money, interests and other fees) and continues until the moment when liabilities (including interests and fees) are repaid. Therefore, worth noting in the overall credit risk assessment process probability of default ratio considered as the most important exogenous variable in internal rating based approach. In order to improve some parts of default risk modelling, this article focuses in the analysis of factor selection.

Generally, the development of default probability methodologies in commercial banks is challenging and should not only take into account historical information of borrowers but also include implied assessment of market tendencies, which relate to dynamic environment in real economy and capital markets. The assessment of this ratio usually starts from the definition of default probability. By developing the definition, we have to consider factors, which may result insolvency of the borrower and models to use. Default probability generally considered as theoretical and not directly observed and implies from default frequency. According to international standards, it is important to take into account two criteria to define it: first, historical information of default factors in particular borrowers' group; and second, information implying on the future, that is, important information of client group that may signal default of the borrower (Comptroller of the Currency Administrator of National Banks

2015). This double criterion helps to avoid some false signals of default, which may erupt because of changed historical information or too volatile implied signals on the trends. The choice of these criteria also depends on the purpose of the model – whether the purpose is to assess borrower or loan (Dzidzevičiūtė 2010). Finally, there should be assumed on what indication the default will rely. The early probability of default models were developed mainly in the reference to bankruptcy (Cibulskienė *et al.* 2014). However, gradually models using indication of default became more popular amongst scientists and practitioners because of the increasing number of evidences that definitions with bankruptcy indication have lower discriminant power.

One of the most commonly used approaches to evaluate probability of default is rating based assessment that estimates probability in accordance to financial and other borrower-related data. In general, development of this approach is considered as relatively complex process, which requires correct choice of tools as well as forming comprehensive database (Dzidzevičiūtė 2010). Furthermore, it can be subdivided into eight stages: definition of project in order to describe goals and feasibility, definition of doubtful and non-performing borrowers, choosing particular period for analysis, division of borrowers into groups, formation of sample size and analysis of potential variables, choice of statistical methods, estimation of factor coefficients and execution of back testing of overall assessment approach.

To include factors into such assessments, four methods may be potentially used: linear probabilistic, logistic, probit and linear discriminant analysis. These methods may also include neural networks and decision-making tree. Logistic method is usually considered as one of the most valuable with relatively easier interpretation power in scientific literature. The general idea of the approach is having any type of independent variables, dependent variable will be determined by one of two possible events – default or not default, that is, zero value or 1. Usage of this type of models is based on sufficient number of empirical evidences (Mileris, Boguslauskas 2011). However, the requirement to have relatively high level of sample size is considered as the main drawback. Therefore, its two features limit usage of logistic method – dependent variable is binomial and adequate database is required. This suggests us that factor selection is important stage of default probability estimation and is determined by availability of sufficient data and standardisation. Consequently, the definition should be carefully considered and criteria should be set for factor selection in order to model default probabilities.

Criteria for factor selection

Factors have to help to achieve defined models' goals. For this reason, qualitative criteria of best model selection as well as quantitative in selection of variables should be taken into account (Mader *et al.* 2007). Though sometimes the criteria may seem relatively simplistic, it can be hard to define them knowing their importance in overall process. Besides, this is what scientists and practitioners seek in definitions of their methods. Worth mentioning that though the criteria considered as important element, they are rare topic in the scientific literature. The research of Mader *et al.* (2007) finds that the criteria are often hard to meet and few of them are usually conflicting. For the criteria definition, the authors suggest to link areas related to organisation including the areas of information technology, requirements for analysis and design of modelling.

The factor analysis can be defined as a multivariate statistical procedure that has several uses: to reduce a number of variables into a smaller set of factors, to identify interconnectedness of variables and financial phenomenon and to validate reasoning behind choices. In accordance to study of Brett *et al*. (2012), the financial ratios and economic indicators' analysis may use several steps of exploratory factor analysis protocol, which provides researchers with starting reference point in developing clear decision criteria. According to analysed researches for modelling probability of default, the most important groups of criteria for factor selection may be identified as follows:

- Availability of data;
- Scientific evidences;
- Forward looking;
- Interpretation power.

Availability of data. For modelling purposes, it is important to clearly define the factors in order to have interpretable and consistent results. For instance, appropriate models and factors used in the assessment of default risk may vary a lot. This is because objects of modelling may vary in their nature as well. Therefore, information availability sometimes becomes essential determinant of the modelling process. Most of the models aim to have parsimonious tools, and according to Occam's razor-based theories, such as Akaike Information Criterion and the Bayesian Information Criterion (Vrieze 2012), this principle is particularly relevant to modelling: amongst models with roughly equal predictive power, the simplest one is the most desirable. Hence, the number of states and variables should be concise and, ideally, the models should use stable, clearly defined and well-understood factors to achieve its goals. However, publicly available methodologies and researches on particular factors could limit this.

Another common issue related to factors is availability to obtain sample size. There should be enough qualitative historical data in order to test and validate modelling results (Hogarty *et al.* 2005). However, optimal sample size for the statistical analysis is still debating question. Although many researchers have been suggesting various optimal sample sizes, all of them agree that ability to obtain as numerous sample size as possible is important criteria for the factor. Accessibility to publicly available databases and data sets could determine this ability.

Scientific evidences. Scientific substantiation supported by empirical evidence and interpretation under scientific method is an important element, which serves to either support or counter a hypothesis (Theobald 2012). Therefore, having evidences and methods in decision-making process is very important. Relevant properties of factors should be adequately based as well. Assumptions have to be often made in the development of models in order to allow using a certain modelling technique. Therefore, the factors should be weighted enough in terms of scientific evidences and behaviour in order to avoid errors in further stages of modelling and overall credit risk assessment. Another aspect is determinability of adequate scientific evidences level to validate usage of factors. Although this is intuitive concept, some scientists argue that scientific evidence itself is subjective. However, most of scientists would agree that the validity of any inference should not be based on just a few observations or contradictions but on the totality of the evidence (Martis 2006). In this article, we simplistically describe whether there are at least several researches proving necessary evidences. The more evidences could be gathered, the more arguments are to select the factor.

Forward looking. Each model has a specified purpose and contributes to the realisation of that purpose. Possible purposes may include (Evans, Lindner 2012)

- Analysis of past events;
- Verification of specific properties;
- Implying on future from currently available information, hat is, models can be divided into descriptive, prescriptive and predictive.

As the purpose of the default probability modelling is considered as predictive, the factors should also contribute to this purpose. Additionally, such models and factors should be extensible and reusable, that is, methods and factors has long-term value if their predictive features are sustainable. Number of scientific researches, which compare forward-looking features of different factors, can determine this feature. In reference to Organisation for Economic Co-operation and Development (2012), economic indicators can also be divided into lagging, coinciding and leading. In this sense, financial, lagging or coinciding economic indicators may signal warnings on default with a time lag in comparison to leading ones (Albrice 2014).

Ideally, the models and factors should not solve only specific one-time problems; therefore, appropriate inclusion of different types of factors in model may help to address the problem from higher number of dimensions (Brett *et al*. 2012). In modelling probability of default, it would mostly relate to usage of different types factors. Some of the factors may represent only borrower-specific information (financial factors), business sector tendencies (sectorial factors) and macroeconomic

(macroeconomic factors) or can be blended (borrower-sector, sector-macroeconomic). Therefore, it is important to understand which type of information it represents. This is useful not only for interpretation part but also to understand interdependencies of factors in analysis of multicollinearity.

Interpretation power. Interpretation power criteria include examining which of the variables corresponds to a factor by giving that factor a name or theme. For instance, several variables may construct particular factor, all of which relate to one perception-creating name for that factor. Usually, at least two or three variables should be used on one factor so it can give a meaningful interpretation (Henson, Roberts 2006). However, this labelling has subjectivity nature, more theoretical process and is dependent on researcher‘s definitions. Generally, such research should aim to find those factors that taken together explain direct or indirect relationships. For the purpose of interpretation, it is essential that these names would correspond to the theoretical intent. Therefore, the scientific literature should provide adequate number of alternative interpretations.

In addition to researcher’s subjectivity, some of the information may be exposed to subjectivity of its creator or intermediate (Gervasio, Montani 2013). This would create relatively lower representation of objective reality and could lead to erroneous forecasts. For instance, financial information such as annual financial statements may include subjective judgments of accountant or financial officers such as depreciation or amortisation schedule or other in accounting policy-stated judgements. To avoid these subjectivities, researchers should state the deviations and desirably find solutions to correct them.

Finally, a well-functioning model should be developed in manner to be able to share its semantics (Brett *et al.* 2012). In the assessment of overall credit risk in commercial banks, different models using different factors may lead to inconsistencies of results, that is, models representing different views on factors would be hard to compare and interpret in general assessment of all risks.

Mapping the criteria. Generally, the criteria link areas of data gathering, design of modelling and ability to use them in forecasting of default probabilities (for generalisation, see Fig. 1).

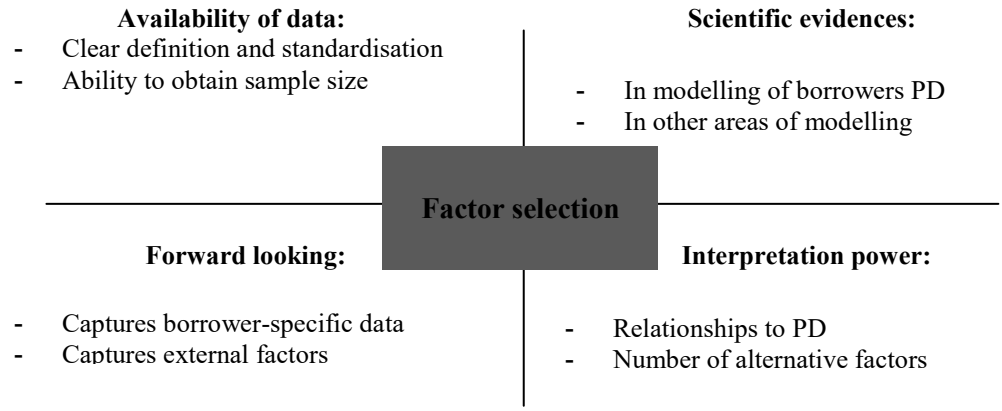

Fig. 1. Mapping of criteria for factor selection (Source: author’s compilation)

It can be stated, basing on the literature reviewed, that factors, first, have to be clearly defined, ideally should be stable and well understood. Another related common issue is availability to obtain sample size. In other words, there should be enough qualitative historical data in order to test and validate modelling results. In addition, factors should be weighted enough in terms of scientific evidences, and their long-term behaviour should be well understood to avoid errors in further stages of modelling. As the purpose of default probabilities considered as predictive, it should use factors, which are forward looking, extensible and reusable. It is also important to analyze to which type of information these factors correspond. It is important not only for interpretation part but also to understand

interdependencies amongst factors in the analysis of multicollinearity. Finally, for the purpose of interpretation, it is essential that clarification would correspond to the theoretical intent in such way avoiding researchers' subjectivity. In addition, it should be taken into account that some of the information may be exposed to subjectivity of its creator or intermediate.

Financial and economic factors

History of scientific researches on factors for default probability modelling is closely related to the development of credit risk assessment tools. This financial research area was initiated in 1932 when FitzPatrick found a relationship between default probabilities and financial ratios of borrowers. These researches based on relatively standard and in nature similar financial ratios; however, in later researches, more complex and various ratios were applied. Recently, in spite increased interdependencies of economies and financial markets, macroeconomic ratios started to be applied in default probabilities estimations gaining the ability to capture systemic risk factors. This part of the article provides literature analysis of each factors group aiming to identify their applicability determined by scientific evidences, interpretation power, forward-looking features and availability of data.

Financial Factors

The studies of financial factors already have rich history – summing up the development of researches and use of financial ratios, they can be grouped into three (Cibulskienė *et al.* 2014 and others):

- Balance structure and accounting profit based;
- Financial cash flow based;
- Blended.

The first group of ratios started to use in early researches and included ratios such as working capital/assets, income/assets, profit/assets, equity/liabilities, profit/short-term liabilities and similar. In later researches, cash-flow-based ratios were included in default probability estimations in addition to balance and accounting profit based. Finally, methodologies developed by modern rating agencies have included all types of ratios (included blended ratios). However, in later years, to facilitate cash-flow-based analysis, methodologies of Standard & Poor's (2013) rating put more weight on cash flow based and blended ratios. However, at the beginning, researches used relatively simplistic financial ratios related to balance sheet and accounting profit, since then methods have been significantly improved and more complex financial cash flow ratios were used.

The intuition behind using financial cash-flow-based ratios is relatively simple – the borrower who is able to generate positive free cash flow (after all related costs) is less dependent on external financing sources and will be able to generate dividends and increase borrower's value. This is mainly based on discounted cash flows method, which was firstly developed by Fisher (1930) and more extensively used in further researches. For instance, rating agencies usually put more weight on financial cash-flow-based ratios in modelling default probability. The underlying reason behind this is that, sometimes, book values in balance sheet are more exposed to subjectivity of accounting rules and accountants. However, there are some drawbacks of these ratios as well – mainly because the ratios are not compared to liabilities or other balance sheet values. For instance, although borrower may generate high financial cash flow, it may have even higher financial liabilities to cover (which sometimes may be too high to serve). In order to outweigh such drawback, it is advisable to use blended ratios. For instance, financial cash flow relative to balance sheet and accounting profit may give more comprehensive view on covering capacity overall debt or dependency on external financing. Generally, usage of all types of financial ratios is proven empirically and methods to include them have been tested well. Worth noting because of differences in business sectors, the level of requirements for each borrower's ratio should be different as well. In addition, if necessary information is available, it is advisable to adjust these ratios with following corrections: transaction with related parties, re-evaluate balance sheet values, consider off-balance liabilities. Therefore, to have most representative ratios, there should be ability to compare them to peer group and adjusted if needed.

These types of factors usually are well defined because of the convergence of international accounting standards. Several factors including the belief that it would increase the comparability of different entities' accounting numbers drive convergence (Financial Accounting Standard Board 2012). However, this is more applicable for corporate borrowers, which often have to comply with international standards, and to make periodically audit of competent external parties. Small and medium enterprises (SME) borrowers have less defined and accurate accounting systems, which vary in different countries. In addition, these ratios may be exposed to subjectivity of accountant and management as several flexibilities are left in the standards (Gervasio, Montani 2013).

Although these ratios are relatively well defined, availability of information may vary depending on the type of the borrower. Information of corporate borrowers, who traded in stock exchange market, is publicly available and comprehensive, although, sometimes in order to fully understand the business additional information needed. However, there is a tendency regarding SME – the smaller the borrower is, the less publicly available information you can get. Therefore, banks have to request additionally borrowers to submit such information and, if necessary, to ask to audit these financial statements. The main advantage of these ratios is interpretation power because of the well-defined practices of accounting and large amount of scientific researches. For each group of financial factors in literature, you can easily find more than three possible variables that give opportunity to compare them. The biggest drawback of these ratios is relatively long lag of information provided. According to Kaplan (2010), traditional financial and cost accounting measures record what has happened in a previous period and are often referred to as lagging factors. Sometimes, in order to receive audited financial statements, commercial banks have to wait for four to six months. The lag is smaller if we consider using final non-audited accounts. In these cases, the process would speed up to two or three months. However, recent dynamic economic changes and increasing interconnectedness amongst economies and sectors set new requirements for default modelling and suggest not rely only on financial ratios.

Economic Indicators

Lagging and Coinciding Economic Indicators. Other type of factors, macroeconomic indicator based, (which by typology considered as lagging and coinciding economic indicators) is seeking to identify mainly systemic type of risks using external databases. One of the best-known examples of the model using macroeconomic factors is McKinsey's Portfolio Credit View (Derbali, Hallara 2012). The methodology is useful to estimate exogenous variables on portfolio or sub-portfolio level. Although it was proved that economic indicators are useful in such type of modelling, they are made to capture too wide population and may not be useful for the estimation of default probability for separate borrowers.

Seeking to capture systemic risks in default estimations, later tools based on capital market ratios proved their ability to generate lower standard errors than macroeconomic. Hillegeist *et al.* (2004) developed one of the researches that provided necessary evidences. Such evidences encouraged number of new researches in this area and development of information technologies improves availability of this type of information. Other examples of such models include cohort analysis (based on statistical analysis of borrowers groups), survival analysis (tries to estimate the number of defaults within a fixed time interval, typically 1 year) and the most prudent estimation principle based on statistical analysis of borrowers groups (Pluto, Tasche 2005). Generally, this type of analysis proves to be helpful analytical tool to capture some tendencies in the real economy, however, has some drawbacks. First, they evaluate the level of portfolio and it is hard to attribute one or another default probability to particular borrower. Second, this type of models requires number of assumptions, which makes estimations more exposed to subjectivity. In addition, although assumption of all economic cycle inclusion in estimations makes valuation more stable, such assumption is criticised for too slow reaction to structural changes in the market (Kiff *et al.* 2013).

Researchers recently blend these factors into hybrid models taking into account advantages and disadvantages of already mentioned factors. Recent researchers found that default probability assessment is more accurate using financial, macroeconomic and capital markets factors (Chan-Lau 2006). However, there is still being debated whether hybrid models are more effective for assessments. Though most researches proved effectiveness of blended ratios inclusion, other such as

Hillegeist *et al.* (2004) insisted that traditional financial ratios based tools are sufficiently effective. In accordance with such discussion and goal to blend financial, economic and market information into assessment of default probability, some scientists were seeking for more evidences supporting such hybrid models (Jimenez, Saurina 2006). For instance, Carling *et al.* (2002) research successfully uses such hybrid approach based on Swedish databases in their survival rate. In the study, they found that inclusion of economic indicators in credit risk assessments significantly improves predictability power.

As data standardisation, these factors (macroeconomic and capital markets) are generally well defined, as the science has become international matter, which motivates separate countries to converge their methodologies in longer term (International Monetary Fund 2015). This type of information is easily publicly accessible taking into account the developed databases of Eurostat, Bloomberg and other similar. Another advantage of these ratios is relatively decreased subjectivity of data in comparison to financial factors. These models are able to solve not only one-time problems because of the factor standardisation, which makes them very useful tools in order to understand estimations. However, there is still being debated whether these models are able to catch up the newest tends in the market because of their lagging and coinciding nature, in scientific literature, they are more considered as lagging and coinciding (Organization for Economic Co-operation and Development 2012).

Leading Economic Indicators. As it was mentioned, new requirements are set in estimation of default probability in modern society of dynamic information flows. As one of the best ones to capture market tendencies, scientific literature underlines leading economic indicators. As it was previously described, in general, economic indicators can be divided into lagging, coinciding and leading. Lagging or coinciding indicators may signal warnings on default with a time lag comparing to leading ones. In addition, it may also take some time to collect necessary information. Therefore, all these ratios may result too slow reaction to current news from real economy.

Examples of leading economic indicators may include several types depending on their nature. For instance, business, consumer or other respondents' sentiment economic indicators may be able to capture most of current tendencies in the market. Monthly retail market data may reflect trends in retail sector of particular country in more sensitive manner than general macroeconomic ratios. This ability is already proven in modern economies such as the United States, the EU and some Asian markets. In addition, there is already a significant number of evidences showing benefits of such economic indicators in risk assessment as well. This provides us useful findings regarding capability of these factors to be forward looking: they are able to indicate structural changes in the markets (Frankel, Saravelos 2011), they may be useful for indication of changes in business sectors (Nippala, Paivi 2012), leading economic indicators derived from stock exchange market may be useful as well (Izani, Raflis 2004).

Other part of researches has been describing some of the features of these factors (Fritsche, Stephan 2002). These researches showed that there is no single indicator that could potentially describe market trends; however, inclusion of leading economic indicator amongst others may results more accurate estimations. These researches commonly use leading economic indicators as money supply (M2), stock exchange market data, business and consumer surveys, buildings permits and so on. Finally, researches such as Izani and Raflis (2004) give us identification that on an average, lag between leading and coinciding economic indicator may be equal to one to three months.

However, these indicators have some drawbacks as well. It is known that these indicators may be useful tools to capture future developments, however, that are relatively sensitive and may overshoot the trends. Therefore, these factors are usable only together with other indicators such as financial and lagging or coinciding economic ones. Analysing mentioned factors scientists found that most of the economic indicators (including lagging, coinciding and leading) are exposed to seasonality. In addition, there are other troublesome issues such as ignorance of past changes and shifting levels of data sets. Also in some cases, non-linear behaviour is observed, which eliminate linear models from toolset (similar to lagging and coinciding economic indicators). Therefore, although these researches suggest that they may be useful, they have to be used with couscous by incorporating them into overall model.

Common methodologies are still being developed for standardisation of these ratios. In some cases, this may cause some higher obstacles relatively to other factors for comparability between periods and regions. Although these indicators are available from public databases, their use should involve serious analysis of methodologies (The Organisation for Economic Co-operation and Development 2012). As for interpretation, such factors as well as lagging and coinciding have numerous studies and interpretations in different economic contexts. Therefore, these factors have relatively good interpretation power and are useful; however, the application methodologies should be clearly defined.

Results

After analysis of related scientific literature on nature of default probability estimation, applied models and criteria for factor selection, several conclusions can be made on applicability of different factor groups. In order to make such comparison, SWOT analysis was used for mapping common illustration of each factor group's features (Table 1). Exploratory factor analysis is a complex multivariate statistical approach involving many sequential steps. Therefore, this should be viewed as suggestions from scientific literature and supplement quantitative analysis of these factors.

Table 1. SWOT analysis of financial and economic factors (Source: author's compilation)

	Financial ratios	**Economic indicators**	
		Lagging and coinciding	**Leading**
Strengths	- Highly empirically proven - Well standardised - Captures borrower specific information	- Highly empirically proven - Good standardisation - Captures trends of market in long term - Avoid borrower's subjectivities and complex structures	- Low number of empirical proofs - Sufficient standardisation - Captures trends of market, forward-looking features - Avoid borrower's subjectivities and complex structures
Weakness	- Long lag of information - Extensive informational requirements to adjust book values - Does not capture market developments - Financial statements' subjectivity and complex borrower groups	- Relatively long lag - Do not represent borrower specific information - More commonly applied portfolio level analysis	- Less standardised - Do not represent borrower's specific information - More commonly applied portfolio level analysis
Opportunities	- Increasing convergence of methodologies in international level - Improving accounting standards may solve some subjectivities and adjust to fair values	- Increasing convergence of methodologies in international level - Improving standards may improve applicability	- Increasing convergence of methodologies in international level - Improving standards may improve applicability
Threats	- There will always be some subjectivity of borrower's management - Globalisation makes borrower groups more complex	- Development of methodologies may result in some inconsistencies	- Developing methodologies may result higher inconsistencies than to other economic indicators

The analysis indicates main benefits and drawbacks of each of ratios and indicators group, which should be taken into account before starting to collecting data and executing quantitative analysis. If these features are taken into account in advance, it would help academics as well as practitioners to overcome main limitations or state them together with research results.

Conclusions

After analysis of scientific literature on factors used in default assessment, several findings can be stated on benefits and drawbacks of using financial and economic indicators. These findings are important for theoreticians as well as for practitioners to apply factors in order to have forward-looking default probability models.

First, it was approved that development of default probability methodologies in commercial banks should take into account not only historical information of borrowers but also include implied assessment of market tendencies. To include factors into assessments, logistic method is considered as the most accurate with relatively easier interpretation power; however, it requires comprehensive database. Furthermore, these factors have to help defined models to achieve their goals and qualitative criteria of factor selection by taken into account quantitative criteria as well. However, sometimes it can be hard to define them because of the fact that it is rare topic in the scientific literature. From scientific literature, it was found that most relevant criteria for factor selection in the assessment of default probability are availability of data, scientific evidences, forward-looking features and interpretation power.

The comparison of factors indicates strengths and weaknesses of each factor. The biggest strengths of financial factors are related to high number of empirical evidences. This and good standardisation makes these factors easier to apply for more simple assessments of borrowers, especially, smaller ones when systemic and market risk is not so relevant. However, long lag of information suggests that assessment should involve other type of factors, which could indicate forward-looking tendencies in the market. Another issue is relatively high level of informational required from borrowers, which is used to eliminate subjectivity of accounting and management, complexity of borrowers' group structures. In future, some of subjectivities can be eliminated by the improvement of accounting standards; however, this will not fully solve the issue.

Whilst lagging and coinciding economic indicators have strengths in terms of standardisation and empirical evidences. These indicators are already widely used by international organisations as well as commercial banks. So, it is already proven in modelling of long-term market tendencies. However, it still has some lag in comparison to leading economic indicators and has a common drawback for all economic indicators – does not capture borrowers' specifics. In addition, these factors are more applicable for portfolio analysis because of their wide sampling reach (no detailed division on sectors). In future, methodologies should converge internationally making easier comparison amongst separate countries, although such tendency may result temporary inconsistencies of methodology as well.

Finally, the main strengths of leading economic indicators are ability to make forward-looking insights on market developments. Although these factors has significant amount of empirical evidences and sufficiently standardised, however, as methodologies are still being developed, it may cause some obstacles to consistently apply them. Therefore, they should be used carefully (with comprehensive analysis of methodologies) and in combination with other factors in order to avoid overshooting effects. In future, if methodologies be more developed and standardised internationally, applicability of these facts would improve.

Concluding the article, as borrowers default risk is one of the most relevant types of risk in commercial banking, it is important to investigate topics related to assessment of borrowers' default probability and applicability of factors that would enable to capture the newest trends of borrowers' markets. Based on the scientific literature reviewed, this paper contributes to researches on forward-looking indicators and concludes that although leading economic indicators are able to capture forward-looking signals, they should be used with careful analysis of weaknesses identified in the article and in combination with financial factors.

The limitation of the article is that analysis of factors is based on rather theoretical analysis than estimation of quantitative criteria. This suggests that while each time using leading indicators quantitative validation should be used as well. In addition, the article also found a number of topics on which further researches would be beneficial. First, there is still a lack of comprehensive study of qualitative criteria applied for factor selection. Second, more empirical studies are needed, which

identify characteristics and specifics of factors' applicability in assessment of corporate versus SME borrowers. Furthermore, researches, which compare estimation methodologies of leading economic indicators, would give more insights on applicability of these factors. Lastly, surveys of experts on applicability and more related empirical analyses are needed, which would give more empirical evidences on the topic.

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SOCIAL CAPITAL, WELL-BEING AND MUNICIPALITY: SALASPILS MUNICIPALITY (LATVIA) CASE

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Abstract. During the last three decades, social capital has gained prominence throughout the social sciences. The concepts has been analysed in various manners (from perspectives of economics, political sciences, sociology, anthropology etc.) providing wide range of theoretical conceptualizations. The aim of paper is to analyse the relation of social capital and possibility to improve the well-being of the municipality's citizens using co-responsibility approach. In order to achieve the aim, the tasks are formulated as follows: 1) to review theoretical background for concept of social capital and subjective well-being, 2) to analyse the factors of social capital at local level, and 3) to use the results of conducted empirical research at Salaspils municipality in analysing the correlation of level of social capital and possibility to improve well-being implementing inclusive local management. Research methods used: Scientific literature studies, several stages of focus group discussions, statistical data analysis, SPIRAL methodology, scenario method. The main findings of the paper – there are evidences on relation of social capital and possibility to improve the well-being of the municipality's citizens. In municipalities with sufficient level of social capital are good opportunities to use participatory techniques for achieving higher level of overall well-being. The paper consists of practical value how to mobilise the social capital of the municipality in order to ensure the inclusive management of the territory.

Keywords: social capital; social inclusion; municipality; innovative management; subjective well-being.

Type of the paper: Empirical study

JEL Classification: I31, I38, O21, R58.

Introduction

The concept of social capital became the topic of discussion only relatively recently, but the term has been in use for almost a century while the ideas behind it go back further still. Summarising different definitions (Nenadovic 2015; Lin 2001; Putnam 2000; Burt 2000), it could be concluded that social capital includes the links, shared values and understandings in society that enable individuals and groups to trust each other and so work together. Taking into account recent movements towards implementation of more inclusive government form including society in decision-making processes, the relation between social capital of certain territory and the possibility to involve citizens in improvement of the well-being of that territory contributing with their own resources using so-called co-responsibility approach should be analysed.

Nowadays, taking into account different financial and administrative instruments, the local governments have wide opportunities to affect well-being of society. Indeed, involvement of society in decision-making processes and provision of effective dialogue with society could positively influence the subjective well-being, especially if citizens have opportunity to participate with own resources in resolving of topical local issues. These topical issues are described in many researches (see Keating, 2005; Cegarra-Navarro et al., 2012; Almazan & Garcia, 2008;).

Within URBACT programme project "Together for territories of co-responsibilities" Salaspils municipality (Latvia) had an opportunity to test the SPIRAL methodology for determination of subjective well-being indicators (see more Jēkabsone et al., 2013). The research methodology was

developed by the Council of Europe, providing opportunity to evaluate the personal well-being form the point of view of persons themselves (Council of Europe, 2008). Based on the results of research, the Local Action plan was developed in order to promote the well-being of citizens activating the social capital.

Taking into account all mentioned above, the aim of paper is to analyse the relation of social capital and possibility to improve the well-being of the municipality's citizens using co-responsibility approach.

In order to achieve the aim the tasks are formulated as follows:

1. To review theoretical background for concept of social capital and subjective well-being
2. To analyse the factors of social capital at local level
3. To use the results of conducted empirical research at Salaspils municipality in analysing the correlation of the level of social capital and possibility to improve well-being by implementing inclusive local management.

The following research methods were used: scientific literature studies, several stages of focus group discussions, statistical data analysis, SPIRAL methodology and scenario method.

Social Capital

The OECD (2001) gives a definition of social capital, consistent with that of Putnam (2000), as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups".

The concept of social capital began to be used in the 1970s as a rehash of ideas not new to sociologists (Portes, 1998). Loury (1977) explains the different degree of success of young people in increasing their human capital using this concept.

According to Putnam: "social capital is a set of features of social organization such as trust, norms and social networks" (Putnam et al., 1993). In subsequent work he states that "social capital refers to interpersonal ties, social networks, reciprocity and trust arising from the ties" (Putnam, 2000). In addition, Putnam stated that "social capital reflects essentially the involvement of individuals in social networks, the creation of reciprocity relations and interpersonal or generalized trust. Trust is considered a prerequisite for involvement in networks of civic engagement and for long-term preservation of social relations" (Putnam, 2000).

Putnam (2000) understands that "what is productive for a social group may be unproductive for another group and he identifies the different consequences of dealing with a bridging social capital (aimed at creating links between groups) or a bonding social capital (aimed at re-establishment of ties of a specific group)". Lin emphasizes the importance of the proactive investment in profitable relationships for the achievement of its own purposes (Lin, 2001). Moreover, Lin (2001) stated that "having access to social capital depends on the individual's position in the social structure, on its role within the network, on the strength of its strong ties (family relationships and friendship) and weak ties (other social relations)".

Social Capital and Well-being

The concept of well-being refers to the quality of people's lives which is regarded as "a dynamic process, emerging from the way in which people interact with the world around them" (Rees, Bradshaw, Haridhan, & Keung, 2010). Ben-Arieh et al. argued that "individual well-being is influenced not only by personal attributes, but also by the characteristics of the contextual factors emphasizing the significance of interactions among individuals, family, peers, schools, neighbourhood, the broader community, and society at large, the structure and processes of these contexts can facilitate or hinder access to social and material resources which is vital for a human's survival, development, protection and participation" (Ben-Arieh et al., 2001).

Subjective well-being, the self-evaluation that people carry out of their lives, has been proposed (Diener, 1984, 2000; Cummins et al., 2003) as an alternative measure to track the development of societies instead of economic growth and other related objective indicators such as population health, crime and objective security. Past research has demonstrated that social capital produces subjective well-being, and that people with high degree of subjective well-being tend to partake in online community activities through reciprocal adaptation (Helliwell & Putnam, 2004; Ellison et al., 2007). Putnam (2000) proved that "social capital is a principal driver that promotes healthy and effective democracy". The past literature on social capital reveals that researchers have approached it as a multi-faceted concept composed of social network, trust, civic participation, life satisfaction, and others (Newton, 2006; Putnam, 2000).

Several papers have documented that social capital is strongly correlated with subjective well-being in cross-sections (see the pioneering studies by Helliwell (2011, 2006) and Helliwell and Putnam (2004); see also Bruni and Stanca (2008), Becchetti et al. (2008) and Bartolini et al. (2014)).

Social Capital and Municipality

Sacco and Vanin (2000) declared that "the local dimension is very important in the study of social capital since contains both predominantly, locally occurring shared norms and values of a community and the highest number of interactions between economic actors; a good network of relationships between interest groups and local public institutions can facilitate the improvement of infrastructures and services, and investments". Saxenian (1994) also pointed that "social capital can play an important role in regional development in a globalized world where it can help reduce the costs required for coordination of more and more specialised businesses".

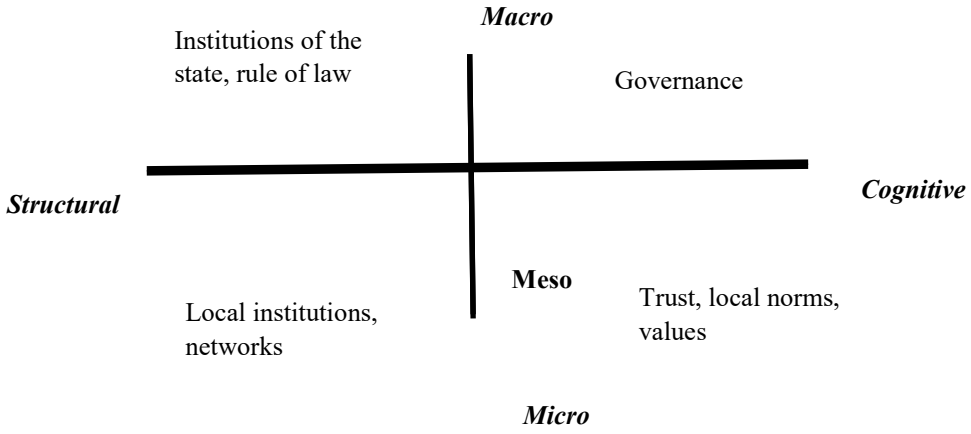

Fig. 1. The Forms and Scope od Social Capital (Source: Grootaert, Van Bastelaer, 2002)

Municipality's social capital, or more generally, macro-level social capital, is a resource one can access via membership in a group or community. Social capital on the macro-level as opposed to micro-level social capital, which operates exclusively on the individual level consists of norms of reciprocity, civic participation, trust in others, and the benefits of membership. Work by Kawachi, et al. (2008), Putnam (2000), Subramanian et al. (2003), and, in particular, work on the neighbourhood level (Stafford et al., 2008; Van Hooijdonk et al., 2008) provides examples of this macro-level approach to social capital.

The discussion of social capital according to it forms and scope is illustrated in Fig.2, where specific concepts of structural and cognitive social capita are presented along the continuum from the micro to the macro dimensions.

The breadth of the concept of social capital has been a sign of both strength and weakness of conceptual debate so far. However, at municipal level where citizens have possibility to spend the

most part of their leisure time the social capital could be understood better. At local level citizens have an opportunity to build a network and use it for realization of different initiatives and attitudes.

Methodology

During the research in Salaspils Municipality so-called SPIRAL (*Societal Progress Indicators for the Responsibility of All*) methodology was used, which provides the way to define and measure well-being from the subjective point of view of the persons themselves. This methodology was approbated in different European cities – more than 100 municipalities tested it according to local circumstances.

During the data collecting citizens of municipality are gathered in homogeneous groups (focus groups) representing all society. Moderator of the groups ask to provide answers to open-ended questions like "*What is well-being for you?*", "*What is not well-being for you?*", "*What do you do or could do for your well-being?*", "*What municipality could do for your well-being?".* The collected answers are divided in 8 main blocks: 1) access to means of living; 2) living environment; 3) relations with institutions; 4) personal relations; 5) social balance; 6) personal balance; 7) feelings of well-being/ill-being; 8) attitudes and initiatives. Avery block has wide range of possible well-being indicators (URBACT, 2009).

The input data were gathered from different homogeneous groups (focus groups), which in general represent the society of municipality. After conducting research on structure of the society, 25 homogenous groups were gathered for further research. Table 1 shows the analysis of homogeneous groups in Salaspils municipality.

Table 1. The Analysis of Homogeneous Groups in Salaspils Municipality (*Source*: Author's construction based on observations during the meetings with focus groups)

Society group	Homogeneous groups	Number of groups	Level of participation	Level of importance	Level of influence
Youth	The Student Councils of Salaspils First and Second High Schools	5	Medium	Medium	Low
Parents	School for mothers and babies; The board of parents of preschools; society of large families; Salaspils Women's Club	8	High	High	Medium
Cultural/ sport/ religion workers	Russian song ensemble**;** middle age dance group; education, culture and sport department; sport club; Lutheran church; Roman Catholic Church	8	High	High	High
Science workers	Institute of Inorganic Chemistry, Institute of Physics and Institute of Biology	3	Low	Medium	Low
Municipality workers	Social service; the Union of municipality workers; council	3	High	High	High
Disabled people	The association of children and young people with disabilities; NGO of disabled persons	3	High	Medium	High
Seniors	Society of Russians; the Board of Salaspils retired people**;** club	3	High	Medium	Medium
Representatives from rural territories	Society 'Partnership of Stopini and Salaspils'; Initiavive group of citizens of Dole island	2	High	High	High
TOTAL	25	35			

Data gained at the focus group discussions were analysed using the software designed by the Council of Europe. The software program on SPIRAL methodology updates the results of homogeneous group

findings, the experts entered the focus group participants' written criteria data, allocating them to the right indicator group and giving estimates.

The overall sequence of researching and promoting well-being methodology approbated in Salaspils Municipality is provided in Fig. 2.

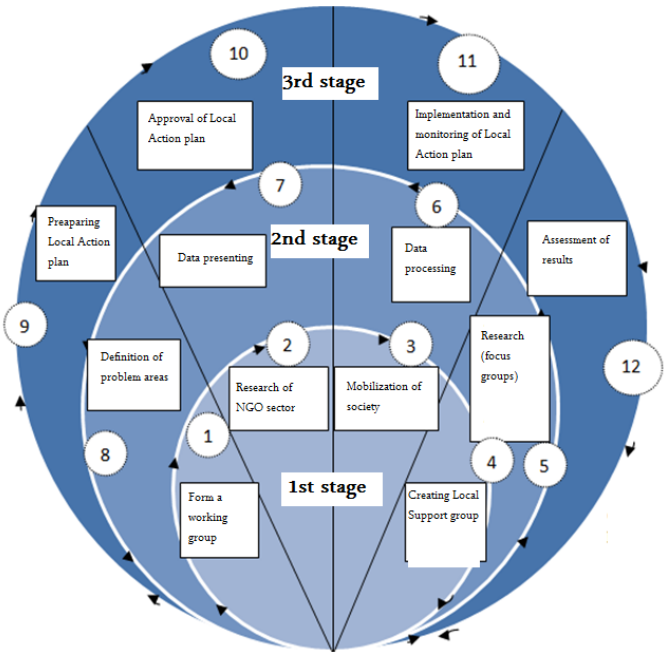

Fig. 2. The sequence of researching and promoting well-being methodology in municipalities (*Source*: elaborated by the authors)

The first stage is preparation, which includes formation of working group that would provide the research inputs, research of NGO sector at municipality, mobilisation of society to ensure the participation of the to the survey, and creation of local support group from the leaders of NGOs. The second stage is the conduction of research, which includes data collection from focus groups, data processing and presenting to respondents, as well as definition of problem areas according to research data. The last stage is achievement and maintenance of results. This stage includes preparation, corroboration and implementation of local action plan, which includes activities aimed to improve the well-being of municipality, as well as monitoring of results.

Research Results and Discussion

According to methodology description mentioned before, research was conducted on 25 focus (homogeneous) groups about well-being dimensions and indicators. The Overall results show (see Fig. 3) that 44% of the respondents related to well-being dimension 'Access to means of living'. The most popular indicators were: 'Education/training' (249 responds), 'Health' (234 responds), 'Employment/economic activities' (216 responds) and 'Leisure/culture/sports' (177 responds). This subjective well-being dimension concerns rather material circumstances. It relates to the basics of daily life ranging from food and shelter, clothes, education and work to money and information, and contains 11 different categories. Examples of the types of responses to the questions that fall into this category include: "to have a home"; "proper education"; "good salary"; "wide range of social services"; and in response to the ill-being question "no job"; "ill-ness"; "no money"; "bad environment". The second most popular well-being dimension is 'living environment' – 16% of the responses were related to this dimension. The most popular indicators were: 'Basic infrastructure and amenities' (178 responses), 'Meeting and leisure places' (76 responses), 'Service structure and facilities' (64 responses) and 'Living environment in general' (34 responses). Examples of replies in

this category include, "green area", "bicycle paths", "parks with benches" and on the ill-being question examples of replies included "expensive heating", "bad roads" and "no place for NGO". The third most popular well-being dimension is 'attitude and initiatives' (11% of the responses). Indicators mentioned the most include 'Private activities and initiatives' (122 responses), 'Engagement in civic life' (62 responses) and 'Responsibility' (46 responses). This particular subjective well-being dimension relates to citizen participation. Its seven elements include self-improvement, personal/entrepreneurial initiatives, behaviour and commitment within civic life. Examples of observations are "to be in NGO"; "to realise projects"; "to be social active"; "do some work for community" and on the ill-being side such as "no possibility to realise ideas"; "no new initiatives".

Taking into account that social capital includes different factors related to personal relations, this well-being dimension would be further analysed. Overall, 6% of all responses relate to well-being dimension 'Personal relations'. It has six sub-elements covering personal and sexual relations, family life, friend, relations within the neighbourhood and relations at work. Here examples of observations include "having parents", "good relationship with colleagues", "to have nice neighbours", "to have good friends", "to worry about my daughter", "mobbing at work", "no love in life", "abuse in the family".

As it is illustrated in Fig. 3, the most popular indicators of personal relation dimension of well-being were 'Family life and family relationships', 'Personal relations in general' and 'Relations with friends'. Many respondents admitted that the well-being for them is to have good relationship in family and with surrounding persons.

In order to see what the situation is at each indicators of subjective well-being dimension 'Personal relations', all results of the research were presented to the representatives (mostly leaders) of the homogeneous groups, which participated in the research of data gathering. Afterwards they needed to agree in which situation every indicator is (possibilities: 'very bad situation', 'bad situation', 'medium situation', 'good situation' and 'very good situation'). Further, well-being indicators related to social capital and topics of interest for Salaspils inhabitants are presented (see Table 2).

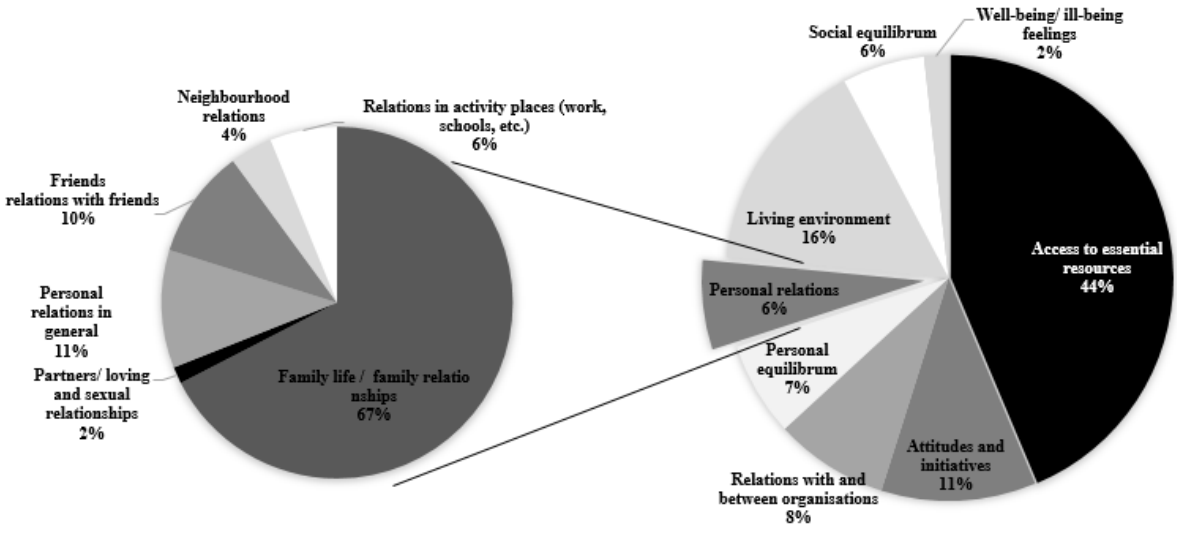

Fig. 3. Indicator Synthesis from Responses in all Homogeneous Groups in Salaspils Municipality in 2011, % (*Source*: Results of analysis of 25 homogenous groups in Salaspils – results gained from three meetings from September 2010 until May 2011 (from 2867 responses))

As illustrated in Table 2, the situation of well-being indicators representing social capital is good in Salaspils. That means there are enough pre-conditions for improving overall well-being using co-responsibility approach in decision-making processes as in society with relatively high social capital. Many problems are taken care of by social networking outside of government, and when remaining

problems are addressed through governmental intervention, administrators find a rich array of implementation allies.

Table 2. Subjective Well-being Indicators Related to Social Capital in Salaspils Municipality (*Source*: Results of analysis of 25 homogenous groups in Salaspils – results gained from three meetings. September, 2010 until May 2011(from 2867 respondents))

Well-being indicator	Family life/ family relationships	Personal relations in general	Relation with friends	Neighbourhood relations	Relations in activity places
Very bad situation	Violence in families. Dysfunctional families. Parents living abroad.	There is no mutual respect. There are intractable conflicts. People do not listen to the views of others.	Loneliness. No friends. Friends are not helping in need.	Bad relations with neighbours.	Bad atmosphere at work.
Bad situation	No stable families. Parents are not taking care of children.	There is a mutual aggression, conflict. There is no love in society. There is no harmony.	Virtual friends. Inability to get along with others.	The neighbours don't know each other and don't help in need.	Bad relationships with colleagues, negative emotions at work.
Medium situation	Stable family, careful nurturing. Families spend their free time together.	There is mutual respect, tolerance, the ability to give each other something good. There are genuine and honest relationships.	Good people all around, a lot of friends who provide moral support.	Good relations with neighbours, friendly co-existence.	Employees' needs are met. Creation and maintaining of good relations.
Good situation	Family traditions and values are taken care.	There is mutual understanding. Tolerant society.	Friends – representatives of other nationalities.	Some traditions between the neighbours. Organisation of events between neighbours.	The organisation meets the needs of employees.
Very good situation	Every family has at least two children. There is serious attitude towards the institution of marriage.	People respect each other, help in times of need. People are polite.	Good, sincere relations with people of different groups.	Cross-co-operative activities among neighbours.	No mobbing. Employees have a pleasure to go to work.
Situation in Salaspils municipality	Good situation	Good situation	Good situation	Good situation	Good situation

Another result regarding social capital included the level of participation of different NGOs of the municipality. As mentioned before, in the preparation stage of the research, a research about NGO sector in the municipality was undertaken. Overall, 25 NGOs (including non-registered organisations and interest groups) were identified. During the next step, the working group provided an analysis of their participation level in the social life of the municipality (see Table 3). It was concluded that some of the NGOs are insufficiently active (e.g. groups of youth, science workers and disabled persons) and it was decide to pay addition attention to them during the research in order to mobilise their social capital (those groups were selected by the authorities of the municipality as target groups for mobilising social capital).

Table 3. The Analysis of Participation level of NGOs in Salaspils Municipality (*Source*: Authors' construction based on observations during the meetings with homogeneous groups)

Society group	NGOs/ Homogeneous groups	Number of groups	Level of participation before the research (2010)	Level of participation after the research (2013)
Youth	The Student Councils of Salaspils First and Second High Schools	3	Low	High
Parents	School for mothers and babies; The board of parents of preschools; society of large families; Salaspils Women's Club	4	Medium	Medium
Cultural/ sport/ religion workers	Russian song ensemble**;** middle age dance group; education, culture and sport department; sport club; Lutheran church; Roman Catholic Church	4	High	High
Science workers	Institute of Inorganic Chemistry, Institute of Physics and Institute of Biology	3	Low	Medium
Municipality workers	Social service; the Union of municipality workers; council	3	High	High
Disabled people	The association of children and young people with disabilities; NGO of disabled persons	3	Medium	High
Seniors	Society of Russians; the Board of Salaspils retired people; **club**	3	Medium	Medium
Representatives from rural territories	Society 'Partnership of Stopini and Salaspils'; Initiative group of citizens of Dole island	2	Medium	Medium
TOTAL	25	25		

During the research, different mobilising techniques were used like helping them to build their administration capacity, improving dialogue with local authorities and administration of municipality, providing premises for the meeting, etc. For example, the municipality announced a project application call for NGOs for organising different events for improvement of overall well-being of society, which encouraged NGOs to work collectively, strengthening social capital. After three years of work, the working group of the research again analysed the participation level of NGOs. It was concluded that the participation level of target groups (youth, science workers and disabled persons) had improved. Those groups were actively participating in social life of the municipality, voluntarily organising different events (like science week, youth award, city festival and many others), participating in regular meetings with administration and political authority of the municipality. Using the co-responsibility approach in identification of well-being indicators and preparation and implementation of local action plan for overall well-being of the municipality, the participation in decision-making processes had increased. Also NGOs were more actively participating in social life of the municipality. Thereby, it also could be concluded that the social capital of the municipality has been mobilised and developed.

Conclusions

The concept of social capital became topical only relatively recently, but the term has been in use for almost a century while the ideas behind it go back further still. Summarizing different definitions, it could be concluded that social capital includes the links, shared values and understandings in society that enable individuals and groups to trust each other and so work together. There are 2 forms of

social capital: a bridging social capital (aimed at creating links between groups) or a bonding social capital (aimed at re-establishment of ties of a specific group).

The concept of well-being could be devided in objective (measured by indicators) and subjective well-being (self-assessment of person). During the last decades subjective well-being is on research agenda for many researches as these studies can give significant outputs describing the development of society. In addition, scientific researches documented that social capital is strongly correlated with subjective well-being in cross-sections.

It was concluded that studies on social capital with local dimension contains locally occurring shared norms and values of a community and the highest number of interactions between economic actors. A good relationships between society (different NGOs, interest groups) and municipality can facilitate the development of different public services, better governance. Social capital can therefore play an important role in local development reducing resources required for improvement of public services.

Social inclusion and participatory democracy is becoming more and more important across the EU municipalities. Different approaches have been developed to ensure participation of society in the strategic planning processes. These processes are possible due to relatively high social capital and its development. Those approaches are closely related to social inclusion and citizen engagement processes, leading to a society that is more democratic.

Research conducted in Salaspils Municipality shows that mostly society associates personal well-being with access to essential resources (material well-being), good living environment and possibility to realise their attitudes/initiatives. In addition, for citizens personal relations are also important, especially relations with family members, friends, colleagues and neighbours. The indicators analysis showed that in Salaspils, the level of those indicators are relatively high, which means that in the municipality there is relatively high social capital. In a society with relatively high social capital, many problems are taken care of by social networking outside of government, and when remaining problems are addressed through governmental intervention, administrators find a rich array of implementation allies.

The research conducted in Salaspils municipality not only shows the clear relation of social capital and well-being but also shows a good practice on how to mobilise the society in municipality with initially low level of participation (forming focus groups for research of well-being, setting up a local support group from leaders of NGOs and interest groups as a public platform, etc.).

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THE DEBTOR'S PROPERTY SELLING IN THE CROSS-BORDER INSOLVENCY PROCEEDINGS

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Abstract. The title of this research is "The debtor's property selling in the cross-border insolvency proceedings". The insolvency proceeding gets the cross-border status also in case, if a debtor is an owner of the property outside of the main interests' centre, namely, in another country. Therefore, there are many problematic cases when insolvency administrator (also called insolvency practitioner) defines the real estate in this other country and has to make a decision concerning the methods of selling the real estate in accordance with the law of the Member State in which territory the insolvency proceedings have been started. At the same time, the administrator shall provide that the property is sold in particular with regard to procedures for the realization of assets defined in the legislation of that country, where such real estate has been located. The article's aim is to give a view of the features of the sale of the property in the insolvency proceedings and to define the possible lack and improvements in the cross-border insolvency concerning the selling of a debtor's property. The European Parliament and the Council of the European Union has adopted Regulation (EU) 2015/848 of 20 May 2015 on Insolvency proceedings, which shall apply from 26 June 2017, with some exceptions Despite the regulation of the cross-border insolvency has been improved, the procedure of the property disposal is still incomplete in the cross-border insolvency proceedings. Within the study the following research methods are applied: the analytical method, comparative method, sociological method and descriptive method. The predicted value of the research is theoretical and also practical. The research should be useful for the insolvency proceedings administrators, the companies and the banks, other experts involved in the cross-border insolvency proceedings, as well as for students to improve their theoretical knowledge about the cross-border insolvency

Keywords: Law; cross-border insolvency proceedings; property, auction.

Type of the paper: Theoretical paper

JEL Classification: K330

Introduction

"If international economic law is not necessarily congruent with the laws of international economics, it is nevertheless true that economics – knowledge, faith, skepticism included – has had a strong influence on the shape and evolution of the international trade, investment, and financial transactions" (Lowenfeld, 2003:4)

In nowadays the cross-border activities are those taking place when a company is running business in more than one Member State of the European Union. For example, when the registered office and the headquarters of the company are located in Latvia, however, an affiliate or another office is located in Estonia. In these cases, therefore it is necessary to avoid incentives of the companies, upon becoming insolvent, for example, to transfer assets from one Member State to another seeking to obtain a beneficial legal position in administration of insolvency proceedings, and this may not always suit the creditors' interests.

"The proper functioning of the internal market requires that cross-border insolvency proceedings should operate efficiently and effectively" (Proposal for a Regulation, 2012:2). These objectives were not possible to achieve to a sufficient degree on the national level, and here the necessity arouse to improve the effectiveness of cross-border insolvency proceedings by means of drawing up standard

provisions regarding recognition of judgments and application of laws and regulations, to be incorporated in a single Community act, which then become directly applicable in Member States.

As result, "the Council Regulation (EC) No 1346/2000 of 29 May 2000 on Insolvency Proceedings" (hereinafter – Regulation No 1346/2000) was drawn up which for the first time laid down obligatory basic cooperation requirements "between the Member states of the European Union in regard to cross-border insolvency proceedings" (Regulation No 1346/2000, 2002). Regulation No 1346/2000 entered into force on the 31st of May 2002, in Latvia – on 1st May 2004, and is applicable to all Member States of the European Union (except Denmark).

Regulation No 1346/2000 "should apply to any insolvency proceedings, whether the debtor is a natural or legal person, a company or an individual." Before the Regulation No 1346/2000 become effective, the judgments of the Member States' courts on insolvency proceedings become effective only in the States where the particular judgments were made, and quite so often they failed to prevent from repeating similar cases of individual debt recovery in other Member States. "The provisions of the Regulation No 1346/2000, however, resulted in a substantial improvement in this field" (Regulation No 1346/2000, 2002; Saleniece, Upenieks, 2007:3).

The Regulation No 1346/2000 has changed cross-border insolvency law in Europe more than all the treaties, case law and academic writings in innumerable decades previously. As a consequence, the enactment of this measure of European law has attracted global interest and all of a sudden the developments, interpretations and application of its rules became a trend-setter in this field of law for the rest of the world. This stands in stark contrast to the times before when cross-border insolvency situations in Europe were observed and commented on, if at all, only occasionally and within small groups of insiders with rarely any impact or influence on other jurisdictions (Moss *et al.* 2009:28).

While the Regulation No 1346/2000 "is generally considered to operate successfully in facilitating cross-border insolvency proceedings within the European Union, the consultation of stakeholders and legal and empirical studies commissioned by the Commission revealed a range of problems in the application of the Regulation in practice. Moreover, Regulation No 1346/2000 does not sufficiently reflect current EU priorities and national practices in insolvency law, in particular in promoting the rescue of enterprises in difficulties. The overall objective of the revision of Regulation No 1346/2000 is to improve the efficiency of the European framework for resolving cross-border insolvency cases in view of ensuring a smooth functioning of the internal market and its resilience in economic crises. This objective links in with the EU's current political priorities to promote economic recovery and sustainable growth, a higher investment rate and the preservation of employment, as set out in the Europe 2020 strategy" (Proposal for a Regulation, 2012:3).

Therefore, "the European Parliament and the Council of the European Union, having regard to the proposal from the European Commission, have adopted Regulation (EU) 2015/848 of 20 May 2015 on Insolvency proceedings" (hereinafter – Regulation No 2015/848). "The provisions of Regulation No 2015/848 shall apply only to insolvency proceedings opened after 26 June 2017." (Regulation No 2015/848, 2015:92).

At the same time, there are several exceptions concerning the few articles entering into force, for example, Article 86, which shall apply from 26 June 2016, determines that the "Member States shall provide, within the framework of the European Judicial Network in civil and commercial matters and with a view to making the information available to the public, a short description of their national legislation and procedures relating to insolvency. The Article 24(1), which shall apply from 26 June 2018, provides that Member States shall establish and maintain in their territory one or several registers in which information concerning insolvency proceedings is published ('insolvency registers'). That information shall be published as soon as possible after the opening of such proceedings" (Regulation No 2015/848, 2015:92).

"Acts committed by a debtor before that date shall continue to be governed by the law which was applicable to them at the time they were committed. Notwithstanding Article 91 of Regulation No 2015/848, Regulation No 1346/2000 shall continue to apply to insolvency proceedings which fall

within the scope of that Regulation No 2015/848 and which have been opened before 26 June 2017" (Regulation No 2015/848, 2015:84).

The Research's aim is to give a view of the features of the sale of the property and to define the possible lack and improvements in the cross-border insolvency.

To achieve the above mentioned aim, the author will focus on the cross-border legal regulation, analyse the issues of auction of the debtor' property in the national and cross–border insolvency regulation, and define the lack and possible improvements of the cross-border regulation. Within the study the following research methods are applied: the analytical method, comparative method, sociological method and descriptive method.

The Concept of the Cross-border Insolvency

To understand the "cross-border insolvency proceedings, it would be necessary to start with the insolvency proceedings. Usually, there are two types of the insolvency proceedings – voluntary and involuntary insolvency" (Garner, 2001:60), where voluntary insolvency is a bankruptcy proceeding initiated by the debtor, and involuntary insolvency is a bankruptcy proceeding initiated by the creditor to force the debtor to declare bankruptcy or be legally declared bankrupt (Garner, 2001:60).

In the United States very popular is insolvency reorganization before the winding-up procedure. A fraudulent conveyance occurs when a debtor conveys or transfer funds or assets for the purpose of defrauding its creditors. The third party that receives the funds or assets from the debtor typically provides little or no consideration in return. Both the Bankruptcy Code and state law invalidate these conveyances or transfers (Haas, 2004:260).

A fundamental issue in international insolvency law is whether the effects of an insolvency proceeding are to be universal (Viimsalu, 2009:32), i.e. in all countries where assets of the debtor are situated, or whether territoriality restricted "insolvency proceedings may be opened in each country" (Virgós, Garcimartín, 2014:11). The "rules of jurisdiction set out in the Regulation No 1346/2000 establish only international jurisdiction" (Torremans, 2002:157) to open insolvency proceedings. Article 3 of the Regulation No 1346/2000 regulates the relationship between main and territorial insolvency proceedings and the requirements pursuant to which they may be opened (Torremans, 2002:157).

For example, in Latvia, the "insolvency proceedings of a legal person are an aggregate of measures of a legal nature, within the scope of which the claims of creditors are settled from the property of a debtor, in order to promote the honoring of the debtor's obligations. The insolvency proceedings of a legal person can be voluntary and involuntary insolvency proceeding. While the insolvency proceedings of a natural person are an aggregate of measures of a legal nature whose aim is to satisfy the claims of creditors as much as possible from the property of a debtor and provide the opportunity for a debtor whose property and income is insufficient to cover the entire obligations to be released from the obligations which have not been honored and to restore solvency" (Insolvency Law of the Republic of Latvia, 2010:4). In this case the insolvency proceedings of a natural person can be only voluntary insolvency proceeding.

The Regulation 1346/2000 stipulates that the "main insolvency proceedings shall be opened in the Member state where debtor's center of main interests is situated. Centre of main interest should correspond to a place where the debtor conducts the administration of his interests on regular basis and is therefore ascertainable by third persons. For natural persons their center of main interest normally should be their place of habitual residence" (Regulation No 1346/2000, 2002:13).

At the same time the "presumptions that the registered office, the principal place of business and the habitual residence are the center of main interests should be rebuttable, and the relevant court of a Member State should carefully assess whether the center of the debtor's main interests is genuinely located in that Member State. In the case of a company, it should be possible to rebut this presumption where the company's central administration is located in a Member State other than that of its registered office, and where a comprehensive assessment of all the relevant factors establishes, in a manner that is ascertainable by third parties, that the company's actual center of management and

supervision and of the management of its interests is located in that other Member State" (Regulation 2015/848, 2015:30).

"In the case of an individual not exercising an independent business or professional activity, it should be possible to rebut this presumption, for example, where the major part of the debtor's assets is located outside the Member State of the debtor's habitual residence" (Regulation No 1346/2000, 2002).

Although there is now a broad consensus at least in theory that the principle of universality is the better solution in a globalized world, because it also reduces the cost of the credit by allowing ex ante more efficient assignment of capital and reduces ex post the rush "by the creditors to request the opening of insolvency proceedings" (Virgós, Garcimartín, 2014:15). However, the universal model can be modified, for example, a) by allowing certain subordinated territorial insolvency proceedings to run concurrently alongside the main insolvency process; b) by allowing, under certain conditions, "the opening of territorial insolvency proceedings without the need to open proceedings with universal scope; or c) by establishing exceptions to the application of the *lex fori concursus"* (Virgós, Garcimartín, 2014:16). So, universal proceduralism, have been introduced (Janger, 2007:819).

Therefore, it is necessary to regulate such cross-border insolvency actions to achieve the balance between the claims of creditors and the selling of the property of a debtor.

Main Insolvency Proceedings

In general, the main insolvency proceedings are the most popular proceedings within the cross-border insolvency process. A number of legal issues, in addition to the national laws and regulations governing the opening of the proceedings, are governed by the Regulation 1346/2000 and from June 26 of 2017 the Regulation 2015/848, including the following:

- The duty to notify on individual basis the creditors of "other Member States on the opening of the main insolvency proceedings" (Regulation No 1346/2000, 2002);
- The authority of the creditors, whose "habitual residence, domicile or registered office is located in the territory of the European Union, to lodge claims" within the scope of the main insolvency proceedings and secondary insolvency proceedings (Regulation No 1346/2000, 2002; Saleniece, Upenieks, 2007:4);
- "When main insolvency proceedings are opened, the territorial insolvency proceedings shall become secondary insolvency proceedings" (Regulation 2015/848, 2015:3).

The main insolvency proceedings have the following effects:

- "Assets that are situated outside the territory of the State where the main insolvency proceedings were opened, except for the assets of secondary insolvency proceedings, are deemed to be a subject of this proceedings as from the date of opening thereof" (Dirix, Sagaert, 2006:59);
- The scope of the main insolvency proceedings includes all creditors, with the exception of secondary insolvency proceedings;
- An insolvency proceedings opened in one Member State shall have the same effects in all Member States. The recognition of the effects of insolvency proceedings in other Member States shall take place automatically and it will not be subject to formal procedure for recognition of judgments made by foreign institutions or previous notice. "In order for Regulation 2015/848 to apply, proceedings (comprising acts and formalities set down in law) should not only have to comply with the provisions of this Regulation, but they should also be officially recognized and legally effective in the Member State in which the insolvency proceedings are opened" (Regulation 2015/848, 2015). "This recognition includes the termination of the debtor's authority to dispose of the assets. It also puts an end to a judgment that results in executing in favor of an individual creditor" (Wessels, Omar, 2009:9);
- The liquidator of the "main insolvency proceedings shall be empowered to operate in other Member States of the European Union" as well (Regulation 1346/2000, 2002:36). "Such provision empowers any liquidator to participate in other proceedings. The aim of this

provision is to better ensure the presence of creditors and the expression of their interests through the liquidator. In order to resolve the frequent absence of creditors, the provision allows the liquidator to attend creditors' meetings" (Wessels, Omar, 2009:34);

- "Prohibition to realize the existing debtor's assets on individual basis in other Member States of the European Union" (Regulation No 1346/2000, 2002; Saleniece, Upenieks, 2007:5).

"In cases where the debtor's center of main interests is located in a Member State, the courts of other Member States have no power to open main insolvency proceedings. However, any of those States may open territorial proceedings, if the debtor has an 'establishment' in the territory of that State. This is called a secondary proceeding" (Wessels, Omar, 2009:37)

Secondary Insolvency Proceedings

"To protect the creditors interests, the Regulation 1346/2000 and Regulation 2015/848 allows Secondary insolvency proceedings to be opened in another Member State, which would run in parallel to the main insolvency proceedings. Their effects shall be restricted to the debtor's assets situated within the territory of that other Member State" (Regulation No 1346/2000, 2002; Regulation 2015/848, 2015; Saleniece, Upenieks, 2007:7).

The competent court of the Member State empowered to open secondary insolvency proceedings needs to examine "whether the court of another Member State, empowered to open main insolvency proceedings, opened insolvency proceedings within the meaning of Article 2 (a) of the Regulation 1346/2000 as listed in Annex A of the Regulation 1346/2000 and whether its judgment is effective" (Regulation 1346/2000, 2002). In order to do that the competent court of the Member State which has jurisdiction "to open main insolvency proceedings has to clearly express in the judgment that it has jurisdiction within the meaning of Article 3 (1) of the Regulation 1346/2000, and that main insolvency proceedings listed in Annex A of the Regulation 1346/2000 have been opened" (Regulation 1346/2000, 2002).

Such a provision to express clearly what set of insolvency proceedings are "being opened by the competent court of Member State may be inserted into the national laws of the Member States" (Jakubecki A., 2013:241). "In order to state whether the judgment opening of insolvency proceedings concerns main or secondary insolvency proceedings, the national laws of the Member States should be amended accordingly, if the court has no legal grounds to clearly specify its international jurisdiction and type of the insolvency proceedings opened in a given case" (Viimsalu, 2009:39).

"According to the Virgós-Schmit Report the concept and definition of establishment was the subject of intensive debate from the very beginning of the territorial insolvency proceedings, because it is linked to the basis of international jurisdiction to open secondary insolvency proceedings" (Viimsalu, 2009:42).

Fletcher states that the key concept "in relation to the opening of secondary insolvency proceedings is the existence of an "establishment" belonging to the debtor" (Fletcher, 2005:375). Thus, what are the main problems which may be faced by the "courts of the Member States empowered to open secondary insolvency proceedings implementing the concept of establishment, which is according to Article 2 (h) of the Regulation 1346/2000 based on the following criteria: any place of operations, non-transitory nature of economic activity and utilization of human means and goods" (Viimsalu, 2009:46).

The stay of "secondary insolvency proceedings may be requested by the administrator in the main insolvency proceedings provided that it is in the capacity to take discharge the potential request of the court to take any suitable measures to guarantee the interests of the creditors in secondary insolvency proceedings" (Regulation 2015/848, 2015:37).

Such order has been defined in the Regulation 2015/848 "in order to avoid the opening of secondary insolvency proceedings. In Article 36 of the Regulation 2015/848 is noted that in order to avoid the opening of secondary insolvency proceedings, the insolvency practitioner in the main insolvency proceedings may give a unilateral undertaking (the 'undertaking') in respect of the assets located in

the Member State in which secondary insolvency proceedings could be opened, that when distributing those assets or the proceeds received as a result of their realization, it will comply with the distribution and priority rights under national law that creditors would have if secondary insolvency proceedings were opened in that Member State" (Regulation 2015/848, 2015:36).

The "undertaking shall specify the factual assumptions on which it is based, in particular in respect of the value of the assets located in the Member State concerned and the options available to realize such assets. The undertaking shall be made in writing and in the official language or one of the official languages of the Member State where secondary insolvency proceedings could have been opened, or, where there are several official languages in that Member State, the official language or one of the official languages of the place in which secondary insolvency proceedings could have been opened" (Stones, 2015; Regulation 2015/848, 2015:36).

The "undertaking shall be approved by the known local creditors. The rules on qualified majority and voting that apply to the adoption of restructuring plans under the law of the Member State where secondary insolvency proceedings could have been opened shall also apply to the approval of the undertaking. The insolvency practitioner shall inform the known local creditors of the undertaking, of the rules and procedures for its approval, and of the approval or rejection of the undertaking" (Regulation 2015/848, 2015:36).

It should be stressed that by its nature secondary insolvency proceedings are not a special type of proceedings. The Regulation 1346/2000 modifies conditions to open secondary insolvency proceedings laid down by the applicable national law in two aspects: the "requirement for the de facto insolvency of the debtor established by national law does not need to be satisfied; the recognition of the decision opening main insolvency proceedings makes any further examination of the debtor's insolvency in other Member States unnecessary; and the right to request the opening of secondary insolvency proceedings is vested directly to the liquidator of the main insolvency proceedings" (Regulation 1346/2000, 2002:27).

The court seized of a "request to open secondary insolvency proceedings shall immediately give notice to the insolvency practitioner or the debtor in possession in the main insolvency proceedings and give it an opportunity to be heard on the request. But here an undertaking has become binding in accordance with Article 36 of the Regulation 2015/848, the request for opening secondary insolvency proceedings shall be lodged within 30 days of having received notice of the approval of the undertaking" (Regulation 2015/848, 2015:38).

In general, due to the many consummates the Regulation 2015/848 improves the "efficiency of the European framework for resolving cross-border insolvency cases in view of ensuring a smooth functioning of the internal market and its resilience in economic crises" (Regulation 2015/848, 2015).

The Debtor's Property Selling

The purpose of the insolvency proceedings "is to promote the honoring of the obligations of a debtor in financial difficulties and, where possible, the renewal of solvency, applying the principles and lawful solutions specified in the Law. Hence, in the Member States the most important is to promote the honoring of the debtor's obligations from the property of a debtor" (Insolvency Law of the Republic of Latvia, 2010:1).

The property in the general comprehension "means any external thing over which the rights of possession, use, and enjoyment are exercised" (Garner, 2001:563). In Latvia Insolvency Law of the Republic of Latvia Article 93(1) provides that "within the meaning of this Law, the property of a debtor is the immovable property and moveable property of a debtor, including funds; funds acquired by alienating the property of a debtor; the property recovered in accordance with this Law; fruits that have been acquired from the property of the debtor during the insolvency proceedings of a legal person; and other property legally acquired during the insolvency proceedings of a legal person" (Insolvency Law of the Republic of Latvia, 2010:93).

Suppose, for example, that the debtor defaults on its obligation to repay interest. This will generally lead to an acceleration of the obligation to repay the principal amount. If the debt is secured by property, the insolvency administrator may then proceed to enforce the security interest – that is, to enforce the lien (Klein, Coffee, 2004:259). This would involve a procedure leading to the selling of the property to satisfy the claims of the bondholders.

In Latvia it is necessary to apply to the insolvency proceedings the general principles, like, the "principle of the preservation of rights – the rights of creditors acquired prior to proceedings shall be observed during the proceedings; the principle of effectiveness of proceedings - such measures which allow the objective of the proceedings to be achieved in a most complete manner with the least resources shall be applicable within the scope of proceedings; the principle of quick turnover – the task of the proceedings is to maintain a commercially lawful quick turnover, the sale of the property of a debtor shall be performed in order to ensure the return thereof to commercially lawful circulation as quickly as possible; principle of transparency – in order to ensure credibility, information regarding proceedings must be accessible to all persons involved in the proceedings, thereby promoting the observation of the interests of these persons and the achievement of the objectives of the proceedings" (Insolvency Law of the Republic of Latvia, 2010:6).

Each Member State's normative acts intend different methods of "sale of the property of a debtor coordinated with the secured debtor - with or without an auction" (Insolvency Law of the Republic of Latvia, 2010:113). For example, Insolvency Law of the Republic of Latvia Article 113 defines that insolvency "administrator shall include the information in the plan for the sale of the debtor's property concerning the methods of sale of the non-pledged property of a debtor - with or without an auction" (Insolvency Law of the Republic of Latvia, 2010:113).

Similar situation is also in the Bankruptcy Act of the Republic of Estonia where Article 136 provides that "bankruptcy estate is sold by auction pursuant to the procedure provided by the Code of Enforcement Procedure and the starting price of assets shall be determined by the trustee and approved by the bankruptcy committee" (Bankruptcy Act of the Republic of Estonia, 2004:136). Then Article 137 provides that a "general meeting of creditors may require the trustee by a precept to sell the assets without an auction if the sale of assets in another manner is more profitable" (Bankruptcy Act of the Republic of Estonia, 2004:137).

In Latvia Insolvency Law Article 115 provides that if "debtor's property is sold at auction, the auction thereof shall be carried out and the ownership rights recorded in the beneficiary's name in accordance with the provisions of the Civil Procedure Law regarding the sale of property in a compulsory auction, unless otherwise prescribed by this Law. Also, the sale of the property of the debtor serving as security (pledged property) shall take place in auctions in accordance with the procedure specified in the Civil Procedure Law, if the secured creditor has not agreed with the administrator on the sale of property without an auction. The administrator shall perform the activities of the bailiff specified in the Civil Procedure Law in respect of the auction of the debtor's property. By agreeing with the secured creditor on the sale of pledged property, the administrator shall ensure that this property is sold for as high a price as possible, taking into account the interests of non-secured creditors" (Insolvency Law of the Republic of Latvia, 2010:115).

In Estonia the Bankruptcy Act Article 139 provides "if a trustee sells an immovable included in the bankruptcy estate at an auction, only such rights encumbering the immovable which have a ranking higher than the right which was entered first in the land register and according to which forced sale of the immovable may be demanded remain in force. The rest of the rights encumbering the immovable which are entered in the land register are deemed to have extinguished. The rights entered in the land register which have the same ranking as the right which was entered first in the land register and according to which forced sale of the immovable may be demanded remain in force only if forced sale of the immovable cannot be demanded according to such rights" (Bankruptcy Act of the Republic of Estonia, 2004:139).

In the local insolvency proceedings in general there are no difficulties in the selling procedure of the debtor's property. The problems arise at the moment when insolvency proceedings administrator

establishes the property in the different Member State and they are mostly related to the selling procedure due to the law of the Member State where the immovable property is located.

The frontal problem is the lack of the information; therefore, insolvency practitioner does not get the information about possible property in different Member States or outside the European Union.

The Property Selling Lack in the Cross-border Insolvency Proceedings

"In nearly all the European Union Member States, contracts covering immovable property are subject of the special rules. This means that both on a level of conflict of laws as well as on the level of international jurisdiction, one has to take into account several interests. The main categories are the interests of the parties to the contract and the general interests protected by the State in which the immovable property is to be found. Protection of these specific interests were considered to justify an exception to the application of the law of the State of the opening of the proceeding. Therefore, Regulation 1346/2000 Article 8 makes the effects of the insolvency proceedings solely subject to the law of the Member State where the immovable property is located. The word 'solely' illustrates that only and exclusively the law of the Member State of the location of the immovable property (*lex rei sitae*), and not the *lex concursus* under Article 4, is applicable to establish these effects." (Wessels, 2006:21)

In practice insolvency administrators face several problems during the selling process of the immoveable property, which is located in another Member State.

The Article 4(1) of the Regulation 1346/2000 defines that "save as otherwise provided in that Regulation, the law applicable to insolvency proceedings and their effects shall be that of the Member State within the territory of which such proceedings are opened. Then, the Article 18 (3) regulates that in exercising his powers, the liquidator shall comply with the law of the Member State within the territory of which he intends to take action, in particular with regard to procedures for the realization of assets. Those powers may not include coercive measures or the right to rule on legal proceedings or disputes" (Regulation 1346/2000, 2002: 4,18).

Similar regulation is in the Regulation 2015/848 and its Article 21 provides that in "exercising its powers, the insolvency practitioner shall comply with the law of the Member State within the territory of which it intends to take action, in particular with regard to procedures for the realization of assets. Those powers may not include coercive measures, unless ordered by a court of that Member State, or the right to rule on legal proceedings or disputes" (Regulation 2015/848, 2015:21).

The terminology "shall comply" in English appears to be stricter than various other text, see the Netherlands "eebiedigen", french: "doit respecter", which is the equivalent of "to respect". Therefore, the "principle of the *lex concursus* of main insolvency proceedings stays intact, with due respect to the *lex fori* of the other Member State, in as far as it concerns taking actions, more specifically procedures for the realization of assets" (Wessels, 2012:681).

The *lex concursus* establishes the "extent of the powers of the insolvency administrator and the manner in which such powers may be exercised. Only the *lex fori concursus* of the main proceedings is decisive with regards to, for example, whether the sale of immoveable property can be a private market transaction or if a sale by public auction is necessary. Once the *lex concursus* has determined the form of sale, the procedures by which the assets are realized must be in accordance with the provisions of the national law of approached Member State. If the *lex concursus* requires a sale by public auction, the procedure for carrying out this sale in the State where the immoveable property is situated shall therefore be determined by the Law of that latter State" (Verweij, Wessels B., 2010:186).

Not clear is the situation when in the main proceedings State, the immoveable property is possible to be sold only on the public auction. So far, it should be clear that insolvency administrator makes a decision to sell the property at an auction. According to the "principle *lex concursus,* which determines the form of sale" (Verweij, Wessels B., 2010:186), insolvency administrator should realize selling procedure in accordance with the provisions of the national law of approached Member State,

where the property is located. Then insolvency administrator finds out that in this Member State it is possible to "sell the property at an auction" (Insolvency Law of the Republic of Latvia, 2010:113), but the problem is that such auction can be organized only through special electronic means and only local insolvency administrators have an access to such auction system. Therefore, insolvency administrator concludes that he/she cannot register to obtain access to the electronic auction system and sell the property like the main proceedings insolvency administrator.

Such situation is unacceptable, because Regulation defines that the "insolvency practitioner appointed by a court which has jurisdiction pursuant to Article 3(1) may exercise all the powers conferred on it, by the law of the State of the opening of proceedings; the insolvency practitioner may, in particular, remove the debtor's assets from the territory of the Member State in which they are situated" (Regulation 1346/2000, 2002:21).

The author supposes that to resolve the mentioned problem it would be necessary to provide that all property selling procedures by public auction should be organized by using electronic means within the European Union. Such electronic auction system is already applicable in Latvia (insolvency administrators sell debtor's property in the electronic auction site – www.izoles.ta.gov.lv since 1st January of 2016), besides similar procedure is in Estonia, Lithuania, Hungary and Czech Republic (Ķirsons, 2015).

The electronic auctions are created to prevent problems in the field of auction relating to its participants' interpersonal possibility of reducing the person dishonest or unlawful conduct of the feasibility of real estate auctions. In addition, it is contemplated that the electronic auction makes more comfortable and more economical auction process, thereby it is possible to recover a larger amount of means to cover creditors' claims (The Cabinet Republic of Latvia 16.06.2015. "Rules of electronic auctions site" No 318).

So, if each Member State provides that the public auctions are organized by official electronic site, then it would be useful and effective to unify electronic auction sites. Thus, it would be possible to organize the "interconnection of such electronic auction registers via the European e-Justice Portal" (Proposal for a Regulation, 2012).

Regulation 1346/2000 and Regulation 2015/848 provide that "where the center of the debtor's main interests is situated within the territory of a Member State, the courts of another Member State shall have jurisdiction to open insolvency proceedings against that debtor only if it possesses an establishment within the territory of that other Member State. The effects of those proceedings shall be restricted to the assets of the debtor situated in the territory of the latter Member State" (Regulation 1346/2000, 2002; Regulation 2015/848, 2015).

The author supposes that another solution to the problem that insolvency administrators cannot or it is difficult to sell the immoveable property, which is located in another Member State, would be to permit to open the secondary proceedings at the Member State, where property is located, without any requirement for establishment within the territory of that Member State.

Therefore, it is necessary to consummate the Regulation 2015/848 Article 3 (2) and provide that "where the center of the debtor's main interests is situated within the territory of a Member State, the courts of another Member State shall have jurisdiction to open insolvency proceedings against that debtor only if it possesses an establishment within the territory of that other Member State. The effects of those proceedings shall be restricted to the assets of the debtor situated in the territory of the latter Member State" (Regulation 2015/848, 2015:3). In case it is impossible or too complicated to sell the immoveable property, which is located in another Member State, the courts can open the secondary insolvency proceedings.

The Transparency of Cross-border Insolvency Procedures

One of the problems "concerning the procedural framework for determining jurisdiction" (Proposal for a Regulation, 2012) is lack of information about the possible property in the other Member States or somewhere else. At this moment insolvency administrator can find the information about debtor's

property in the local public registers. Not always the representative of a debtor performs duties in good faith.

In Latvia "the representative of a debtor has the duty to provide the information requested by the court or administrator regarding the debtor without delay, but not later than within 10 days following the day of sending the request, besides the representative of the debtor shall submit the requested information or the appropriate notification that he or she is unable to submit in writing the information requested, certifying this with his or her signature" (Insolvency Law of the Republic of Latvia, 2010:71).

In case the representative of a debtor does not perform duties in good faith and does not submit information requested by insolvency administrator, it is complicated to establish the debtor's property in the other Member State.

In Latvia since 1st March of 2015 is in force Article 72^1 of Insolvency Law which provides the liability of the representative of a debtor. The mentioned Article provides that Members of the Board of a debtor jointly liable for the damages, if they do not transfer requested information, like, debtor's accounting documents, or such documents are in a very bad condition, therefore insolvency administrator cannot evaluate the financial situation over the past three years prior to the insolvency proceedings. The amount of mentioned damages is presumed as the claims of creditors amount in general, which is not possible to cover during the debtor's insolvency proceedings. The insolvency administrator prepares and submits such claim to the court (Insolvency Law of the Republic of Latvia, 2010:72^1). Despite the amendments in Insolvency Law, in Latvia there is still a problem that insolvency administrator is not able to get all the information about debtor's property.

Significantly, that Regulation 2015/848 provides innovation concerning the transparency of cross-border insolvency procedures. The "certain minimum information relating to the insolvency proceedings has to be published in an electronic register available to the public free of charge via the internet" (Proposal for a Regulation, 2012: 6).

"In order to facilitate access to that information for creditors and courts domiciled or located in other Member States, this Regulation 2015/848 provides for the interconnection of such insolvency registers via the European e-Justice Portal. Member States will be free to publish relevant information in several registers and it will be possible to interconnect more than one register per Member State. Till 26 June of 2018 all Member States have to establish and maintain in their territory one or several registers in which information concerning insolvency proceedings is published ('insolvency registers'). That information shall be published as soon as possible after the opening of such proceedings" (Regulation 2015/848, 2015, 24).

Author thinks that very positive innovation in the Regulation is Article 86 providing that the Member States "organize within the framework of the European Judicial Network in civil and commercial matters and with a view to make the information available to the public, a short description of their national legislation and procedures relating to insolvency" (Regulation 2015/848, 2015:86). This provision will be in force from June 26 of 2016 and will help insolvency administrators to find out the necessary information about the debtor's property selling methods.

Author supposes that such innovation will improve and provide an effective administration of cross-border insolvency proceedings, also will "improve the effectiveness of the insolvency proceedings in cases where the debtor has an establishment in another Member State" (Proposal for a Regulation, 2012).

Unfortunately, such innovation does not resolve the lack of information about debtor's property, which is located in the other Member State. Therefore, author supposes that by analogy with the insolvency registers it should be necessary to include in the Regulation a provision ensuring that Land register offices or similar institutions in all Member states interconnect in one register that would be available to the insolvency administrators.

Such possibility to receive the information from the Land register offices is evaluated positive and will help insolvency administrators to achieve the purpose of the insolvency law and "promote the

honouring of the obligations of a debtor in financial difficulties and, where possible, the renewal of solvency, and to renew the ability of a debtor to settle their debt obligations when a debtor has financial difficulties" (Insolvency Law of the Republic of Latvia, 2010:1).

Conclusions

European Parliament and the Council of the European Union, having regard to the proposal from the European Commission, have adopted Regulation (EU) 2015/848 of 20 May 2015 on Insolvency proceedings, which improves the "efficiency of the European framework for resolving cross-border insolvency cases in view of ensuring a smooth functioning of the internal market and its resilience in economic crises" (Regulation 2015/848, 2015).

Where local law provides for certain formal procedure for the realization of assets, the insolvency administrator shall comply with the law of the State in which the assets are located. The insolvency administrators exercising its powers, have problems to comply with the law of the Member State, where immovable property is located, because the "law applicable to insolvency proceedings of the Member State within the territory of which such proceedings are opened" (Regulation 2015/848, 2015).

The author supposes that to resolve the problem that insolvency administrators cannot or it is difficult to sell the immoveable property, which is located in another Member State, it would be necessary:

- to provide that within the European Union all property selling procedures by public auction should be organized by using electronic means. Thus, it would be possible to unify electronic auction sites and organize the "interconnection of such electronic auction registers via the European e-Justice Portal" (Proposal for a Regulation, 2012), or;
- to permit opening of the secondary proceedings at the Member State, where property is located, without any requirement for establishment within the territory of that Member State. Therefore, it would be useful to consummate the Regulation 2015/848 Article 3 (2) and provide that "where the center of the debtor's main interests is situated within the territory of a Member State, the courts of another Member State shall have jurisdiction to open insolvency proceedings against that debtor only if it possesses an establishment within the territory of that other Member State. The effects of those proceedings shall be restricted to the assets of the debtor situated in the territory of the latter Member State" (Regulation 2015/848, 2015:3). *In case it is impossible or too complicated to sell the immoveable property, which is located in another Member State, the courts can open the secondary insolvency proceedings.*

One of the problems concerning the "procedural framework for determining jurisdiction" (Proposal for a Regulation, 2012) is lack of information about the possible property in the other Member State or somewhere else. The author supposes that by analogy with the insolvency registers in order to achieve the Insolvency law purpose it should be necessary to include in the Regulation 2015/848 a provision ensuring that Land register offices or similar institutions in all Member states interconnect in one register that would be available to the insolvency administrators.

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THE ISSUES OF THE MANAGEMENT OF RECEIVABLES: LITHUANIAN CASE

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Abstract. Constant changes in business environment determine the significance of receivables to business. The analysis of the current situation in Lithuania has revealed that a substantial part of business enterprises are facing the problem of overdue receivables. This issue emerged as extremely topical after the beginning of the economic crisis in 2008. A number of scientific studies confirmed that the level of receivables has a significant impact not only on smooth business operation but also on operational results and serves as the cause of numerous economic and social problems, faced by both business enterprises and the state. Rising level of receivables determines slower recovery of total economics because it has a negative impact on the sustainability of the public sector of the country. In addition, the scientists highlight economic problems such as production capacity losses, general decrease in competitiveness and failure to satisfy the debt claims. The social problems include the increase in unemployment rate, fall of living standards, dissatisfaction with poor economics of the country and uncertainty about the future. The aim of this article is to analyse the impact of receivables on business in Lithuania. The methods of the research include scientific literature analysis and statistical data analysis.

Keywords: *receivables; management of receivables; Lithuania.*

Type of the paper: Empirical study

JEL Classification: M21.

Introduction

The effects of economic crisis, which determined the decline of gross domestic product (GDP), rise of unemployment rate and reduction of consumption in both domestic and export markets, can still be felt in current economies. The economic crisis has also had a negative impact on businesses that are still dealing with the problem of high level of receivables. Although it is the case that particular rate of risk is inherent to business, credit risk is one of the types of risk that can have the most detrimental effect on the solvency of business companies (Jasienė, Laurinavičius 2009). Under such circumstances, it is necessary to focus on the analysis, management and control of receivables because the efficiency of debt management has a direct impact on a company's turnover and other critical operational indicators. On the contrary, improper debt management has a negative impact on a company's operational results. Owing to the relatively complicated economic situation, banks are inclined to establish extremely high requirements for credit issuance. Hence, not all business companies are able to comply with the established requirements. For this reason, companies have to control their receivables to escape the shortage of working capital. Receivables as well as the issues of their management have always had a significant impact on business operation results. However, the economic crisis of 2008 determined even faster rise of debt level, which has disclosed the urgency of debt management and the benefits of proper management of receivables on business efficiency.

Both Lithuanian and foreign scientific studies still lack the comprehensive research on the issue of the management of receivables in the private sector. Some scholars (Snieška, Drakšaitė 2013; Ribeiro *et al.* 2012; Sokolov, Sokolova 2012) analysed the issues of public debt and its impact on the economics of the country. Snieška and Drakšaitė (2013) studied the sustainability of public debt in small open

economies and the impact of the public debt on economic growth. The influence of public debts on economic growth of the European States as well as public debt advantages and disadvantages were analysed by Ribeiro *et al.* (2012). According to Sokolov and Sokolova (2012), who researched the development and determinants of public debt, the issues of public debt have earned rather sufficient scientific attention, although they remain topical in the area of state management. The scientists (Sokolov, Sokolova 2012) noted that global financial crisis of 2008 forced state governments to increase public debt in order to develop private sector and sustain the stable economic situation.

High level of debts is also inherent to private sector. The companies that fail to manage and control their receivables in an appropriate manner, are eventually forced to deal with the problem of insolvent customers. As a result, they lose a significant share of their working capital and delay wage payments, which, in turn, determines lower purchasing power of a country's population and burdens the overall economic growth.

The object of this research is the issues of the management of receivables in Lithuanian business companies. The aim of this article is to analyse the impact of receivables on business in Lithuania. The methods of the research include scientific literature analysis and statistical data analysis.

Literature Review

According to Malinauskas (2014), risk is inherent to any business, and debt risk refers to the type of risk that has the most significant impact on business efficiency. The issue of receivables has become extremely topical for both domestic and global businesses that operate under conditions of economic crisis. With reference to Kaleininkaitė and Trumpaitė (2007), management of receivables is one of the most urgent issues for business companies all over the EU. In accordance with Aleknavičienė and Girdžiūtė (2009) and Lamminmaki and Leitch (2011), receivables compose a substantial share of assets in business balance sheets. Lamminmaki and Leitch (2011) noted that nearly 80 percent of transactions are based on sales of goods or services for credit. The analysis of the scientific literature has revealed that a number of scientists – Snieška, Drakšaitė (2013), Ribeiro *et al*. (2012), Sokolov, Sokolova (2012) and others – have researched the issues of public debt and its impact on economics, whereas the issues of debts in private sector have not earned sufficient scientific attention. According to Charitonov (2004), both global and Lithuanian economics are facing the problems of business insolvency. The author proposed that a company's ability to react to ongoing changes as well as business managers' knowledge, perception and comprehension highly determines business success and general existence. This attitude was supported by Norvaišienė and Stankevičienė (2012), with reference to whom, debt level influences not only business activities but also operational results.

Receivables refer to credits, ensured to customers by suppliers. Considering the nature of receivables, they can be treated as a substitute to bank loans (Badu *et al.* 2012). Hence, the level of receivables is likely to increase during the periods of economic recession when the volumes of issued bank loans decline (Jasienė, Laurinavičius 2009).

The analysis of the scientific literature has enabled to systematise the findings of previous scientific studies on the determinants of receivables (see Table 1).

Table 1. Receivable debt determinants (Source: authors' compilation)

Author(s), (year)	Determinants
Brennan *et al.* (1988)	Receivables provide an opportunity of price discrimination. However, supplier's credit and assurance of discounts for earlier payment allow to employ this measure
Boissay (2004)	Receivables determine information asymmetries among companies, suppliers and banks
Lamminmaki, Leitch (2011)	Receivables refer to a sales policy measure that allows to attract new customers
Snieška, Drakšaitė (2013)	Receivables allow to reduce transaction costs in case of frequent purchases
Owusu-Manu *et al.* (2014)	Receivables provide an access to capital for construction contractors globally and is an important source of finance in both developed and developing countries

Chludek (2011)	Employment of receivables has some cost saving advantages; receivables offer flexibility (by offering the possibility to pay invoices flexibly within a certain time frame, trade credit use improves cash flow synchronisation, in this way reducing the (opportunity) costs of paying and managing invoices); receivables are generally automatically granted at purchase by the supplier's general terms and conditions, so that financing is directly available at purchase, thereby avoiding the transaction costs associated with the procurement of other funds; receivables serve as implicit quality insurance because the customer can inspect the quality of delivered goods or services during the net period, verifying quality before payment.
Badu *et al.* (2012)	Employment of receivables serves as a financial intermediation device whereby construction vendors act as financial providers to their customers through deferred payments of goods purchased
Norvaišienė, Stankevičienė (2012)	Receivables promote customers' trust in an enterprise and speak about the ability of this enterprise to operate flexibly
Boden, Paul (2014)	Managed effectively, receivables can confer competitive advantage in terms of information and signalling, customer relationships and financing of working capital
Han *et al.* (2013)	Receivables (or trade credits), as one off substitution, give another access to SME finance
Nobanee, Abraham (2015)	Receivables are used as a sales policy measure; they allow to adjust sensitivity of working capital management to the conditions of market imperfection

Summarising the data presented in Table 1, it can be stated that in some cases, receivables are used with the purpose to increase sales or emerge as a result of information asymmetry or mutual agreement. In accordance with Norvaišienė and Stankevičienė (2012), debtors usually believe that they will be able to pay all their creditors. Mackevičius and Rakštelienė (2005) argued that indebtedness, in fact, causes numerous economic and social problems not only for business companies but also for the state. They distinguished the following economic problems: 1) production capacity losses, 2) general decrease in the competitiveness of country's economics, 3) reduced amounts of taxes collected in the state budget, and 4) failure to satisfy debt claims. Mackevičius and Rakštelienė (2005) also highlighted the following social problems, determined by indebtedness: 1) increase in unemployment rate, 2) fall of the general living standards, 3) population's dissatisfaction with poor economics of the country, and 4) uncertainty about the future.

The authors noted that it is difficult to determine which – economic or social – problems have more significant impact on the development of the state because both of them influence business continuity and population's life standards. According to Kaleininkaitė and Trumpaitė (2007), lack of experience in debt risk management in dynamic competitive markets determines insufficiently reasoned decisions and negative effects on business.

Thus, receivables must be considered with appropriate accuracy because they not only influence a company's operational efficiency and results but also have the impact on a country's overall economics and population life standards. The majority of scientists agree that debts in private sector affect both business efficiency and economics of the country (see Table 2).

Table 2. The impact of debt ratio increase on business and economy (Source: compiled by the authors with reference to Kuizinaitė and Paliulytė (2008), Liu and Rosenberg (2013) and OECD (2012))

Author(s), year	Research results
Kuizinaitė and Paliulytė (2008)	Constantly increasing debt ratio deepens financial problems, increases risk and reduces the stability of economy
Liu, Rosenberg (2013)	Rising debt ratio slows down economic revival since high level of debts in the private sector deteriorates sustainability of the public sector
OECD (2012)	High debt ratio burdens smooth operation and investment, which makes country's economy vulnerable. Such findings confirm the results of previous scientific research on this topic

Owing to the reasons, explicated in Table 2, debt risk management has become an extremely important issue because each businessperson seeks not only to maintain one's business but also to

compete successfully in the dynamic markets, at the same time, promoting revival and stability of economics. Dooley (2000) noted that optimal debt management balances the earnings and expenses, incurred because of customers' failure to fulfil their obligations. According to Grigonytė and Sūdžius (2009), the situation when debt ratio increases stimulates the need to develop a 'mechanism' which would allow to replace the current mode of decision-making. Financial indicators, in particular, liquidity and solvency, are treated as highly informative measures that allow to prognosticate the difficulties in a company's financial state. Such mechanism would enable to escape a part of expenses. This way, the overall solvency ratio would be improved. Hence, business should follow the aim to develop a strategy or a mechanism that would help to manage timely inflows of the revenue (Grigonytė, Sūdžius 2009).

Evidently, development of the model by itself will not eliminate the problem of solvency. Efficient application of the model is no less important. Debt management can be burdened by the fears that application of the model might bring about some negative consequences. Nevertheless, with reference to Aleknavičienė and Girdžiūtė (2009), it is possible to defend a company's interests without any negative customers' reactions and with saving the prospects of further co-operation. Employment of psychological measures such as keeping one's word, politeness or originality may highly contribute to this purpose.

The authors of this article agree with the opinion that all market participants are inclined to successful competition. Hence, each customer, even the one who is in debt at the particular moment but can be expected to pay off the debts and continue further co-operation, should be appreciated. Such attitude calls for the development of a system that would allow to recover the debt without losing a potential customer in the future.

Grigonytė (2012) stated that business, by large extent, is influenced by economic cycles. 'Changing economic cycles cause higher than common risks to business. During the periods of changes, the significance of timely revenue highly increases, and receivable debts may determine unwanted negative effects on a company's financial indicators and its reputation' (Grigonytė 2012, p. 1).

The findings of the research, carried out by Jasienė and Laurinavičius (2009), revealed that business companies do not use debt risk reduction measures in the following cases:

- If trading parties are bound with long-term business relations
- If managers have personal contacts with a customer
- If a customer usually pays timely.

However, disregard of debt risk reduction measures might cause extra risk. According to Jasienė and Laurinavičius (2009), more than a half of managers admit having had losses determined by the disregard of debt reduction measures. The fact that a substantial part of business companies are inclined to risk is disclosed by the tendency that only nearly one-third of companies would not sell their products to customers about whom they have acquired any negative information (Jasienė, Laurinavičius 2009). This reveals inclination to assume the largest part of the risks related to sales.

Methodology

Prevention measures are considered as the most critical factor that determines smooth and qualitative business operation. Debt prevention measures cover the entirety of the measures that could be used to prevent the emergence of debts. Such measures should be used in the early stages of prevention of receivables. They are developed not for the elimination of the debts that have already emerged but for the protection from the emergence of new debts. In order to operate smoothly, it is necessary not only to ensure an appropriate business functioning but also to develop a relevant prevention system that would enable to prevent the chain reaction, meaning that a single debtor can cause bankruptcy of a few or more creditors that are interrelated in their business. Hence, implementation of efficient debt prevention measures would determine less common employment of forced debt recovery. Even if the latter measure was invoked, forced debt recovery would become faster and more efficient.

The analysis of the scientific literature (Chludek 2011; Sokolov, Sokolova 2012; Snieška, Drakšaitė 2013; Boden, Paul 2014) proposes that the following steps should be taken by business companies to prevent the emergence of receivable debts: first, business managers or appointed employees should establish a purchaser's or a seller's identity; second, the method of payment, acceptable to both contract parties, should be confirmed; third, all expenses should be estimated, and scenario matrix should be developed; in the fourth step, potential debt should be evaluated, and debt management measures as well as the possible impact of the debt on a company's financial indicators should be anticipated; in the fifth stage, a contract partner, his reputation and significance to a company's business continuity should be assessed; finally, the decision on risk assumption and transaction execution should be made. Only consideration of all of the steps introduced above ensures an appropriate control of the transaction.

With the purpose to research the issues of the management of receivables in Lithuanian business during the period of 2000–2014, the methods of statistical data analysis and interpretation were used in the empirical part of the research. For the evaluation of the current trends of the management of receivables in Lithuanian business during the researched period, the data accumulated from the databases of Lithuanian Department of Statistics and the figures announced by 'Intrum Justitia, Ltd.' in 'European Payment Report 2013, 2014, 2015' were used.

Results

With reference to Mackevičius (2008), during the period of independence of the country, Lithuanian business companies have passed through numerous events that have had a direct impact on their operation. Particular political events and decisions have determined the current financial state, operational results, stability and development of Lithuanian business companies. Owing to inability to respond to changing economic and political conditions and withstand competitive pressures, a significant number of companies have come through financial difficulties or even bankrupted. Over the period of 1993–2006, bankruptcy was announced for 5,261 Lithuanian companies. Lack of business operation analysis is considered as one of the main causes of bankruptcy. 'Business operation analysis refers to accumulation, comprehensive and objective analysis, and assessment of different economic information on a company's activity, aimed at fulfilment of the defined goals' (Mackevičius 2008, p. 46). 'Under the conditions of market economy, from 2 to 6 percent of business companies bankrupt yearly. Therefore, bankruptcy is treated as a macroeconomic problem, inevitable phenomenon of market economy, or even as an acceptable way of debt recovery' (Mackevičius 2008, p. 26).

With reference to statistics, in 2014, Lithuanian economics revived after the economic crisis of 2008–2009. Lithuanian GDP increased by 1.3 percent in 2010. Growth of foreign demand, which, to the largest extent, determined the rise of real GDP and also conditioned the improvement of business financial indicators. In 2015, Lithuanian GDP increased by 2.9 percent, which proposes that GDP returned to the pre-crisis level of 2007.

With reference to the data of Lithuanian Department of Statistics (2016), short-term debts to suppliers considerably increased during the analysed period of 2000–2014, in particular over the period of 2008–2009, and reached their peak in 2013, whereas the share of long-term debts was significantly smaller in the amount of total commitments, although it had followed the tendency of increase since the period of 2008–2013. The analysis of the statistical data proposes that debt recovery, which has gained its intensity over the past 14 years, remains one of the most problematic areas in Lithuanian private sector.

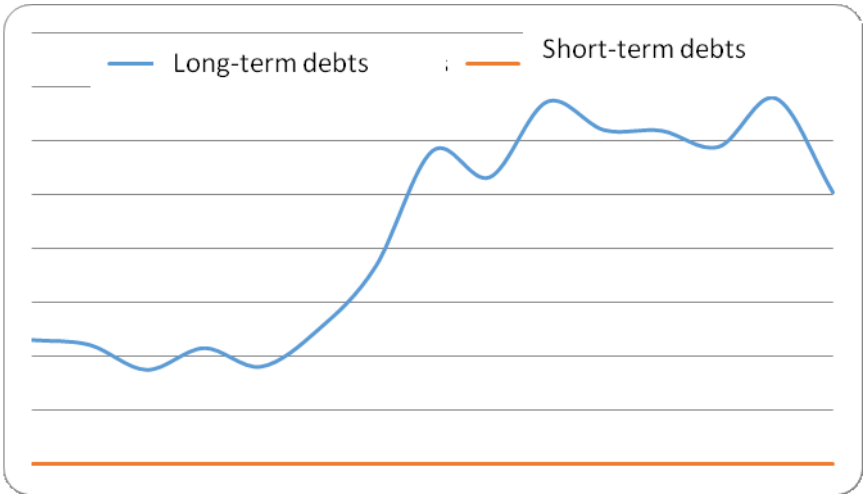

Fig. 1. The rates of long- and short-term debts in Lithuanian private sector over the period of 2000–2014, in thousand EUR (Source: Lithuanian Department of Statistics 2016)

The report, presented by 'Intrum Justitia, Ltd.' (2013), introduced Payment Risk Index for Lithuanian business companies (see Fig. 2). The values of the index should be interpreted as follows:

- the value of 100 stands for no payment risk; payments are made in advance or just after the reception of products or services; no credits are available;
- the value of 101–129 stands for low risk, although relevant observation is required;
- the value of 130–139 stands for the transfer from low to medium-high risk, when risk management and reduction already requires appropriate intervention and actions;
- the value of 140–149 stands for the stage of medium-high risk, when employment of appropriate actions of necessary;
- the value of 150–159 stands for the transfer from medium-high to high risk, when urgent actions must be used for risk reduction;
- the value of 160–169 stands for high risk stage, when urgent actions are vital;
- the value higher than 170 stands for the critical situation with risk management in the company.

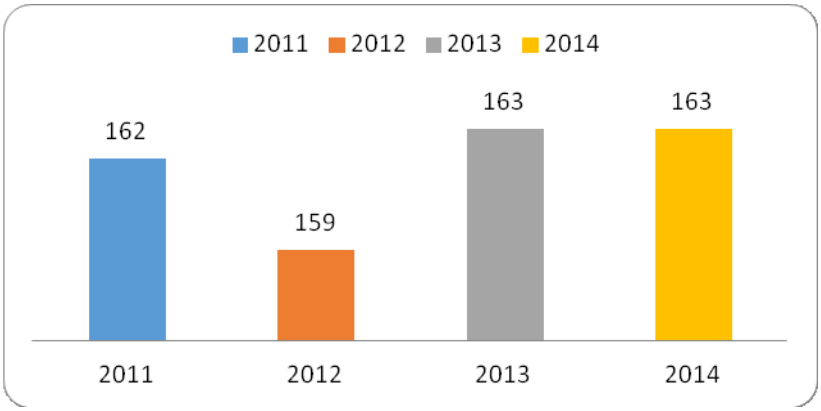

Fig. 2. Payment Risk Index for Lithuanian business companies (Source: compiled by the authors with reference to the data of 'Intrum Justitia, Ltd.', 2013)

Figure 2 reveals that the lowest payment risk was attributed to Lithuanian business companies in 2012, when Payment Risk Index composed 159, although this value of the index stands for the stage of the transfer from medium-high to high risk. In 2010, 2011, 2013 and 2014, Payment Risk Indexes for Lithuanian business companies are attributed to high-risk profile, which shows that the situation calls for urgent improvements in the field of debt risk reduction. With reference to the description of the situation, presented by 'Intrum Justitia, Ltd.' (2014), bad debt loss percentage slightly decreased, and

payment duration stabilised. However, 57% of business companies reported no organic growth determined by the recession, and 52% noted that they were not investing in innovation. Sixty-eight percent of business companies admitted predicting stable late payment risks over the coming 12 months, whilst 16% declared about anticipation of increased risk.

'Intrum Justitia, Ltd.' (2014) also announced the statistical information on Business-2-Business (B-2-B) debt payment delays in Lithuanian business companies (see Fig. 3).

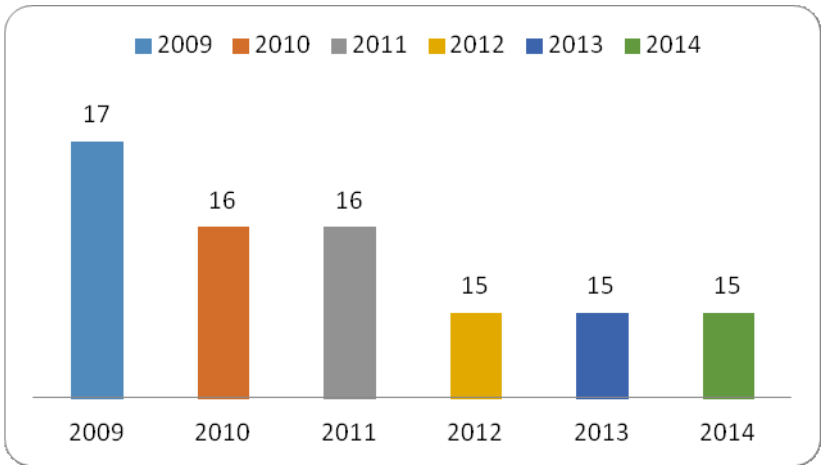

Fig. 3. Average Business-2-Business (B-2-B) debt payment delays in Lithuanian companies, in days
(Source: compiled by the authors with reference to the information of 'Intrum Justitia, Ltd.' 2014)

As it can be seen from Figure 3, debt payment delays in Lithuanian companies stabilised over the period of 2012–2014. Nevertheless, the average delay in days is relatively short in comparison with the EU average (47 days in 2014). According to Jasienė and Laurinavičius (2009), debt payment delay terms may vary, depending on the stage of the economic cycle: economic recession determines longer debt payment delays, whereas economic growth makes the delay terms shorter. Hence, better overall economic situation as well as more stable business position should drive debt ratios down. The report of 'Intrum Justitia, Ltd.' (2015) proposes that if payment delays exceed the limit of three or more months, possibilities of debt recovery are extremely small, and such delays are detrimental for the creditors themselves. Thus, all available debt risk reduction measures should be used to recover the debts earlier than the appointed limit.

Summarising, it can be stated that the problems with the management of receivables, faced by Lithuanian business companies in the private sector since the beginning of the economic crisis, have been basically determined by the following reasons:

- considering the value of Payment Risk Index, Lithuanian business companies fall into the category of high risk, when appropriate actions and measures must be used for the management of receivables and commitments;
- the rate of short-term debts to suppliers decreased by 9.75 percent from 2013 to 2014;
- the average debt payment delay is equal to 15 days, and this tendency has not changed over the past three years.

Considering the impact of the level of receivables on business and the overall economics of the country, it should be noted that in order to operate efficiently, Lithuanian business managers must constantly analyse the financial state of their companies, business partners, and current and potential customers. Such analysis would enable to reduce the level of receivables, would increase the possibility to receive timely payments for provided products and services, would guarantee the sufficiency of working capital and would help to escape the delays in wage payments. As a result, business efficiency would vastly increase, which, in turn, would contribute to the upswing of the overall economics of the country.

Conclusions

The analysis of the scientific literature has revealed that in some cases, receivables are used with the purpose to increase sales or emerge as a result of information asymmetry or mutual agreement. Financial indicators, in particular liquidity and solvency, are treated as highly informative measures that allow prognosticating the difficulties in a company's financial state. Development of a mechanism would allow replacing the current mode of decision-making, would enable to escape a part of expenses and would contribute to the improvement of the overall solvency ratio. Hence, business companies should follow the aim to develop a strategy or a mechanism to manage timely inflows of their revenue. For the appropriate control of transactions and management of receivables, business companies should take the following steps: first, a purchaser or seller's identify should be established; second, the method of payment, acceptable to both contract parties, should be confirmed; third, all expenses should be estimated, and scenario matrix should be developed; fourth, potential debt should be evaluated, and debt management measures as well as possible impact of the debt on a company's financial indicators should be anticipated; in the fifth stage, a contract partner, his reputation and significance to a company's business continuity should be assessed; finally, the decision on risk assumption and transaction execution should be made.

The empirical research has revealed that considering the value Payment Risk Index, Lithuanian business companies fall into the category of high risk, where appropriate actions and measures must be used for the management receivables and commitments; the rate of short-term debts to suppliers in the private sector decreased by 9.75 percent from 2013 to 2014; the average debt payment delay is equal to 15 days, and this tendency has not changed over the past three years. The findings, based on the analysis of the statistical data, proposed that Lithuanian business companies do not manage their receivables with appropriate efficiency and are attributable to a high-risk profile. Hence, the current situation calls for urgent improvements in the field of debt risk reduction.

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THE ROLE OF STAKEHOLDERS IN CULTURAL ENTREPRENEURSHIP MANAGEMENT

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Abstract. The skills and knowledge of the owners and employees of cultural enterprises on economic use of financial resources do not guarantee valuable artistic results. Therefore, a substantiated question has arisen: how to evaluate management in enterprises with bad financial ratios and outstanding artistic indicators. The existing definitions of cultural management (Aageson, 2008; Hagoort, 2007; Klamer, 1999; Stam, 2006; Nordman, 2003) also do not provide precise suggestions for determining the most important indicators in the evaluation of cultural management. The question is how to evaluate management in cultural entrepreneurship by determining the most important indicators for a cultural enterprise's performance improvement. In order to define the goal of the stakeholders' (artists, clients, media, arts scholars, third parties providing funds, cooperation partners) engagement, it is necessary to analyse the area of an enterprise's activities, and in what way and by what kind of activities it is possible to engage the stakeholders. During the course of empirical research, it is planned to disclose, analyse and interpret the subjective reasons of pursuit. Although a numerical evaluation of stakeholders was obtained during the research and data analysis performed by Spearman's rho correlation calculations, the obtained results during the interpretation have not been generalised. The research results reveal the role of the cultural enterprise's stakeholders' engagement in the evaluation of management, point to the importance of the goals' analysis as well as the analysis of each stakeholder's engagement, and define the criteria for evaluating the activities in cultural entrepreneurship.

Keywords: stakeholder's engagement; cultural entrepreneurship; culture management.

Type of the paper: Empirical study.

JEL Classification: Z10, L2

Introduction

The skills and knowledge of the owners and employees of cultural enterprises on economic use of financial resources do not guarantee valuable artistic results. Therefore, a substantiated question has arisen: how to evaluate management in enterprises with bad financial ratios and outstanding artistic indicators. The aim of the research is to define the role of stakeholders in managing cultural enterprises.

The research results reveal the role of the cultural enterprise's stakeholders' engagement in the evaluation of management, characterise the importance of the analysis of each stakeholder's engagement and indicate the criteria for evaluating the activities in cultural entrepreneurship.

To investigate the research topic, qualitative research methods have been chosen according to the problem to be investigated:

- General scientific methods: monographic method, logically constructive method, content analysis of qualitative research, analytic induction (theoretical aspects and practical research);
- Empirical research methods: in-depth, semi-structured interviews on stakeholer engagement;
- Data processing: for ascertaining the conformity of empirical distribution to normal distribution; review tables; Spearman's rho correlation.

A theoretical innovation has been proposed as a result of the research: the stakeholders' role in the evaluation of the enterprise's management has been revealed and the necessity for determining the

mutual relationship of the stakeholders is disclosed, proposing it as a basis for the evaluation of cultural entreprise management.

Literature Review

To analyse the role of artistically valuable results within the context of managing cultural enterprises, it is necessary to evaluate the management of *sustainable* stakeholders (Jagersma, 2009, 341). The stakeholders (Freman, 2010; Carroll, 1996; Harrison, Freeman, 1999; Waddock, Bodwell, 2002; Philips, 2003; Post et al., 2002a, b) show that sustainable development of an organisation can be fostered by purposefully managing important relationships between the enterprise and its strategic partners. The author assumes that stakeholders are those identified external and internal forces that can impact the process of creation and promotion in a cultural enterprise.

Since the 1990s, cultural field researchers and economists (Klamer, 1999; Baumol, 2003, 1993; Aageson, 2008; Deakins, 1996) have already started a discussion on the development of cultural entrepreneurship, urging artists and their representatives to learn about selling art and orientation in the market. It is possible to determine an enterprise's stakeholders by analysing its objectives and consequently defining those groups without the support of which the enterprise would cease to exist.

The existing definitions of cultural management (Aageson, 2008; Hagoort, 2007; Klamer, 1999; Stam, 2006; Noordman, 2003) also do not provide precise suggestions for determining the most important indicators in the evaluation of cultural management. To substantiate the necessity for stakeholders' engagement and increase credibility, the author proposes to use *AA1000 Stakeholder Engagement Standard* (2015) that has been designed to underpin formal legal engagements between organisations and stakeholders.

To identify the stakeholders according to *AA1000 Stakeholder Engagement Standard,* the engagement objectives and scope have to be defined and analysis of the engagement process performed. When setting the engagement objective, economic, ecologic and social indicators have to be also identified together with the stakeholders, indicating to what extent the real enterprise's activities meet its objectives and values, the objectives and values of the stakeholders as well as the social norms and expectations in their broadest sense. The topical issues have to be found out with the help of the stakeholders to identify the scope of activities. The stakeholders have to be also engaged in the process of developing the information collection methods. Based on the gathered information, it is possible to evaluate whether the enterprise's activities correspond with the previously set values, goals and tasks (Zemīte, *et al*. 2011).

After evaluation and consultation with the stakeholders, the enterprise has to create or revise the future objectives and tasks to improve its performance. Cultural contents (the artistic values (Hoks, 2007) should be assessed first, followed by the evaluation of entrepreneurship processes and assets. The author believes that cultural entreprise management can be evaluated by defining and analysing the role of the stakeholders in managing cultural enterprises.

Methodology

The author characterises the research and analyses involvement of the stakeholders, substantiating it with empirical research data. The author's research data are analysed along with the understanding of cultural entrepreneurship environment on the importance of the stakeholders' engagement. On the basis of the analysed criteria for evaluation of cultural enterprises' activities, the management assessment is performed.

Positivism, interpretivism and pragmatism are the most often used paradigms in social sciences (Walliman, 2006: 19-20). The interpretivism paradigm provides that both deduction and induction methods are used for research (Gill, Johnson, 2010: 60), since the researcher does not view the research object from a distance, but is closely linked to the topic under discussion (Walliman, 2006: 20). The interpretivism paradigm is applied also to this research, as the explanation of subjective meanings of individuals is of the utmost importance within the context of research. During the course

of empirical research, it is planned to disclose, analyse and interpret the subjective reasons of pursuit. The essence of research according to interpretivism is to reveal meaningful relationships and to discover the consequences of activities performed by individuals (Cohen, Manion, 1994: 10-11). For this particular empirical research, the author is oriented towards the research topics that can be perceived by experience-based intervention and by the ability to reach a wide perspective and evaluate the impact of culture (Johnson, Onwuegbuzie, Turner, 2007). It is important to be knowledgeable in the research topic to perform the qualitative research sampling (Kroplijs, Raščevska, 2010: 80), since qualitative research is aimed towards exploration of experience or knowledge acquired during practice; qualitative research methods are used for this empirical research.

The data structure of qualitative research appears during the course of the analysis (Punch, 2005: 57). In many cases it is not enough to use only one method of evaluation to answer the questions of research (Vondal, 2010: 2); therefore, to obtain a more precise point of view from the respondents and to get closer to the daily thinking patterns of the respondents (Branner, 2004: 313), the numerical value of the evaluation of stakeholders' importance was obtained. The task of qualitative research is to discover general dimensions, by learning about the categories and notions used by particular respondents (Kroplijs, Raščevska, 2010: 120). Although a numerical evaluation of stakeholders was obtained during the research and data analysis performed by Spearman's rho correlation calculations, the obtained results during the interpretation have not been generalised. Data analysis performed with the help of the tests substantiate trends and supplement the qualitative data (Branner, 2004, 314). The research results reflect the dominating point of view.

Evaluation of cultural entrepreneurship performed by 42 culture enterprises – art galleries, non-governmental theatres and concert organisations – was done by the owners or managers of cultural enterprises. To facilitate the respondents to express their point of view clearly and understandably, the author included numerical evaluation of the stakeholders' impact according to the Likert scale from 1 to 5 points (5 – very important, 4 – important, 3 – somewhat important, 2 – not very important, 1 – not important at all). The quantitative data added to the qualitative investigation supplement research (Cropley, 2002: 39). The numerical evaluation provided by the managers of the art galleries was summarised by applying SPSS statistical analysis software, using non-parametric tests for the data processing. Non-parametric tests can be applied in cases of small sample size (Baggion, Klobas, 2011). The author defined that a stakeholder gaining the importance indicator lower than 3 points (somewhat important) is not considered effective for achieving the objectives of an organisation, and thus cannot be defined as necessary for ensuring the operations of the enterprise.

Results

The research is done with the cooperation of Latvia's cultural enterprises with the stakeholders and their role within the management of cultural enterprises. To assess the way by which the stakeholder's evaluation is linked to the longevity of an enterprise's operation, Spearman's rank correlation coefficient was calculated (since all data are in metric scale, while the empirical division does not correspond the normal ratio) (see Table 1).

Table 1. Spearman's rank correlation coefficient of stakeholder's engagement (Source: author's compilation)

Stakeholders	Art scientists	Clients	Artists	Cooperation partners	Media	Third party funders
Art scientists	1,000	-,074	,096	,235	,252	,161
Clients	-,074	1,000	,004	,108	,188	,043
Artists	,096	,004	1,000	-,015	-,404*	-,140
Cooperation partners	,235	,108	-,015	1,000	,374*	,056
Media	,252	,188	-,404*	,374*	1,000	,254
Third party funders	,161	,043	-,140	,056	,254	1,000
Length of operation	,134	,146	-,209	,071	,607**	-,204

*p= 0.05

** p= 0.01

The research results indicate that there is no statistically significant difference between the evaluation of stakeholders such as art scientists, clients, artists, media, cooperation partners and third party funders.

The results prove medium positive correlation between:

- Media and cooperation partners;
- Media and length of operation.

Media as an important stakeholder has been evaluated by a comparatively high average ratio of 4.35 points (see Table No. 2). However, when performing the analysis of involvement, the managers of cultural enterprises evaluate the cooperation with media as being basically negative or neutral. Consequently, the longer the operation of the enterprise, the more important is media as stakeholders in the perception of the enterprise's manager. This correlation proves that involvement of the stakeholder ensures long-term activities of the enterprise, since an understanding of the importance of stakeholders' involvement is formed only after some period of time. The cooperation partners as important stakeholders has been evaluated by the lowest average ratio of 3.60 points (see Table No. 2). However, the correlation indicates that the higher the evaluation for the importance of media, the more valuable the significance of the cooperation partners. The author assumes that this correlation is determined by the cultural enterprises' managers' comprehension of the way of ensuring activities; those who understand the importance of the cooperation partners in ensuring the enterprise's operations appreciate also the role of media.

The results prove medium negative correlation between:

- Media and artists ($r = - 0{,}404$, $p = 0{,}013$).

This correlation proves the specificity of cultural entrepreneurship, as those managers of cultural enterprises who are too oriented towards achieving artistic results do not evaluate cooperation with other stakeholders as very important. 'Media are opposed to artistic values and consider them less important and, although oriented towards the society, are ignorant stakeholders.This has been proved also by the assessment of media involvement. On the contrary, those managers of cultural enterprises who understand the importance of stakeholders, have evaluated the significance of artists and consider them as components with the same importance, as are other stakeholders.

The average ratio of stakeholders indicates that all the above-mentioned stakeholders are important for ensuring the activities of cultural enterprises, as the medium ratio exceeds 3 points and remains between 3.60 to 4.79 points (see Table 2). Although creation of artistic value, self-expression and personality development has been perceived as the basic meaning of a cultural enterprise's existence, the research results indicate that managers of cultural enterprises perceive their clients as the main stakeholders. Orientation towards the client and understanding of the importance of artistic values dissemination indicate the necessity of the notion of cultural entrepreneurship, as the basic concept of entrepreneurship is implemented in reality.

Table 2. Importance of the stakeholders engagement (Source: author's compilation)

	Art scientists	**Clients**	**Artists**	**Cooperation partners**	**Media**	**Third party funders**
Medium	3,66	4,79	4,70	3,60	4,35	3,83
Medium in fine arts	3,70	4,68	4,81	3,27	4,29	3,77
Medium in performing arts	3,60	4,91	4,53	4,10	4,43	3,93

The author assumes that the criteria discovered during the analysis of the stakeholders' involvement can be generalised and attributed to the evaluation of activities performed by the art galleries. However, the above-mentioned criteria provide also perspectives that can be applied when analysing cultural enterprises, as they determine the importance of the stakeholders' involvement in cultural enterprise's management. Based on the results of the content analysis of the cultural enterprise

managers' point of view and evaluation of the stakeholders, the author has summarised the main directions and perspectives for evaluation of the cultural sector enterprises – viability, growth and influence.

The author presumes that, to define the goal of the stakeholders' (artists, clients, media, arts scholars, third parties providing funds, cooperation partners) engagement, it is necessary to analyse the area of enterprise's activities, and in what way and by what kind of activities it is possible to engage the stakeholders.

The research results reveal that, basically, personal reasons and common artistic perception is the reason for engagement. The research results prove that viability can be ensured by engaging the most important stakeholders and appreciating the employees, as well as by evaluating the quality of cultural products that are crucial for development. The growth in international markets is also one of the perspectives for development. Information about Internet environment and public space on the activities performed ensures efficiency. It is possible to evaluate the management of cultural enterprises by ensuring the process of relationship management with those stakeholders who, in the case of engagement, would impact an enterprise's development, thus determining the role of the stakeholders' engagement in the management of the cultural enterprise. In creating artistic value and offering it for public assessment, the stakeholders' engagement relationship created by the cultural enterprise and its manager with those groups could impact the process of creating and disseminating artistic value.

The evaluation of cultural enterprise management can be applied in future research, after adapting it for use in the state and non-governmental sector with the purpose of identifying the stakeholders and evaluating their engagement. The author proposes the following hypothesis for future research: development of cultural enterprises could be fostered and state subsidies could be reduced by increasing the engagement of stakeholders in activities of the state sector cultural organisations.

Conclusions

Cultural entrepreneurship environment is formed and determined by the stakeholders, as the artists create the product contents; the audience (visitors, clients) approve the product's necessity; media provide its evaluation, attract attention and inform the audience, helping to reach it; the art scholars, critics and experts ensure professional evaluation within the branch context and motivation of work, while the third party funding sources can ensure independence for the cultural enterprise, and cooperation partners give possibilities for developing ideas and artistic programmes that would not be possible for the enterprise alone.

When comparing the research results with those determined by The AA1000 Stakeholder Engagement Standard, the main reasons for engaging the artists are as follows: the artistic value, ensuring the activities, personal reasons, possibilities for development and growth and sustainable cooperation.

Spearman's rho correlation confirms the specificity of cultural entrepreneurship, as those managers of cultural enterprises who are oriented towards achieving artistic results, do not evaluate the cooperation with other stakeholders too high and appreciate cooperation with stakeholders only in the long term.

By taking into account the stakeholders' needs, the scale of the enterprise's objectives is broadened. According to The AA1000 Stakeholder Engagement Standard, the management functions and the empirical research findings, three procedures are important for aligning the enterprise's interests with those of the stakeholders: defining the enterprise's objectives and results to be achieved, identifying the stakeholders and engaging the stakeholders in setting the directions of the enterprise's activities.

Criteria for assessing cultural enterprise's activities can be defined in three directions, namely, basis viability, growth and influence.

The criteria for evaluation of the viability are as follows: involvement of the existing clients and generation of interest among the potential customers, by developing an understanding and necessity to attend exhibitions; purchase art-works; recognising and evaluating artistic values; ability to find clients (the audience); ability to attract and keep clients (the audience); ability to generate interest among

clients (the audience) about the product offered by the cultural enterprise; interest of clients and visitors about the art-works (attendance of exhibitions, purchases of art-works) and number of clients (in the data base, clients receiving additional services; ability to attract third party funding.

The two criteria for evaluation of growth are as follows: artistic success (product quality appreciation in the branch: the number of nominations and awards; invitations to participate in prestigious arts fairs, competitions, festivals) and personal growth (possibility to grow, learn and perfect one's knowledge; possibility for employees to elaborate some kind of activities; possibility for volunteers to undertake new duties and responsibility, to meet in person representatives of the stakeholders).

The criteria for evaluation of the influence are as follows: ability to ensure activities attracting the interest of other stakeholders (information in Internet environment and public space on the activities carried out by the cultural enterprise: the published news and their quality, media channels and their quality); bringing to the forefront issues important for society (activities noticed and appreciated by the clients, media and other cooperation partners); solving social issues with the help of art (opinion leaders developed by the cultural enterprises); ability to attract the third party funding: sponsors and patrons for publishing the artist catalogues) and ability to attract funding of foundations for performing various activities that promote art and culture in a broader society.

The average ratio of stakeholders indicates that all the above-mentioned stakeholders are important for ensuring the activities of cultural enterprises, as the medium ratio exceeds 3 points and remains between 3.60 to 4.79 points. Although creation of artistic value, self-expression and personality development has been perceived as the basic meaning of cultural enterprise's existence, the research results indicate that managers of cultural enterprises perceive their clients as the main stakeholders. Orientation towards the client and understanding the importance of artistic values dissemination indicate the necessity of the notion of cultural entrepreneurship, as the basic concept of entrepreneurship is implemented in reality.

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THEORETICAL ASPECTS AND DEVELOPMENT OF THE MECHANISM FOR RISK MANAGEMENT IN SMALL- AND MEDIUM-SIZED BUSINESS

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Abstract. Modern scientific research in the field of risk management is mainly devoted to general questions of the market theory of risk management, including qualitative risk analysis, protection of the rights of property owners and the study of the problems of selection of the best strategies for profitable market investments. The development of risk management mechanisms for small- and medium-sized businesses in Lithuania compared to other European markets is happening too slowly. The situation is aggravated by unstable situation of the field itself, corrupted officials and the lack of advanced control strategies for internal and external risk management in organisations. All these factors confirm the need to develop new management tools in the field of risk management at such enterprises. The aim of this article is to develop the mechanism of risk management of small and medium-sized businesses and justify it scientifically. The methodology of the research is based on the principles of objectivity using methods of comparative, logical, mathematical statistics and system-structural analysis.

Keywords: risk management; small and medium-sized businesses; the project process.

Type of the paper: Methodological paper

JEL Classification: D2, L2

Introduction

The scientific approach to the study of risk and risk-related issues has been taken by Lithuanian and foreign scientists for many years. We can distinguish such scholars as Bagdonas (1996), Kanapieckiene (2002), Cox (1994), Cooper (1987), Charette (1989), Lifson (1982), Ogenziht (1994), Raftery (2003), Rowe (2001), Schumpeter (2008) and others. At the same time, these researchers do not take into account the specifics of small- and medium-sized businesses and the sector as a whole.

It should be noted that the holistic and systematic mechanism of risk management of such enterprises, with consideration of the specifics of the industry and issues addressed, has been neither fully implemented nor researched. The analysis of the indicated sources confirms the need to study the best management methods and review the main guidelines and approaches to risk management in general. In connection with that, this article presents and classifies the risks specific to small- and medium-sized businesses and offers their own mechanism for managing these risks.

The aim of this article is to develop the mechanism of risk management of small- and medium-sized businesses and justify it scientifically.

In order to achieve this aim, the following tasks were accomplished:

- the need to develop the mechanism of risk management of small- and medium-sized businesses was proven;
- theoretical basis of risk management at these enterprises was studied;
- the mechanism for risk management based on project-integrated approach was developed;
- the specific nature of the optimisation of processes was identified and methodology to prevent problematic projects of risk management was developed.

The theoretical and methodological parts of the article are based on the works of western scholars, which are related to the theme of the present research, including materials and periodicals in the field of risk management and development of small- and medium-sized businesses. The methodology of the research is based on the principles of objectivity using methods of comparative, logical, mathematical statistics and system-structural analysis.

According to the author, today, there is an urgent need for a unified methodology of project management process of small and medium enterprises, as well as definitions of directions of optimisation and specificity of risk management portfolio.

Risk classification

The author, in the course of studying risks as well as relying on scientific research and the study of the main measures of state support of the industry, ranked and classified the risk inherent to small- and medium-sized businesses. It is proposed that all existing risks in small and medium enterprises should be classified according to the following levels: macro-level risks, meso-level risks and micro-level risks. Macro-level risks include risks such as country, inflation, competition, socio-demographic, legal and regulatory, force majeure and consumer risks. Meso-level risks include industry risks and risks associated with problems in the regions. Micro-level risks are the risks of specific risks of small- and medium-sized businesses that include all possible corporate risks, financial, investment and other economic risks. In Table 1, we'll look at the major types of these risks.

Table 1. Classification, causes, factors and methods of risk compensation in small- and medium-sized enterprises (Source: author's compilation)

Level of risks	Risk type	Causes and risk factors	Compensation method
Macro	Country risk (economical–political)	The emergence of crisis, failures of development strategies, defaults, corruption, external conflicts, unrest, political turmoil	Consideration of trends of the current and long-term development of the country, statistical monitoring, planning taking into account the development of macroeconomic indicators, prediction of interest rates, inflation, improve of the reputation of the ruling power, settlement of political and legal conflicts, development of the foreign economic indicators of the country
	Inflation risk	The crisis in the economy, low purchasing power of the national currency, a weak consumer basket, unstable dynamics of inflation	Consideration of trends of development of the country, stabilisation of the national currency, use of the full list of the instruments for the normalisation of the exchange rate differences
	Competitive risk	Monopolization, unfavourable competitive conditions in the country, weak competitiveness in the global arena and so on	Creation of databases and systems about market competitors, evaluation and identification of market share, improving competitiveness, stabilisation and development of the commodity policy, market segmentation, competitor analysis
	Socio-demographic risk	Dependence on buyers and demographic situation, public opinion, fertility and mortality levels in the country	Accounting and monitoring of effects and changes in various socio-demographic groups, adjusting the strategy and tactics of the activities of the organisations of the industry
	Force majeure risk	The impact of unforeseen circumstances: social and other natural environmental disasters, crime and so on	Accounting and establishing a system of rapid response, development of models of risk insurance and reinsurance

	Consumer risk	The presence or lack of consumer demand, its dynamics, level of stability	Stabilisation of the market trends, development of loyalty systems and the creation of consumer databases
	Price risk	Level of dependence on prices of raw materials, materials, fittings, energy resources, labour and so on	Forecasting and accounting of industry price dynamics, development of strategies and mechanisms for the regulation of prices
Meso	Industry risk	Problems of the developments of the industry, its backwardness and imbalance, weak capitalisation in the industry as a whole, a lack of effective strategies for industry development	The growth of industry capitalisation, elimination of sectoral barriers and imbalances, improving the competitiveness of the industry in the country and the world
	Regional risk	Economic and political risks at the regional level, social and other factors of regional development	The growth of the regional component in the capitalisation of the companies in the industry, maximisation of the value of the industry assets in the region
Micro	Commodities risk	The location of the company considering the sources of raw materials, dependence on suppliers and the level of their impact on the activity of the company	The search of alternative sources of raw materials, introduction of schemes of raw materials, creation of stocks, mutual offset transactions with suppliers of raw materials, expansion of the number of suppliers, the development of schemes of alternative suppliers
	Scientific and technical risk	The lack of achievements of scientific and technical progress in the activity of the enterprise	The search for new technologies, improvement of the quality of products by using new materials and means of production, introduction of innovations
	Investment risk	Absence of external and internal sources of financing, weak capitalisation	Prediction of investment activity, maximising the market value, attracting foreign investors, refinancing, participation at international exhibitions, fairs and shows
	Risks of corporate and organisational structure	The lack of corporate governance structure, lack of corporate culture, inefficient organisational structure	The improvement in the quality of management, the effectiveness of the form of construction of the company, elements of the changes in the structure, transition to vertical or horizontal integration, changes in general management and in management centres according to responsibility as well as changes in the document circulation and information supply of divisions in the company

The author also notes that the impact of these factors in developed and emerging markets is different. Thus, in developed markets, factors of micro level have bigger influence, whereas in emerging markets, factors of macro and meso levels have great significance. According to the author, in order to eliminate the existing risks as for today in the framework of a unified strategy for the development of small- and medium-sized businesses, the development of a universal mechanism for effective risk management is needed, which should take into account the specifics of management as well as the size of the company and all risk factors of the economy of the country as a whole.

Introduction of Project Approach of Risk Management in Small- and Medium-Sized Businesses

Having considered the theoretical foundations of risk management, the author proposes to consider risk management at small- and medium-sized businesses as the project process. It is a set of successive stages of risk management adopted by the company on the basis of existing strategic, tactical and

operational plans. They should be aimed at the effective system-integrated management under the influence of the industry specifics, environment and competitiveness of the industry.

According to the author, in terms of implementation of the project approach, all risks of small- and medium-sized businesses should be considered comprehensively, taking into account their interrelationships. Thus, risk management should not focus only on one type of risks; on the contrary, it must consider all possible risks. Such approach is identified by the author as the system-integrated risk management.
The main advantage of this approach is systemic and holistic view of business risks. This provides with a better picture of risks faced by small- and medium-sized companies and, as a result, to get a more comprehensive approach to risk management in general. Otherwise, under the existing problems, there will be a fragmentation of activities and some risks will be given too much attention, whilst others will fall completely out of sight.

The author noted that this point of view provides with a better alignment with management decisions in other areas, especially with the strategic management, production management, personnel management and financial management. This is due to the fact that in some cases, it is difficult to draw a clear line between the divisions of the company management; so many risks (if not all) refer to issues of systemic management. If risk management is considered separately from other sections of management, there may be contradictions and conflict of interest in the system of management as a whole. In case of systematic approach and integrated solutions, such problems will not arise; therefore, risk management will be more efficient and control system more complex.

In addition, system-integrated risk management does not let to lose sight of the most important risks, which can be neglected by a manager in case of partial risk management.

Another advantage of the system-integrated risk management is that, thanks to the diversification of risks of different nature, the cost of activities for risk management of all types may be less than the appropriate measures estimated individually. Moreover, some activities, which were initially designed for other purposes (e.g. for quality control), may be used (sometimes with slight modifications) for risk management. This fact emphasises the complexity of the considered concept.

However, in the context of this article, the author highlights a number of limitations that can be encountered by small- and medium-sized business in the process of introducing the concept of integrated project risk management:

- the pursuit of the consideration of additional risks may become an end in itself when the meaning of risk management is lost as such;
- the relationships between the various risks are not obvious and require additional studies that would divert resources from the core business of the enterprise;
- a comprehensive analysis of a large number of risks requires a change in the information supply (in particular, the increasing need for statistical data suitable for quantitative analysis), which may not correspond the real possibilities;
- the integrated risk management, as a rule, requires a review of the whole decision-making system, which can cause a change in the organisational structure and affect the interests of the company's management;
- the complexity of the approach requires to improve the quality of decisions made, that is, it is associated with the demand of higher staff qualification (which means the possibility of refection of the new system and the need for retraining of personnel).

Therefore, the introduction of risk management at the level of small and medium businesses takes a lot of effort. In general, the integrated risk management possesses all characteristics of an isolated system as it is defined in the general theory of systems. This demonstrates the possibility and necessity of research in this sphere of activity of managers as a separate area in all its diversity and logical unity.

Overall, the presented management mechanism includes the development of the project for risk management, direct management process, regulation of subsystems of project management, the

formation of the portfolio of risk management projects as well as the process of assessing the effectiveness of the project of risk management.

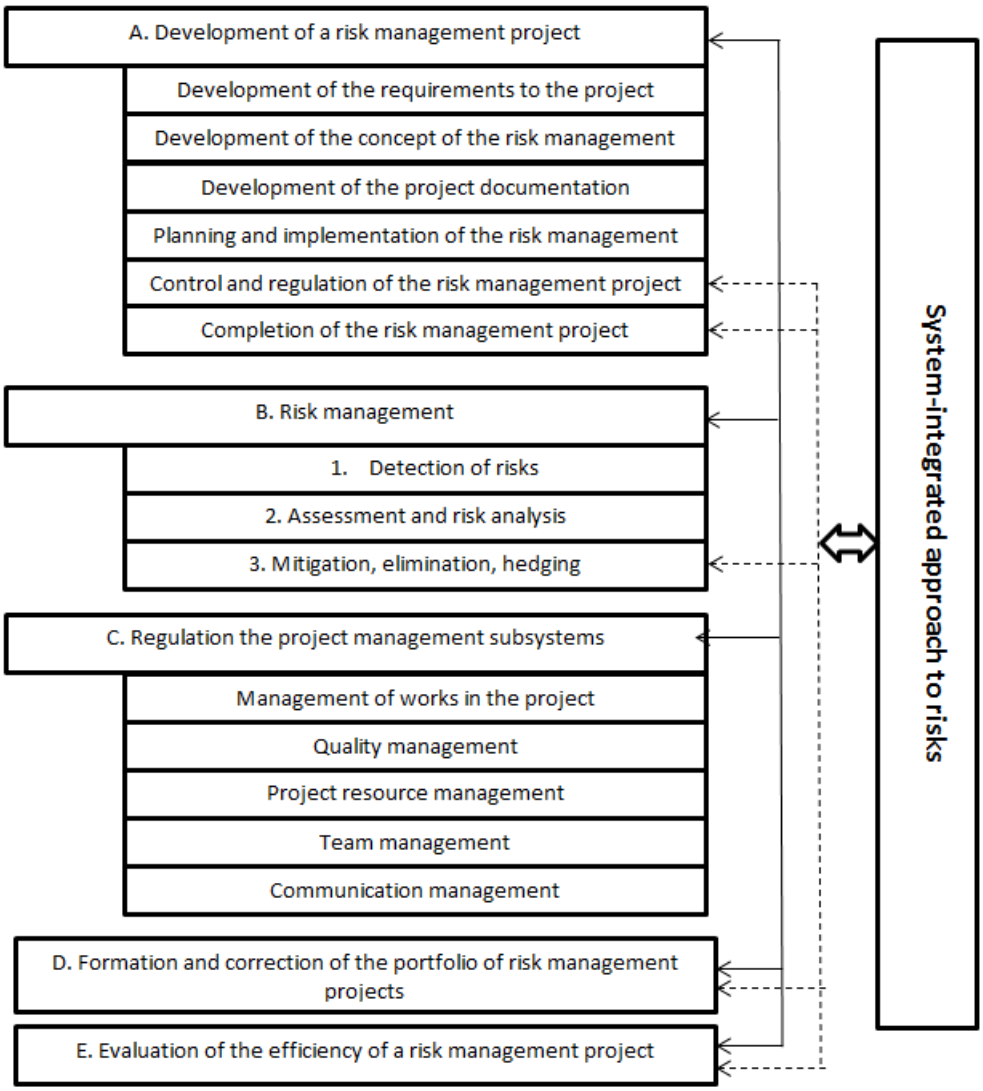

Fig. 1. The mechanism of risk management in small- and medium-sized businesses (Source: author's compilation)

The first module 'Development of the Risk Management Project' is of managerial nature; it is fundamental and is focused on the development of the project itself.

The development of the requirements for the risk management project should include the initial phase of the project and combines the initial project analysis, feasibility assessment and forecast of the effectiveness of the project, the choice of project financing as well as the organisation of the office of the project.

The development of the concept for the risk management project should include important aspects such as the development of the strategy, goals and objectives of the project, expert evaluation of different project scenarios. It is at this stage the company management must form the system-integrated management mechanisms and compile a description of sustainable management in the field of risk management.

The stage of development of project documentation is a very important moment in the creation of all risk management project. Particular importance in the development of project documentation should

be given to cost estimation carried out at every stage of management as well as to the selection of computer-aided design system for organising the project documentation and project management in general.

With regard to the stage of project planning and implementation, the process of formation of decisions, which determines the sequence of certain events as well as actions and works on the project, must be included in the process of planning. Planning should take an important place in the management of the project because planning itself is the organisational start of the entire process for its implementation. In the context of the scientific article and under the conditions of application of the system-integrated approach to risk management, the author proposes to use calendar-network project planning.

The second module 'Risk Management' has a close relationship with the fourth module 'Formation and Updating of the Project Portfolio' and includes the detection process, evaluation, analysis as well as the stage of mitigation, elimination and hedging of risks. According to the author, effective risk management requires development of common methodology for risk management as the project process as well as identification of areas of optimisation and specific features of the portfolio of risk management projects.

The methodology of risk management as a project process, which is proposed by the author, contains a number of fundamental and original solutions. Its main advantage is an attempt to present the documented systemic approach to the problem of improving and enhancing the efficiency of the project process of uncertainties and risks by creating a constructive framework for implementation of effective projects to minimise risks of small- and medium-sized businesses.

The initial stage in creating an effective project process is based on the development of optimal project policy aimed at the production of an integrated approach and implementation of the quality management system as a controlling system.

The author particularly notes that today, in many small- and medium-sized businesses, the project policy, if there is, serves only to satisfy the requirements of supervising bodies and owners, but not in order to express understanding of the situation and prospects of the development by the council and management. In this case, the project policy is a useless paper rather than a reflection of the reality of the market place of the enterprise in the market and integration of the risk management system. Such policy does not work and is ignored by executors.

The policy should be based on the reality. The document on the project policy should cover reasonable, generally accepted principles of project administration. The differences of documents on the project policy are based on the specifics of certain enterprises, their goals, peculiarities of the markets, their financial structures, size, intensity of the competitive situation, the experience of staff and direct impact of various risks on the activity of the company. Consequently, each company must develop its own individual policy, reflecting its specific needs and objectives in the field of risk management.

After the approval of the project policy and the development of standards and regulations, the management of the company needs to move to design, implementation and monitoring of risk management projects themselves.

The author also noted that in the course of their functioning, small- and medium-sized companies face not a single and uniform risk, but a diverse array of risks, which were classified previously. This means that risk management should be a single system of effective measures to overcome negative consequences of the impact of each risk element of this aggregate, that is, to manage the entire portfolio of risks comprehensively. Although certain elements of such integrated management occur at the early stages of development of risk management, they receive their completion in the concept of the integrated risk management, which was presented in the context of risk management mechanism.

The need for the management of the risk portfolio leads to the fact that it is examined in two stages:

• First, the analysis of each risk individually is performed. This empowers the risk manager to find out the specifics of a particular risk situation or the peculiarities of adverse effects because of the

implementation of the estimated risk situation. This analysis empowers such a specialist to choose the most appropriate tools for managing each specific risk separately;

• Then, the entire risk portfolio is studied. This makes it possible to determine the overall impact of all risks in respect to this company. Such a comprehensive understanding about the totality of information on areas of possible risks as well as the guidance on carrying out preventive measures to minimise or prevent their implementation is called the risk profile and its documentary evidence – the risk passport. The performance of the above-mentioned activity creates a single point of view on the risks of the enterprise as a whole, what determines the characteristics of its risk management policy.

According to the author, the risk management system in small- and medium-sized companies should be based on these two stages and combine the tools and techniques specific to each of them. Failure to do so will result in the loss of adequacy of the implemented policy and, as a result, in a decrease in the company's financial stability.

The main problem of the creation of an integrated risk management system is the need to consider a large number of risks of a different nature with ill-structured and not always well-understood relationships as a whole. In other words, there is a question of risk mapping. All this requires to bring all risks to the 'common denominator', that is, to use such an indicator that would take into account the consequences of risks of any nature. Such operation is called risk aggregation. As any process of aggregation and generalisation, it leads to a loss of information, ignorance of the specifics of risk implementation and lower understanding of the notion of risk situation. But in return, it provides with a unified view of all the risks, to compare them and to allocate resources for the organisation of activities of risk management more effectively.

Obviously, the index, which could let to conduct risk aggregation, should be quite general, reflecting the results of the company activity as a whole. At the same time, this index should be free from subjectivism and formalism, which is often present in financial statements. Different approaches to risk measurement are possible, but it is necessary to choose an index that is consistent with the objectives of integrated risk management.

In practice, one of the options of residual profit, which is the difference between the net income and the cost of the capital, is selected to be used as such index. The most popular index of this type is economic value added (EVA), which has its own characteristics. The basic calculation scheme of this index is as follows. The base value is determined by the difference between the net operating profit after tax and costs of using the capital. The latter is calculated for the total capital (equity and liabilities) as the product of weighed average cost of capital (WACC) and its value. Wherein the corresponding multipliers can take into account not only actual values but also target rates. Further amendments are made to the base value, which are necessary to estimate its value in accordance with the economic content.

Let us designate the proportion of each component as w(i), the required rate of return as r(i), then the cost of the capital is the weighted average cost of individual components (formula 1):

$$WACC = \sum_{i=1}^{N} w(i) * r(i) \quad (1)$$

As in this case the value of pre-tax profit is used for the determination of the cost, it is necessary to take into account the fact that because of the interest on loan obligations, the taxable profit is reduced. Therefore, when substituting the value of liabilities in the formula above, this cost must be multiplied by the value (1 − T). As it is known, the purpose of the activity of the company is usually its capitalisation. Accordingly, the higher the cost of the capital of the company at a given value of income, the lower is its cost, and vice versa. Therefore, the task of maximising the value of the company is adequate to the problem of reducing the cost of capital. In this regard, in order to select the optimal capital structure, it is necessary to choose such vector of capital structure W that WACC (W) → min.

The objective would be commonplace if the value of various sources of funding were not dependent on capital structure. The higher the proportion of credit obligations, the higher, for example, is the level of risk for the company's shareholders. Therefore, the required rate of return by various types of financing depends on the share of the total capital structure, namely, r(i) = F (W). This makes the task to be a very remarkable process.

In order to assess risks, the changes in the EVA are considered: the risk is considered to be higher, the more EVA decreases, caused by the risk itself. At the same time, the EVA is estimated not for the previous period, but its forecast for the future is carried out. Thus, this index allows profit, capital needs and risks to be related.

The change of the EVA is an example of a risk measure, that is, the index characterising the magnitude of risk. This indicator collects all information about the risk to a single number. Therefore, risk measures are a popular tool used in risk management. They may be general (universal), as the considered index, and partial, reflecting individual properties of the risk.

The author also emphasised that the stage of the process of risk management as a project as per today requires the creation of techniques based on the detection and prevention of the consequences of the emergence of problematic projects in the portfolio for the management of certain risks at the enterprise. Thus, the author developed stages (zones) of the deteriorating situation of the company until the moment the risk management projects becomes unprofitable and provided with recommendations for each stage of project deterioration.

The process is visualised and presented in Fig. 2. Point A, the appearance of the first symptoms of the problem; point B, the detection of deterioration of symptoms; point C, the beginning of a successful solution to the problem; Line D, the successful elimination of the risk that an entity retains the bulk of the property and the project risk management; Line E, belated elimination: debts repaid, but the company loses a major part of the property and the project risk management is ineffective.

The considered stages indicate that the manager must carry out continuous training of their employees in the field of recognition of problematic projects. And the project management should see the problem and report back on it whilst the project is still in zone 1 or, in extreme cases, in zone 2. The closer to the area of loss, the bigger number of valuable chances in the area of management a certain risk is lost by the company; therefore, in order to minimise the project losses and keep, if possible, assets of the company, it is crucial to see the problem in time and to act quickly to resolve it, by conducting strict control.

The third module of the risk management mechanism 'Regulation of subsystems of the project' is aimed at regulating sub-systems, such as basic operation, quality management, resource and communication management.

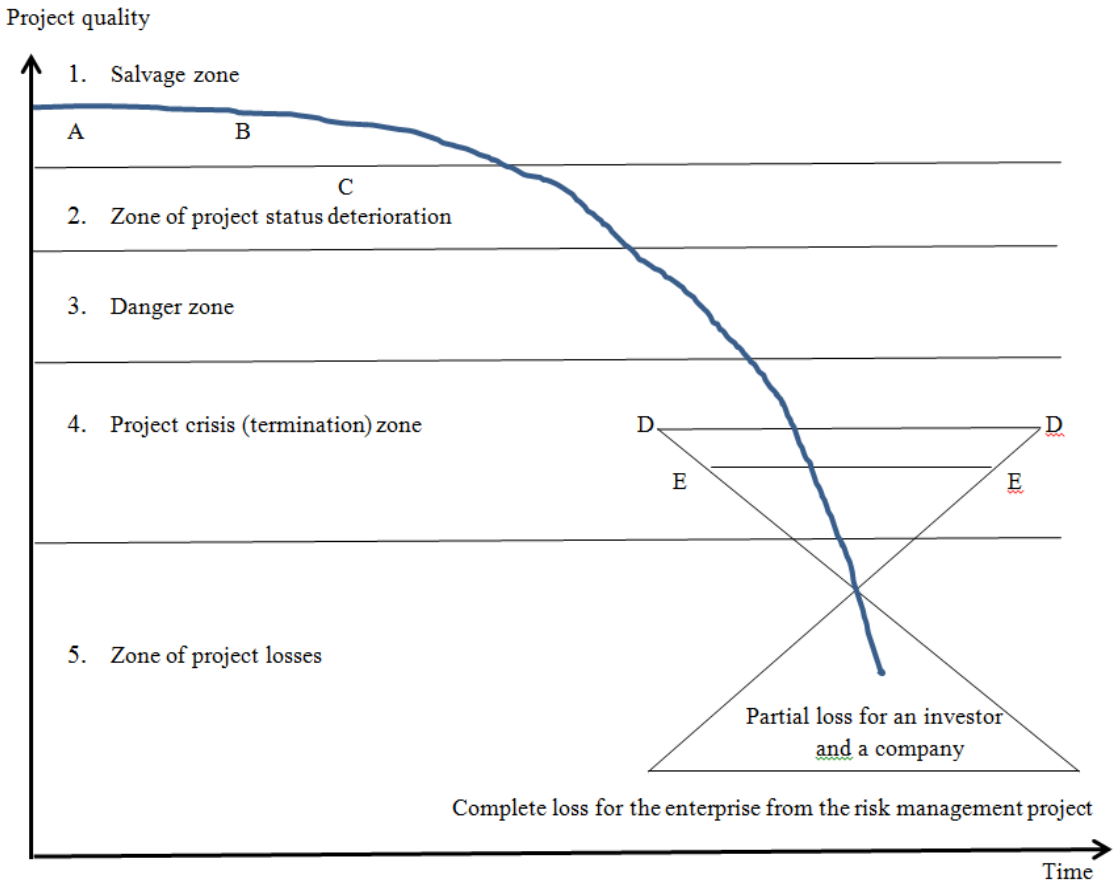

Fig. 2. Stages of quality deterioration of the risk management project of a company

(Source: author's compilation)

According to the author, in order to improve the effectiveness of risk management as a project at small- and medium-sized businesses, it is necessary to divide the entire process as a whole into individual interconnected complexes and work packets on assessment, minimisation and risk management. These activities should be clearly linked to timing and duration as well as resourcing and limitations. In this case, all the same network schedule can serve as a useful tool.

With regard to the project resource management in the context of risk minimisation at small- and medium-sized businesses, introduction of the internal control system for identification and use of efficiency reserves of various enterprise resources is recommended in this area.

Conclusions

In general, the author comes to the conclusion that at the present stage of research, it is already possible to say with certainty that the project process is a complex phenomenon that requires consideration of its essence at different levels. First of all, at the level of essential sensations, the risk management process is a specific tactical regulation on the implementation of measures for evaluation, forecast and risk management, which is based on subjective organisational norms. Second, at the socio-historical level, the project process is an evolutionary phenomenon that changes its content depending on the conditions of development and real needs of small- and medium-sized businesses in the risk management process. According to the author, the project process must have certain mechanisms that will create the right direction in the work of the enterprise and its risk management in particular.

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THE ROLE OF HUMAN CAPITAL FOR NATIONAL INNOVATION CAPABILITY IN EU COUNTRIES

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Abstract. Innovation is essential for economic growth in developed countries. One of the most important sources of innovation is human capital. In this article, state of human capital in EU countries is investigated in order to show the relationship between human capital and national innovation performance. In the first part, theoretical assumptions of human capital importance for innovation processes are analysed. Secondly, measures of human capital are analysed and a measurement model is presented. This model is applied for investigation of state of human capital in 26 EU countries during 2002–2012. Results showed that quality of human capital is the most important factor for innovation performance. Quality indicators have even higher correlation with innovation in countries with low share of innovative enterprises (enterprises with high-level of new technology acceptance and usage). The aim of research is to analyse the theoretical importance of human capital investment for national innovation capability in EU countries, and to determine human capital aspects that foster innovation performance. Therefore, objectives are as follows: to analyse theoretical assumptions of human capital importance for innovation processes and to present the current state of research; to analyse available human capital measures and create a human capital measurement model; and to analyse state of human capital in EU countries as well as its relationship with national innovation capability.

Keywords: innovation; human capital; education; human capital measurement model; European Union.

Type of the paper: Empirical paper.

JEL Classification: J24, O30.

Introduction

Innovation is essential for economic growth in developed countries. One of the most important sources of innovation is human capital. In this article, state of human capital in EU countries is investigated in order to show the relationship between human capital and national innovation performance. In the first part, theoretical assumptions of human capital importance for innovation processes are presented. Further, measures of human capital are analysed and, a model of human capital measurement is presented. The model for investigation of state of human capital in 26 EU countries during 2002–2012 is applied.

In fact, there are various models that analyse human capital as an element of the economic growth process (Lucas 1988; Barro 2001; Romer 1990). Human capital could have a direct effect on the economy by increasing productivity of labour, as well as an indirect effect on economic growth based on increased innovation capability. One of the best-known economic growth models is the Nelson and Phelps' (1966) model where human capital and technology frontier analysis is introduced. Economic growth is based on the level of human capital as well as on the level of technology improvisation. Countries that are far from technological frontiers could sustain their growth by adapting innovations; however, the speed of adaptation depends on the level of human capital in these countries. Countries that are close to technological frontiers could grow only by introducing innovations and this process is related to the level of human capital. In this model, human capital acts indirectly by increasing the level of technology used, thereby raising productivity. This hypothesis is supplemented by numerous

empirical studies (Benos *et al.* 2015; Coe *et al.* 2009; Papalia *et al.* 2011, etc.). What is more, this idea was progressed in the Barro and Sala-Martin (1996, 2004) model, where regional development is analysed in detail and in Schumpeterian economic growth models where more emphasis is given on entrepreneurship and creative destruction processes. More recent studies (Vandenbussche *et al.* 2006; Aghion, Darlauf 2009) consider that the closer the countries are to the technological frontier, the more important are the innovation processes for their economic growth and that investment in human capital is more significant for the development of domestic innovations, especially in higher education. Therefore, the aim of the research is to analyse human capital importance to national innovation capability in EU countries and to determine human capital aspects that foster innovation performance. The objectives are as follows: 1) to analyse the theoretical assumptions of human capital importance for innovation processes and present the current state of research; 2) to analyse available human capital measures and create a human capital measurement model; 3) to analyse state of human capital in EU countries as well as its relationship with national innovation capability. Research limitations – correlation analysis does not allow to revel in the causal relationships of analysed concepts, it only shows the linear relationship between two variables. In order to show dependence between defined factors more advanced methods should be used.

The Interface between Innovations and Human Capital

In the twenty first century, innovation has become a crucial part of the world. This is to say, that the world is changing due to generation of new knowledge and development of new technologies. Innovation in this paper is defined as being a separate activity through which inventions are carried out in the market for commercial purposes (Snyder *et al.* 2016). For instance, Karoglu and Eceral (2015) claim that innovation is one of the determinants of a company's or a region's growth. Pinto *et al*. (2015) state that innovation could invoke the development of 'new products, new processes, new sources of supply, the exploitation of new markets and/or new organizational forms'. What is more, Lyles (2014) claims that innovation is one of the vital elements of sustainability. Scientists agree that innovations are closely related to economic growth and development. For example, Valentinavičius (2006) says that rapid economic growth is related not only to technological renewal but also to innovation implementation in economics and business. Stepanovas and Ostašenkovaitė (2013) state that innovation is the most important factor of economic growth, which helps to seek high value addition and also encourages economic development. What is more, Stepanovas and Ostašenkovaitė (2013) think that innovation provides an opportunity for production technology renewal and creation of new products and services. According to the scientific literature, it is necessary to focus on innovation as it is considered to be one of the most powerful tools used for the development in different fields. The European Commission conducts annual surveys on the level of innovation development in the EU. The results of the previous survey are presented in Fig. 1.

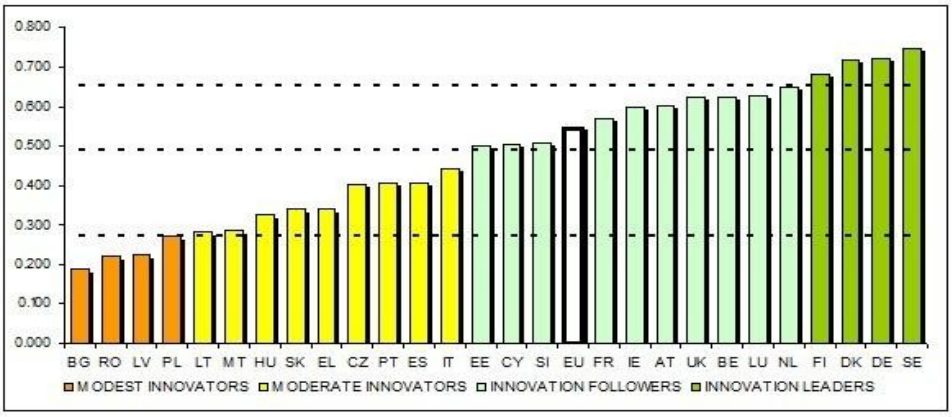


Fig. 1. EU Member States' Innovation Performance (Source: European Commission, 2015)

According to the data in Fig. 1 it can be emphasised that although the mean level of EU countries innovation implementation is quite high and stand for innovation followers level, more than a half of the members of the EU are on the moderate level of innovation development. According to that information, it could be stated that it is necessary to pay attention to the factors that could speed up innovation implementation. In fact, a majority of innovation researches emphasise that innovations are linked to new knowledge creation (e.g. Užienė 2015; Wang 2015; Vick *et al*. 2015; Iturrioz *et al.* 2015; Lyles 2014). The knowledge creation is examined under the human capital concept in the article.

Human capital is a concept that can be investigated as a separate theory, but usually human capital is being investigated as the structural part of intellectual capital. Many authors (Bang *et al.* 2010; Bowman, Ambrosini 2010; Díez *et al.* 2010; Godoy 2008; Hughes 2010; Malgioglio *et al.* 2001; McLean 2006; Pitelis 2009; Wang, Swanson 2008; Zapata 2001) are accentuating the importance of human capital for the successful activities of private or public sector organisations and profit and non-profit organisations. Although the importance of human capital is indisputable, the benefits are not clearly visible, but the importance of human capital is obvious, when it is non-existent. The basis of knowledge and information are employees, who assist in the effective and successful activity as well as in the development and the competitiveness of a respective company. Due to this basis, a company can achieve the desired objectives with the least possible cost.

Human capital can be defined as 'the knowledge, skills, competences and other attributes embodied in individuals that are relevant to economic activity' (OECD 1998, p. 9). Most commonly, human capital is described as knowledge gained through education and training. This understanding was popularised in Becker's (1975) book 'Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education', for which he was awarded a Nobel Prize in Economics (OECD, 2010). Hence, it is necessary to remember that human capital term could be extended in such areas as health, emotions and physical well-being. National intellectual capital researchers analysing human capital include such aspects as opportunities (Alexander, 2006), culture (Pasher, Shachar 2007), health (Malhotra 2003; Pasher, Shachar 2007) and labour qualification (Pasher, Shachar 2007; Lin, Edvinsson 2011). Even more implicit factors such as personal capital which relates to an individual's basic personal qualities and reflects the quality of an individual's psychological, physical, and spiritual functioning (Tomer 2003) are analysed in order to describe the level of human capital. Potelienė and Tamašauskienė (2014) summarised human capital characteristics as education, health, knowledge, competence, skills, talent, motivation, values, national culture and philosophy, labour market conditions, migration tendencies, expertise, experience, intuition, ability to understand national goals, entrepreneurship and ethics. The whole concept of human capital focuses on economic behaviour of individuals, especially the way in which their accumulation of knowledge and skills enables them to increase their productivity and earnings – and in doing so, to increase the productivity and wealth of the societies they live in (Schuller 2001).

Human capital is interpreted in various ways and different features, attributes, and several authors are accentuating peculiarities. For instance, Curado et al. (2011) accentuate a knowledge-based point of view to a company. Knowledge is the main factor of human capital. Employees with a huge knowledge can influence internal and external communication within a company.

In Table 1 the elements of human capital, which are mainly accentuated by various authors, are presented (Bontis 2010; Cabrilo 2009; Chen 2003; Green 2007; Harris 2000; Swart 2006). Stewart (1997) states that human capital is who leaves the company on weekends; human capital is who thinks. According to Stewart (1997), money talks, but does not think. Equipment and machinery work, sometimes even better than humans do, but they do not invent, do not create innovations, improvements and they do not generate ideas. The main purpose of human capital is to create innovations: to generate new ideas, to create new products, services, or goods, to improve existing products, services, or goods, to establish new business processes and so on.

Table 1. The elements of human capital and its benefits (Source: authors' compilation)

Element	Benefits
Knowledge	Helps to perform daily functions
Skills	Help to perform daily functions quickly and effectively
Know-how	Gives an opportunity to work with specific tasks or specific equipment
Education	Helps to understand the essence of the work, to carry out its functions through the knowledge gained from the acquisition of education
Qualification	Reveals the quality of human capital
Motivation	Fosters to work better, faster, and with less errors
Willingness to work	Consequence of motivation, which helps to find the ways of solving raised issues as soon as possible
Learning	Human capital element, which constantly increases knowledge, skills, and qualification of employees
Training	The ability of employees not only to assimilate, but also to convey knowledge to others
Abilities	Personal features of a human capital character /personality trait, which helps or distracts to accomplish given purposes, goals, tasks, or assignments

According to Table 1 it can be noted that human capital has plenty of elements. Interactions between those elements constitute the essential feature of human capital – the ability to use all aforementioned elements and implement company's goals, carry out the objectives of management, stakeholders, and shareholders and to properly, efficiently and quickly perform everyday tasks. The essential function of an effective management of modern human capital – the ability to change, learn, improve, adapt to rapidly changing business conditions and the economic situation.

Methodology

Measurement of human capital is still very complicated due to the intangible nature of this resource. Limitations are even greater in the international context, where it is difficult to find measurements of human capital that are comparable and have a time perspective. There are three main approaches of human capital measurement (Le *et al.* 2005; Mačerinskienė, Viržintaitė 2003): the cost-based approach, the income-based approach and the education-based approach. The education-based approach is most commonly used in macroeconomic studies for at least three reasons (Giménez *et al.* 2015): due to the proposition that formal education is the fundamental source of human capital acquisition, due to strong correlation between this and other acquisition paths and due to the existence of comparable international data. In this article, the education-based approach is used. Most popular indicators of human capital in this approach are average years of schooling, school enrolment rates, adult literacy rates and quality of schooling indicators (Le *et al.* 2005). All those measures have their advantages and disadvantages.

Judson (2002) notes that adult literacy rates could be a good proxy for human capital only in countries where the populace has little education as this measure captures only the elementary level of education. In recent studies it is measured as digital readiness, computer literacy and skills related to new technologies use (INSEAD eLab 2009; Welsum, Lanvin 2012; Jokūbauskienė 2013). In this research, computer and internet use skills are used as proxy for human capital.

School enrolment rates as a measure of human capital represents the flow that adds to the existing stock of education. This measure only tracks investments in human capital more than human capital stock. In this study two indicators are used to describe participation in education.

In economic growth models (Lucas 1988; Rebelo 1992; Barro 1996; Barro, Lee 2011; Benhabib, Spiegel 1994; Krueger, Lindahl 2001; Meschi, Scervini 2014; Morrisson, Murtin 2013) human capital is measured as educational attainment. This proxy could be based due to the differences in the educational system in countries and due to the quality of the educational system. In this research, human capital proxied by tertiary and secondary education attainment is evaluated.

According to Hanushek and Kimko (2000), quality issues have been overlooked in many studies as proxies use only education attainment indicators. In the presented study, to assess the quality of

education international skills assessment tests results are chosen (PISA survey and population digital skills measures measured in Information and Communication Technologies surveys and general rate of satisfaction with education). Satisfaction of education is measured during an academically driven cross-national European Social survey. In this survey, respondents are asked to evaluate the overall state of education in a country. In this research, results of different survey rounds are used (ESS Round 1, ESS Round 2, ESS Round 3, ESS Round 4, ESS Round 5, ESS Round 6). Human capital measurement model and indicators used are summarised in Figure 2.

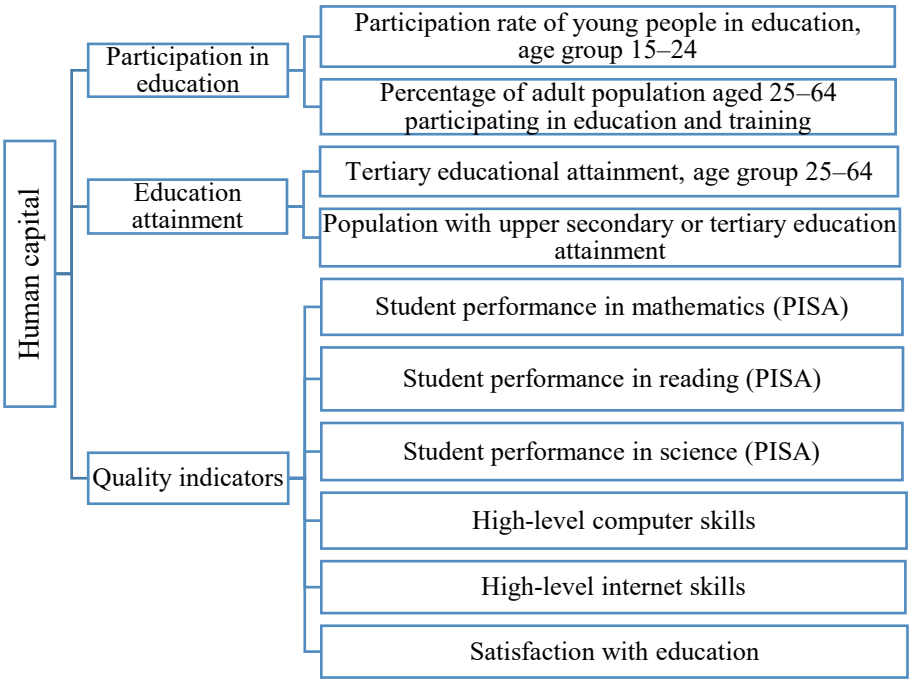


Fig. 2. Human capital measurement model (Source: authors' compilation)

Human capital indicators are divided into three groups. The first group shows participation rates in education; it represents the flow of knowledge acquisition. Second group consists of education attainment indicators and the last group captures quality indicators.

Innovation could be measured by combining several dimensions of technology-related activities (Dakhli, De Clercq 2004). Most commonly used measures are number of patents filed (Jaffe 1989), the expenditures for R&D (Ritsila 1999), the number of innovations reported in trade journals and research periodicals (Acs *et al.* 1994) and data self-reported by the companies (Keeble 1997), technology-based export (Bianchi 2001). All the mentioned measures of innovations have their strengths and weaknesses. In this study, we have chosen to use self-reported number of innovations as indicators of national innovation capability. This measure evaluates innovation by its actual output. Data is collected from national community innovation surveys based on the Oslo Manual, OECD/European Commission, 2005. Measure indicates share of product and/or process innovative enterprises, regardless of organisational or marketing innovation (including enterprises with abandoned/suspended or ongoing innovation activities). Enterprises in all core NACE activities related to innovation activities (C, D, E, I, J, G51, K72, K74.2, K74.3) are evaluated.

In order to examine the relationship between human capital and innovation capabilities, correlation analysis is performed. This model is applied for investigation of state of human capital in 26 EU countries (Austria, Belgium, Bulgaria, Cyprus Czech Republic, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, United Kingdom) during the 2002–2012 period. The data from Eurostat, European Social survey and PISA surveys results is used. Missing data is imputed

by using multiple imputation predictive mean matching procedures within five iterations. For grouping the countries k-mean method of cluster analysis was used.

Results

To start with, an average share of innovative enterprises in each country is presented (see Fig. 3). Countries are grouped into two clusters according to the share of innovative enterprises (country's dependence to cluster is marked with different colours).

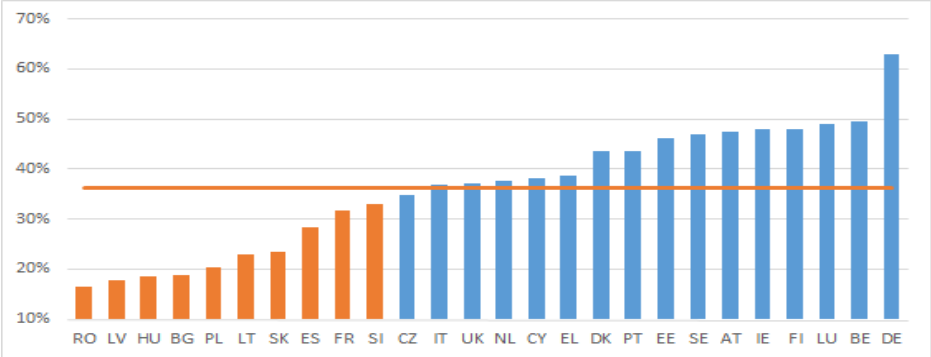


Fig. 3. Share of innovative enterprises in EU countries average of 2002–2012 (Source: Eurostat, 2015)

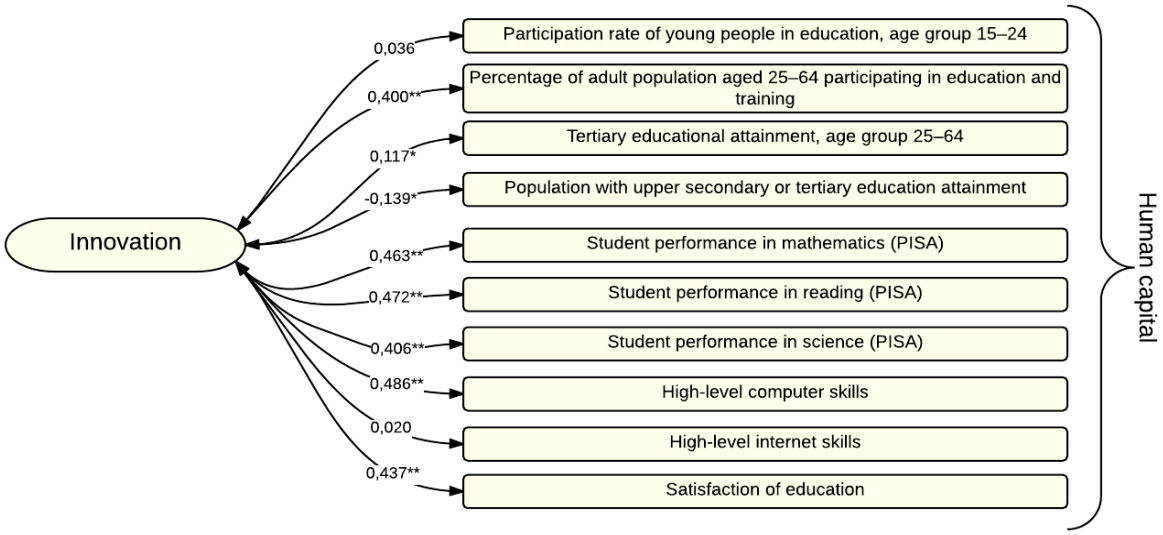
Share of innovative enterprises differs considerably in EU countries. The average share of innovative enterprises in EU is 36%. The lowest share of innovative enterprises are in Romania (16%), Latvia (18%) and Hungary (19%). The highest rate of innovative enterprises are in Denmark (63%).

An analysis of the bivariate correlation coefficients provides some interesting results (Fig. 4).

Education attainment indicators show weak correlation significant at 0.05 significance level with innovation performance in a country. Tertiary education attainment is positively correlated, though share of upper secondary or tertiary education attainment is negatively correlated to innovation performance. Such results show that secondary education in EU countries is not the factor that fosters innovation. Tertiary education might be that factor, but weak correlation shows that other human capital aspects are more important than formal education attainment. This presumption is strengthened by analysing correlation of innovation performance with human capital quality indicators.

Strongest correlation is between high-level of computer skills and innovation performance (0.486**), second strongest correlation is between student performance in reading (PISA) and innovation performance (0.472**). In addition, there is average statistically significant correlation between satisfaction of education and innovation performance (0.437**). It could be noticed that all human capital indicators that have highest correlation with innovations describe the quality of human capital.

This shows the importance of human capital quality for innovation performance. In addition, lifelong learning is important for innovation. Lifelong learning and innovation performance indicators correlation is 0.400 and statistically significant.



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

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

Fig. 4. Human capital indicators correlation with share of innovative enterprises in EU countries 2002–2012 (Source: authors' calculations)

Analysis showed that there is no statistically significant relationship between participation rate of young people in education and innovation performance and between high-level of internet skills and innovation performance. From the human capital indicator group reflecting quality, only a share of the population having high internet skills is not related to innovation performance. High-level of internet skills measures the share of individuals who have carried out five of the six internet-related activities. They are as follows: use of a search engine to find information; send an e-mail with attached files; post messages to chat rooms, newsgroups or any online discussion forum; use the internet to make telephone calls; use peer-to-peer file sharing for exchanging movies, music and so on; create a web page. Such competencies are more related to the ability to use already created technologies and most of those skills relate to communication and entertainment purposes This explains why this indicator does not correlate with innovation performance although high-level computer skills are strongly correlated to innovation performance This proxy measures the share of individuals who have carried out five of the six internet-related activities. They are as follows: copy or move a file or folder; use copy and paste tools to duplicate or move information within a document; use basis arithmetic formula (add, substract, multiply, divide) in a spreadsheet; compress files; connect and install new devices, for example, a printer or a modem; write a computer program using a specialised programming language. Those skills are mainly related to individuals' ability to use information in a digital environment, such skills are essential for innovation process.

In order to test if those indicators correlation is different in countries' groups that were identified according to the level of innovation, correlation coefficients were calculated (Table 2).

Table 2. Human capital indicators correlation with share of innovative enterprises in EU countries clusters 2002–2012 (Source: author's calculation)

	Indicator	Low-level of innovation (1st cluster)		High-level of innovation (2nd cluster)		All countries	
		Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
Participation in education	Participation rate of young people in education, age group 15-24	.146	.129	.205	.006	.036	.541
	Percentage of adult population aged 25-64	.599	.000	-.020	.791	.400	.000

	participating in education and training						
Education attainment	Tertiary educational attainment, age group 25-64 -	-.254	.007	.298	.000	.117	.048
	Population with upper secondary or tertiary education attainment	-.251	.008	.129	.088	-.139	.018
Quality indicators	Student performance in mathematics (PISA) -	.434	.000	.331	.000	.463	.000
	Student performance in reading (PISA)	.313	.001	.299	.000	.472	.000
	Student performance in science (PISA)	.420	.000	.261	.000	.406	.000
	High-level computer skills	.528	.000	.168	.026	.486	.000
	High-level internet skills	.221	.021	-.073	.333	-.020	.736
	Satisfaction of education	.428	.000	.004	.954	.437	.000

Results showed that in countries with low share innovative enterprises more aspects of human capital have significant correlation with innovation performance. In this group, internet skills show significant correlation with innovation level. Only one indicator participation of young people in education is not related to innovation performance. In countries, the group that has high share of innovative enterprises, the participation rate of young people in education is significantly related to innovations. However, in countries with high-level of innovation performance, lifelong learning is not related to innovation performance.

Education attainment indicators in countries with low-level of innovation performance is negatively correlated to innovation performance as in countries with high-level of innovation performance tertiary education attainment is positively correlated to innovation performance and upper secondary education attainment is not related to a country's innovation performance. Such differences in the relationship between education attainment and innovation performance might arise due to differences in the educational system in those countries. Countries having very high education attainment levels has very low-level of innovation.

While analysing the relationship between human capital quality indicators and innovation performance in different countries' groups it could be noticed that correlation coefficients of those indicators are stronger in countries with low-level of innovation performance. In these countries' groups all quality indicators are significantly related to innovation performance. In countries with high innovation performance, high-level of internet skills and satisfaction of education measures are not related to innovation performance.

Conclusions

There are three main approaches for human capital measurement: the cost-based approach, the income-based approach and the education-based approach. At the macroeconomic level, human capital is usually measured by using education-based indicators. Hence, the indicators used in the present study are referenced from an education-based approach. After reviewing those indicators, the human capital measurement model consisting of three groups of indicators was formed. The indicators that were used in the model formation are as follows: participation in education indicators, education attainment indicators and quality indicators. What is more, the main three indicators were compiled by bringing together more specific elements. In other words, participation rate of young people aged 15–24 in education as well as the percentage of adult population aged 25–64 in education and training are elements of participation in the education category. Tertiary educational attainment (age group 26–64) and population with upper secondary or tertiary education attainment are the elements of education attainment indicators group. The last group is quality indicators and it consists of the following elements: students' performance in mathematics, students' performance in reading, students' performance in science, high-level computer skills, high-level internet-skills and satisfaction of education.

After the human model was created, the correlation analysis was performed to assess the level of relationship between human capital factors and innovation performance. The correlation analysis was conducted within 26 EU countries during 2002–2012. The analysis revealed that quality indicators are mostly related to innovation. This relation is even stronger in countries with low-level of innovative performance. The relationship between education attainment and innovation performance is ambiguous. In countries with low innovation performance, increasing level of education attainment is negatively related to innovation performance. In countries with high-level of innovation, tertiary education attainment is positively related to innovation performance

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