Available online at www.sciencedirect.com

ScienceDirect

Procedia Economics and Finance 12 (2014) 37 – 47

Procedia Economics and Finance

www.elsevier.com/locate/procedia

Enterprise and the Competitive Environment 2014 conference, ECE 2014, 6–7 March 2014, Brno, Czech Republic

Quality of life measurements in EU countries

Stela Beslerová[a,]*, Jana Dzuričková[a]

[a]*University of Economics in Bratislava, Faculty of Business Economy, Tajovského 13, Košice, 041 30, Slovakia*

Abstract

In developed market economies, in addition to macroeconomic indicators they track the overall well-being and quality of life of the population. Since the economic crisis in 2008, economic conditions have degraded significantly across countries as reflected in particular rising of debt to GDP and rising of unemployment rates. This leaves space for the examination of the impact of these negative changes to the area of quality of life. There are numerous measurements which are focused on valuation of quality of life globally, but there are considerable differences in the methodology and results among them. Despite the diversity of the content of these indices, to the main components of examination we can include the economic, health, education and life expectancy of the population. Because of that the main aim of this article is to present findings of comparative study that explores selected well known indices measuring quality of life with main focus on Human Development Index and Legatum prosperity index. Based on the fact that those two indices have different content the results might differ. The main purpose is to compare differences of selected indices to point out the most significant indicators which influence the final results. We perform our research on a sample of EU countries out of which we focus mainly on V4 countries. Based on the results we present the most significant components of indices, which we closely research and by using statistical methods we search for potential dependence with selected macroeconomic indicators. Identification of these causes of these disparities and detection of weaknesses is the basis for the subsequent adoption of appropriate measures to develop these critical areas. Development of these parts could support development of the country as a whole.

Selection and/or peer-review under responsibility of the Organizing Committee of ECE 2014

Keywords: HDI; LPI; GDP; quality of life

* Corresponding author. Tel.: +421-915-948866
E-mail address: stela.beslerova@euke.sk

Selection and/or peer-review under responsibility of the Organizing Committee of ECE 2014
doi:10.1016/S2212-5671(14)00318-9

1. Introduction

The aim of European Economic Community establishment after the Second World War was the creation of an economic union, which would help strengthen economic cooperation among the countries of Europe. Mutual cooperation among countries should help boost the economy in war-torn Europe, thus ensuring peace between countries. After achieving this goal, however, the original aim of EEC changed and economic union has transformed into political union – the European Union. The aim of this transformation was the creation of a single economic market, the common European currency, ensuring the free movement of persons within the Union and so on. The globalization, in addition to positives that Union was supposed to bring, demonstrated negatives resulting from the interconnection of economies.

Since the onset of the economic crisis in 2008, the financial management of individual EU countries and their populations became more difficult. In countries with high unemployment, the disposable income of citizens is increasingly more limited, which is reflected in their behavior. A side effect of this change can be seen in deteriorating of life quality of the population and the widening of disparities among countries. This fact is confirmed by the annual global surveys dealing with the monitoring of well-being and quality of life in countries around the world. According to the fact that for the measurement of life quality are used diverse indices, there is scope to explore their explanatory power and reveal major differences in different parts of indices studied.

The first part of this paper is therefore focused on describing the issues of quality of life and the definition of instruments used to measure it. This section focuses more closely on the two selected indices of quality of life – The Human Development Index and The Legatum Prosperity Index, which we have selected deliberately for the purposes of this paper. Selected indices cover a wide range of areas, which examined the quality of life, but despite their similar content structure they describe the quality of life among countries differently.

In the next part of this paper, we focus on a review of the current situation of the quality of life in the EU28 and V4 countries. Even though the two indices selected in the description of the quality of life monitor similar areas, the results, which they present, might be different. Based on this fact, we have therefore decided to further explore the relationship between four variables, namely HDI, LPI, GDP and unemployment.

2. Quality of life and measurement tools

Quality of life is one of the most important areas which are examined within human well-being around the world. The term quality of life was first defined by World Health Organization as a life which reflects how people perceive their place in life, in culture and value system where they live and where they make relationships to objectives, standards or interests. (ISOQL, 2008). With the rapid development of information technology, transportation, manufacturing and services increasing trend of complexity of the concept of quality of life is even more intensified. Quality of life in the age of globalization is affected mainly by the state of environment and economy. The subjective needs of people come to the forefront of their hierarchy of needs. Besides all the different definitions Epley & Menon (2008) opined that "quality of life has become a potential marketing tool for cities around the countries." Currently, the concept of quality of life is associated with several possible approaches and various disciplines, such as economics, environmental science, medicine, sociology, psychology, political science and demography (Andrejovský et al., 2012). This multidisciplinary interest has resulted in the problem complexity and diversity of views on the quality of life, which enriches all parties involved, but also causes various problems. The concept of quality of life is not very consistent, which lacks consensus about its meaning (Hajduová et al., 2011).

Effects of globalization and rapid economic changes result also in changes in quality of life. Thanks to these constant changes raised necessity of examination and measurement of quality of life in countries around the world. As is well known, to measure the economic performance of countries we use macroeconomic indicators such as GNP, GDP and inflation. Given the fact that these indicators do not reflect attitude and opinion of inhabitants, it is not possible to use them to measure and monitor the development of the quality of life of the inhabitants in the country. The application of GDP and GDP per capita, as instruments to evaluate the success of economic growth, calls for wider debate and rigorous respect for the content of these indicators. This issue highlights a wide response in the professional and scientific literature. Specifically this issue is highlighted in the report of Stiglitz, Sena and Fittoussi (Stiglitz, Sena & Fittoussi, 2009). Lately, research has proven that use of a multi-dimensional structure has

advantages when measuring and predicting quality of life (Bramston, Chipuer & Pretty, 2005; Matarrita-Cascante, 2010). Bramston et al. (Bramstone et al., 2005) used a multidimensional approach to evaluate quality of life. They used measures of both satisfaction and importance in material wellbeing, health, productivity, intimacy, safety, community, and emotional wellbeing. There are almost always used aggregated indicators for measurement. Therefore, for the measurement of the quality of life were created indices such as OECD Better Life Index, Well-Being Index, Quality of Life Index and other.

Common core of these indices is focused on exploring the economic situation of the countries but each index is extended to monitor other areas such as health, education, personal well-being and perception of safety or liberty. Due to the fact that the indices provide a comprehensive view of the functioning of the country and include also non-economic factors of the development of the country, we can state that they are suitable for the measurement of quality of life.

For the purposes of this paper, we chose two most widely used indices for measuring quality of life – The Human Development Index and The Legatum Prosperity Index, where we deeply monitor their content and differences.

2.1. Human development index

The Human Development Index (HDI) is consider as one of the most used statistical indices focused on measuring quality of life in the world. This index was founded in 1990 by Pakistan economist Mahbub ul Haq and it examines quality of life in 187 countries around the world.

Methodology of HDI

Globalization and rapidly changing economic conditions had a major impact on development and formation of HDI. Because of that, the current form of HDI consists of four indicators – life expectancy at birth, mean years of schooling, expected years of schooling and gross national income (per capita). These indicators create three main dimensions of HDI – health, education and living standard dimension. For better understanding and performance the content of HDI we present Figure 1.

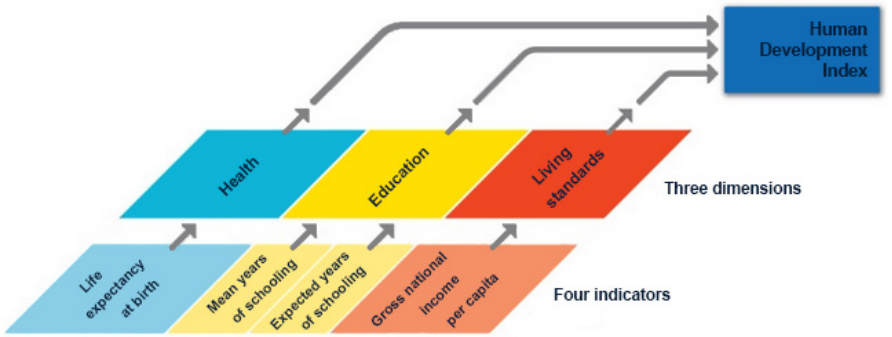

Fig. 1. Content of HDI
Source: Human Development Reports

In 2010 the HDI was updated not only in the content matter but also the mathematical formula for its calculation was modified. HDI thus represents the geometric mean of the three dimensions of indices:

$$HDI = I_{Life}^{1/3} * I_{Education}^{1/3} * I_{Income}^{1/3} \quad (1)$$

where:

I_{Life} – index healts
$I_{Education}$ – index of education
I_{Income} – index living standards

The calculation of these sub-indices is based on the maximum and minimum values of the indicators of which indices composited and indicator values of the country, for which we calculate the HDI. This index is standardized and internationally comparable. On that basis, the categorization of countries is possible, developed and developing countries can be identified according to the real value of the index (Davies – Quinlivan, 2001). Maximum and minimum values are obtained from comparison of indicators among all countries. Based on the HDI values reached by countries those are divided into four groups, namely:

1. Countries with very high HDI (1 – 0,8)
2. Countries with high HDI (0,79 – 0,71)
3. Countries with average HDI (0,7 – 0,53)
4. Countries with low HDI (0,52 – 0)

2.2. Legatum prosperity index

The Legatum Prosperity Index (LPI) is another measurement of quality of life which was founded in 2007 by Legatum Institute. This index examines and measures a level of life quality in 142 countries around the world. As the Legatum Annual Report 2013 (2013) states, there exist a numerous of variables which have an impact on the index. If we categorize those variables that reflect subjective and objective attitude we get two variables – income and well-being which create a main core of LPI. Due to the fact that it would be very difficult to obtain data from all exploring areas of the index, the Legatum Institute has created a model that simplifies the calculation and final results. The LPI model consists of all examined variables which are categorized into eight sub-indices. Those indices are based on what aspects of prosperity data influence. In Table 1 we offer overview of individual sub-indices.

Table 1. Sub-indices of Legatum Prosperity Index

Economy	Health
Enterpreneurship & Opportunity	Safety & Security
Governance	Personal Freedom
Education	Social Capital

Source: own processing according to Legatum Prosperity Index – Annual Report 2013

Economy

The Economy sub-index is focused on four key areas: macroeconomics policies, economic satisfaction and expectations, foundations for growth and financial sector efficiency. This sub-index demonstrates that all macroeconomics outcomes have a strong impact on income and well-being. We assume that there exist a relation between economic efficiency and prosperity of habitants. So, if countries have a stable and growth economy it could have a positive impact on quality of life of habitants.

Entrepreneurship & Opportunity

A friendly entrepreneurial climate and good business opportunity are important driver of any healthy economy. Favourable business conditions and opportunities motivate habitants to establish business thus helps to achieve stability and sustainable economic growth, to decrease the unemployment rate or to rise revenues to the treasury through taxes. Therefore, this sub-index is composed of three areas that significantly contribute to the country's growth – entrepreneurial environment, innovative activity and access to opportunity.

Governance

Political and economic freedom in country creates assumptions especially for stable and democratic institutions as well as environment for freedom of citizens. The basis for a democratic country is well-functioning government, which should accept lows and arrangements which help the prosperity of country. Monitoring and transparency of government action is therefore an important factor which influence the overall quality of life. Because of that, this sub-index contents these three areas – effective and accountable government, fair elections and political participation, and rule of law.

Education

Educated society is another assumption for the efficient and growing economy. Each country should therefore create favourable conditions for human education which support their literacy development. Building and modernization of educational institutions especially in the field of education helps to increase the ability of people and help them to apply their knowledge in practice not only in domestic country. Therefore, the education sub-index measures follow areas – access to education, quality of education and human capital.

Health

Good physical and mental health of citizens helps to increase their quality of life. The government should provide to every resident sufficient health care regardless of their financial background and social status. The level of healthcare is another important area examined in the quality of life indices. The Health sub-index is focused on examination of these areas: basic health outcomes, health infrastructure and mental health satisfaction.

Safety & Security

A stable social and political environment is important assumption for to ensure performance of country. Civil wars, the high crime rate or corruption prevents to growth of the economy. When people and institutions are unsafe it directs to decreasing of well-being up to the emigration of habitants. Within the LPI is therefore important to monitor the degree of safety and security. This sub-index includes two areas: national security and personal safety.

Personal Freedom

Where habitants enjoy freedom to express its opinion, faith and personal autonomy in society it has a significantly impact on their performance and well-being. The freedom of habitants is considered for granted but there still exist countries where freedom is restricted and prevents a personal development of people. Because of that, the sub-index Personal Freedom measures a level of individual freedom and social tolerance.

Social Capital

The Social Capital is last sub-index of all sub-indices of LPI. It examines a social cohesion and engagement, and community and family networks. For human being and happiness are social background and networks very important factor. People who have a good labour relationship and who are surrounded by family and friends have a greater assumption for faster personal development.

3. Results and research prospects

In the following section we present the results of our study. First of all we identify object of the research, present the methodology and results and in the end we present the prospects for further research.

3.1. Object of the research

To meet the main objective it is necessary to define the object of our research. We chose a set of countries that we compare based on the values of their indices and indicators. In our study we research EU28 countries, out of which we excluded Luxemburg, as it represented an extreme value. The special focus was put on V4 countries, namely Slovakia, Czech Republic, Hungary and Poland. As we mentioned in previous text we measure differences between two indices measuring quality of life. Out of many that exist, some of them shown in table 2, we chose Human Development Index and Legatum Prosperity Index.

In examining relationships between variables we based our research on available published data in databases as Eurostat, HDI report and LPI report for the period 2010–2012, respectively 2013 as for HDI, there are not available data for 2013, yet.

Table 2. Quality of life indices

INDICATOR		Number of sub – indicators
Genuine Progress Indicator	GPI	26
Quality of Life Index	QLI	9
Legatum Prosperity Index	LPI	8
Happy Planet Index 2.0	HPI	3
Human Development Index	HDI	3

Source: own processing

3.2. Results of the research

Based on available data for the years 2010 to 2012 (or 2013), we focused on analyzing dependencies between variables. Figure 2 presents LPI for V4 countries in 2003 according to sub-indicators. In terms of LPI, out of all EU28 counties Sweden was no. 1, followed by Denmark. On the other side and the worst LPI among EU28 countries was reached by Romania and Greece. In terms of V4 countries, Czech Republic reached overall 15th place, but the best among V4 countries, followed by Poland (18th), Slovakia (21st) and Hungary (22nd).

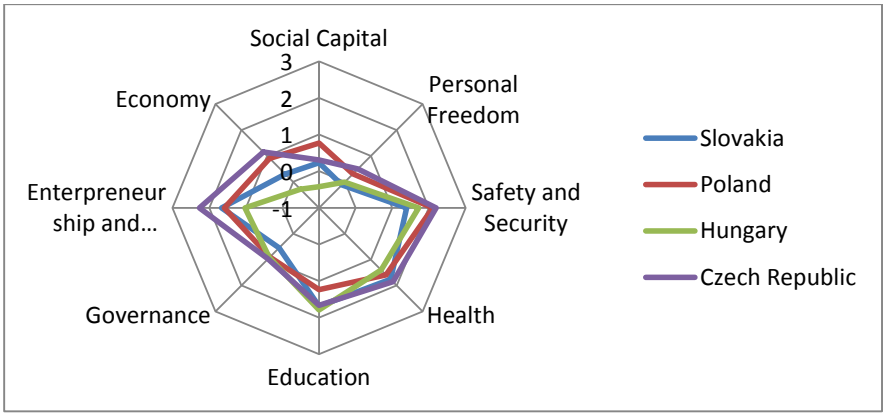

Fig. 2. LPI sub-indicators for V4 countries
Source: own processing according to Legatum Prosperity Index – Annual Report 2013

In terms of HDI indicators, the development and results of V4 countries is quite similar as shown in table 3. Overall among EU28 countries the best values were reached by Netherlands followed by Germany and on the other side, the lowest values were reached by Bulgaria and Romania. Among V4 countries was Czech Republic on 15th place overall, but reached the best score among V4, followed by Slovakia (20th), Hungary (21st) and Poland (22nd).

Table 3. HDI sub-indicators for V4 countries

HDI	Slovakia	Poland	Hungary	Czech Republic
Health	0.878	0.888	0.862	0.912
Education	0.87	0.819	0.89	0.916
Income	0.78	0.765	0.75	0.797

Source: own processing according to Human Development Report 2013

Thus, we have identified that among all the variables evaluated, there is a strong linear relationship. We can see that a linear relationship between HDI and LPI and LPI and GDP per capita is strong. This is confirmed by the high correlation coefficient (value greater than 0.8) and at the same time by the test of significance of the coefficient,

since the p-value is less than 0.05. In case of linear relationship between LPI and unemployment we monitor a moderately strong negative dependence. This can be justified precisely by the fact that the increase in the unemployment rate reduces the value of LPI also on the basis of a deterministic relationship.

Table 4. Correlation matrix for selected variables

Pearson Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations	LPI – real	HDI	HDP capita	Unemployment
LPI – real	1.00000	0.86772	0.82289	−0.45666
		<.0001	<.0001	<.0001
	106	78	78	99
HDI	0.86772	1.00000	0.63161	−0.33293
	<.0001		<.0001	0.0020
	78	84	84	84
HDP capita	0.82289	0.63161	1.00000	−0.42631
	<.0001	<.0001		<.0001
	78	84	84	84
Unemployment	−0.45666	−0.33293	−0.42631	1.00000
	<.0001	0.0020	<.0001	
	99	84	84	105

Source: own processing

For further investigation, we decided to focus deeply on the differences between European countries known as the V4 countries and other European countries. Above mentioned was also verified by differences between the V4 countries and other European countries. We verify this fact for a variable LPI and HDI. Our starting hypothesis was that economic growth does fully explain countries' levels of human development. The data, presented in Figure 2 comparing HDI scores to GDP per capita, clearly supports this hypothesis.

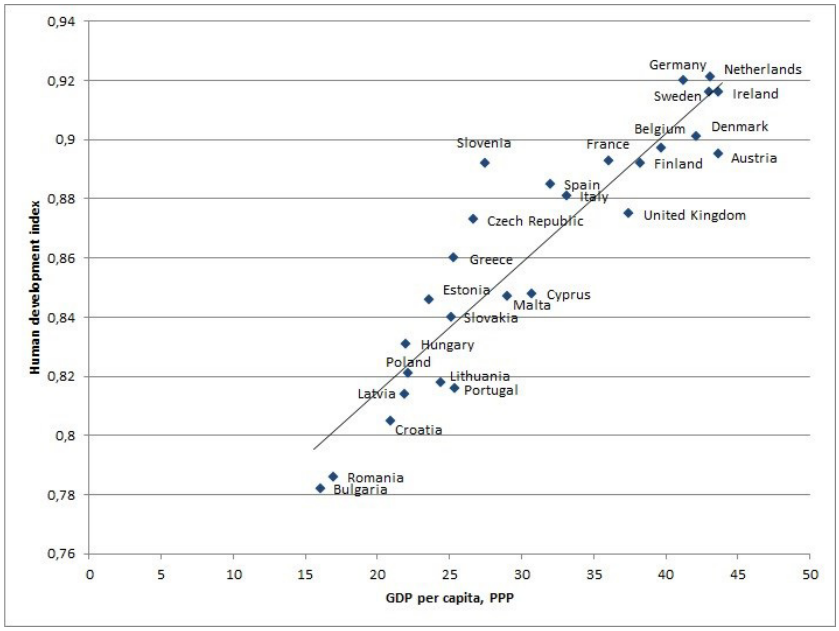

Fig. 3. HDI vs. GDP per capita
Source: own processing

In this case, we did not distinguish between countries in terms of the V4 countries and other European countries. Figure shows a substantial correlation between HDI and economic development. This is not surprising, given that countries with higher levels of income have greater resources to meet the needs of their populations. Data reveal significant divergences between HDI and economic development across the income spectrum. However, the high weighting of GDP in the model means that HDI is heavily reliant on economic rather than social indicators.

Table 5. Two sample t-test for variable HDI

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	82	1.99	0.0501
Satterthwaite	Unequal	29.993	3.22	0.0040

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	71	11	4.29	0.0113

Source: own processing

Out of the result of t-test is clear that there are significant differences in the mean value of the variable LPI between the V4 countries and other European countries, whereas the p-value (0.0040) is less than 0.0001 and thus we reject the null hypothesis of equality of those means. Considering the test methodology, we use Satterthwaite method, since the p-value of F-test is (0.0113) less than 0.05 and thus we reject the hypothesis of equality of variances.

The relationship between other measures of economic performance and quality of life, such as the Legatum Prosperity Index, are also revealing (see Figure 3).

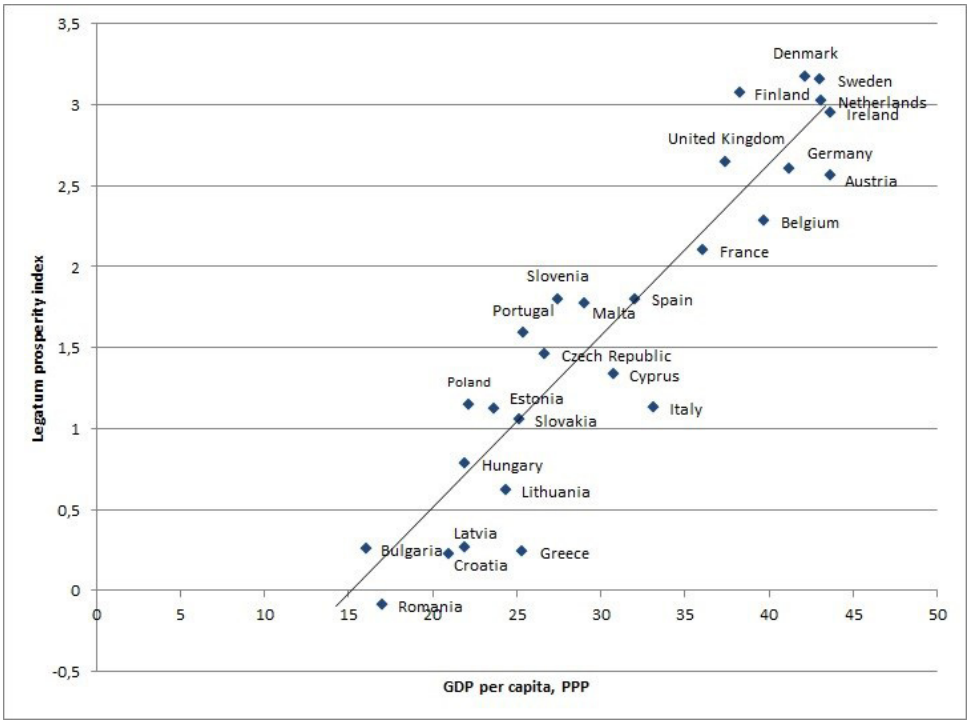

Fig. 4. LPI vs. GDP per capita
Source: own processing

Table 6. Two sample t-test for variable LPI

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	104	2.38	0.0192
Satterthwaite	Unequal	95.901	4.94	<.0001

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	89	15	17.21	<.0001

Source: own processing

Out of the result of t-test is clear that there are significant differences in the mean value of the variable LPI between the V4 countries and other European countries, whereas the p-value is less than 0.0001 and thus we reject the null hypothesis of equality of those means. Considering the test methodology, we use Satterthwaite method, since the p-value of F-test is less than 0.05 and thus we reject the hypothesis of equality of variances.

In addition, we monitored the differences in dependence between LPI and HDI in the countries according to their categorization, and thus the V4 countries and countries outside the V4, as in the previous section we identified differences in the mean values of these variables for different types of countries.

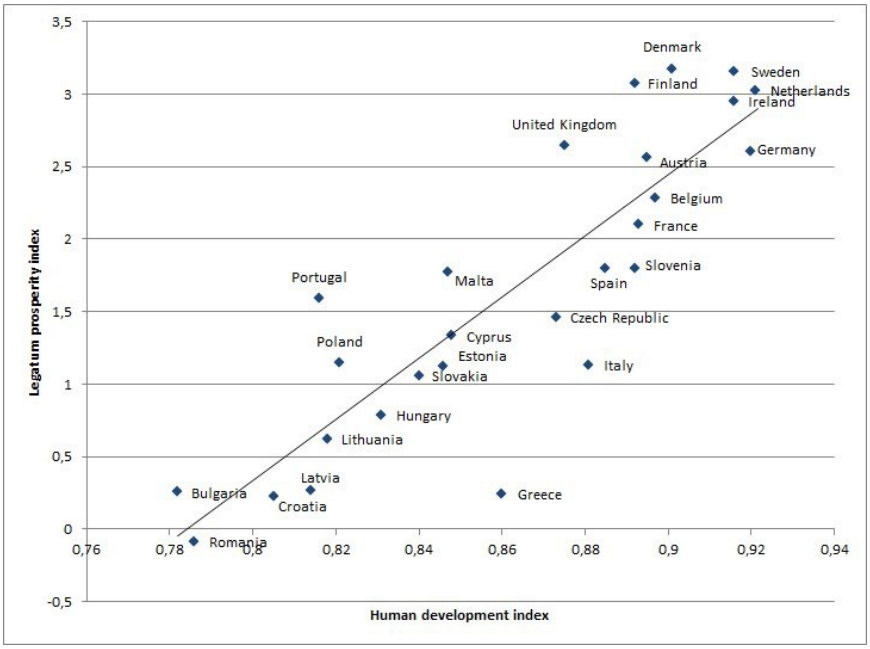

Fig. 5. LPI vs. HDI
Source: own processing

Table 7. Correlation coefficients for selected types of countries between HDI and LPI

Pearson Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations		HDI
non V4 countries	LPI – real	0.86981 <.0001 66
V4 countries	LPI – real	0.57508 0.0504 12

Source: own processing

Based on the mentioned, we can see that for countries that are not in the group V4 there is a strong linear relationship, which is clearly statistically significant (p-value less than 0.05). In contrast, in the case of V4, we can see that the correlation coefficient reaches the value greater than 0.5 and therefore we could consider the relationship as strong, but in this case, considering number of mutual pairs of data, this dependence is statistically insignificant. It should be stressed that the fact of fewer measurements plays a role in the case of not confirmed linear dependence.

4. Conclusion

Quality of life is a very complex concept. The quality of life for residents of any country is influenced by a number of factors such as economic, social, cultural, and environmental. In their classification, we record different approaches, perspectives and theories. Among many different indicators used to measure quality of life we selected for our analysis two indicators, namely The Human Development Index and The Legatum Prosperity Index. Even though those should reflect similar results we can monitor differences between them. It is cause mainly by

differences in indicators used, as LPI includes more sub-indicators and therefor reflects broaden spectrum of information and aspects. Lack of HDI is that it does not sufficiently cover several dimensions of human development – eg. poverty and income distribution justice, gender equality, housing, access to public services or markets, human and political rights, personal safety and so on. After performing this part of research we set the aim and scope for possible future research. To evaluate indicators of both indices would support our research with information about most significant sub-indicators, which effect HDI or LPI the most significantly. Therefore we propose to conduct further research on sensitivity of indices to a change of sub-indicators. Identification of significant indicators and disparities and detection of weaknesses is the basis for the subsequent adoption of appropriate measures to develop these critical areas. Development of these parts could support development of the country as a whole.

References

Andrejovský, P., Gajdoš, J., Hajduová, Z., Andrejkovič, M., 2012. Ecologisation of social development and quality. 12th international multidisciplinary scientific geoconference SGEM 2012, Albena, Bulgaria, 307−312.

Bramston, P., Chipuer, H., & Pretty, G., 2005. Conceptual principles of quality of life: an empirical exploration. Journal of Intellectual Disability Research, 49(10), 728−733.

Epley, D. & Menon, M., 2008. A method of assembling cross-sectional indicators into community quality of life. Social Indicators Research 88(2), 281−296.

EUROSTAT. http://epp.eurostat.ec.europa.eu /portal/page/portal/sector_accounts/data/annual_data> (Accessed:12.2.2014)

Hajduová, Z., Andrejovský, P., Gajdoš, J., Andrejkovič, M., 2011. Kvalita života a životné prostredie. Journal of innovations and applied statistics 1, 37−42.

ISOQL., 2008. Quality of Life Research., Journal of Quality of Life, no. 1136.

Matarrita-Cascante, D., 2010. Changing communities, community satisfaction, and quality of life: A view of multiple perceived indicators. Social Indicators Research 98, 105−127.

Paper, UNDP, New York, http://hdr.undp.org/en/media/HDI_methodology.pdf, (Accessed:12.2.2014)

Stiglitz, J.E., Sen, E.A. & Fitoussi J-P., 2009. Report by the Commission on the Measurement of Economic Performance and Social progress, www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf (Accessed:16.2.2014).

UNDP, International Human Development Indicators, http://hdrstats.undp.org/en/tables/, (Accessed: 14.2.2014).

The Legatum Prosperity Index – Annual Report 2013, http://media.prosperity.com/2013/pdf/publications/ PI2013Brochure_WEB.pdf, (Accessed:12.2.2014).