Montenegrin Journal of Economics

Vol. 12, No. 4 (2016), 141-156

Expanded Concept of Human Capital as Intangible Resource at Macro Level

ŽANETA KARAZIJIENĖ[1], and ARTŪRAS JURGELEVIČIUS[2]

[1] Assoc. prof., Mykolas Romeris University, Faculty of Economics and Finance, Institute of Economics, Ateities str. 20, LT-08303, Vilnius, Lithuania; zkarazijiene@mruni.eu
[2] Phd student in Economics, Mykolas Romeris University, Faculty of Economics and Finance, Institute of Economics, Ateities str. 20, LT-08303, Vilnius, Lithuania; jurgeleviciusarturas@yahoo.co.uk

ARTICLE INFO

Received August 11, 2016
Received in revised from – October 10, 2016
Accepted November 29, 2016
Available online December 15, 2016

JEL classification:

E24, E2, A13

DOI:
10.14254/1800-5845/2016.12-4.13

Keywords:

Human capital,
Quality of human capital,
Value orientation,
Composite indicator,
European countries

ABSTRACT

The subject of the research is the human capital as intangible resource at macro level in European countries. The aim of the research paper is to propose expanded concept of human capital differentiating it into three dimensions (qualitative, quantitative and value orientation) and empirically apply this concept for European countries. In the research paper, it is believed that classical understanding of human capital as skills, knowledge and educational attainment is incomplete. The values and attitudes are embodied in individuals the same as skills and knowledge. Having high level of educational attainment can be treated only as necessary but not sufficient requirement for human capital's value growth. It is assumed that value orientation is complementary for human capital value creation. To assess these relationships the composite indicator methodology has been applied. The results revealed that societies with higher qualitative dimension of human capital possess with more tolerance, more openness for different individuals with various cultural backgrounds, trust people more and are more motivational. The strong and positive relationship has been identified between these two dimensions. Scandinavian and Western European countries scored the highest points. Meanwhile Eastern, Central and Southern European countries were categorized as countries with low and very low scores. The conducted research points out the benchmark group of the level of accumulated human capital and lies strategic orientation for policy makers. It is essential and critical to understand the significance of expanded human capital concept as a key factor for economic development especially in the context of knowledge based economy.

INTRODUCTION

A great number of various scholars attempting to analyze from different aspects the nature of human capital and has been using cases studies, experiments and a variety of research methods. While these tremendous efforts have significantly contributed to understanding of the subject itself, nevertheless there are many unclear aspects on the concept and many hypothesis to be tested. The great challenge lays in the nature and definition of human capital as a fundamental source in knowledge driven economies. Broad, complex and multi-angle concept of human capital can take many forms in various contexts from cultural to economic or technological ones.

In recent economics, sociology and related disciplines the concepts of intangible capital and its various forms have emerged. The scholars analyzed these forms of capitals as a factor to economic growth or impact to economic development in general: health capital (Grossman, 1972), religious capital (Azzi and Ehrenberg, 1975), linguistic and cultural capital and symbolic (Bourdieu, 1977), reputational capital (Veljanovski and Whelan, 1983), social capital (Bourdieu, 1986; Coleman, 1988, 1990; Putnam, 1995) academic capital (Bourdieu, 1988), cultural or consumption capital (Becker and Murphy, 1988), cognitive capital (Rescher, 1989),), network capital (Sik, 1994), personal capital (Dei Ottati, 1994; Becker, 1996), political, social and cultural capital (Mouzelis, 1995), intellectual capital (Edvinsson and Malone., 1997), resource capital institutional capital (Oliver, 1997), spiritual capital (Verter, 2003), cultural or creativity capital (Florida and Tinagli, 2004), collective trust capital (Castelfranchi et al., 2006).

However, deeper analysis of these forms of capitals suggests that human capital, fundamentally, is the source for other forms of intangible capital. Since everything has become the capital there is no point to create unclear and confusing forms of capitals but focus and improve the concept of existed human capital. The aim of the research paper is to propose expanded concept of human capital differentiating it into three dimensions (qualitative, quantitative and value orientation) as intangible resource and empirically apply this concept for European countries

1. PROPOSAL FOR EXPANDED DIMENSIONS OF HUMAN CAPITAL CONCEPT

In a vast majority of studies human capital refers to the following definition: the skills the labor force possesses and is regarded as a resource or asset. Most of researcher view human capital as knowledge, skills, education and abilities embedded in an individual (Kagochi and Jolly, 2010; Beach, 2009, Alan et al., 2008; Garavan et al., 2001). These dimensions can be acquired by formal and informal education or working experience (Barney, 2011; Kagochi and Jolly, 2010).

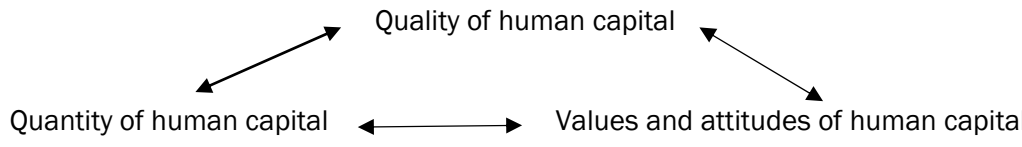
Another view point on human capital is linked to production oriented perspective. Authors claim that human capital is a key source of economic productivity (Romer, 1990). Skills represent individual capacities contributing to production as an argument in the production function (Bowles and Gintis, 2001). Frank and Bemanke (2007) define human capital as a bunch of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness, lifelong learning and initiative that affect the value of a worker's marginal products. Sullivan and Sheffrin (2003) argue skills and knowledge are necessary for human capital to produce economic value. In this context, human capital studies focused on investment – return approach and the main determinants were analyzed in three ways: formal schooling (individual devotes his time to learning at school and universities), learning at the job place (trainings provided by employer) and off the job training (learning new skills not at work place). All these researches support idea that higher skills, more experience and higher level of educational attainment increase the earnings of individual and make higher productivity for the firms and economic growth in more general.

One more view on human capital tries to integrate more qualitative aspect. The most popular qualitative dimension of human capital is considered to be health (Akbari et al., 2012, Barney, 2011; Nureev, 2010; De la Fuente and Ciccone, 2002). Some empirical studies human capital's quality interpret as relative cognitive skills measuring by scores of students in math and science (Laabas and Razzak, 2011). Hanushek and Woessmann (2015, 2012) to the scores on math and science additionally introduce reading achievements as cognitive skills as well. Authors claim that not only years of schooling is important but the quality of schools as well. After correlation analysis, Balcerzak (2016) produces six indicators that reflects the quality of human capital: effectiveness of labor force, employment rate among people in the age 55-64, educational attainment, participation rate in education and trainings, R&D expenditure, tertiary graduates in science and technology.

Meanwhile authoritative economic international organizations World Bank and World Economic Forum and later OECD introduce qualitative measures for human capital. The scope of dimensions acquire quality of education system, quality of primary schools, healthy years beyond 65, high skills employment shares. Quality of math and science education has become very significant dimension in human capital's quality analysis. Math and science education associates with the cognitive skills which is measured by IQ tests and presents human ability to learn, memorize and connect abstract ideas (Kauts et al, 2015). However, above mentioned economic organizations do not provide deeper relationship analysis of human capital quantity and quality dimensions. Very recent studies suggest that analyzing human capital without non-cognitive skills is incomplete and does not provide full understanding of human capital theory. Authors contributing in human capital theory (Kauts et al., 2015; Lunberg, 2015) emphasis openness, conscientiousness, extraversion, agreeableness and neuroticism as personal traits. Research shows that scores on IQ tests much depends on people motivation rather than level of education (Borghans et al., 2008; Segal, 2012). The higher motivation of person, the higher IQ test results.

This paper suggests to expand and empirically test the concept of human capital claiming that traditional dimensions of human capital do not reflect the whole idea of human capital theory and human values, attitudes are not least important than skills and education. In the paper, it is believed that the increase of the stock of human capital by educational or skills dimensions alone will not ensure social or economic progress. Some values embodied in individual might stimulate or hinder the qualitative dimensions of human capital. In general authors agree that values or attitudes are a part of human capital. Rastogi (2002) and Youndt et al (2004) conceptualizes the human capital as knowledge, competency, attitude and behavior embedded in an individual. Gižienė and Simanavičienė (2012) conducted literature review of historical developments of the term of human capital summarize that human capital is composed not only of knowledge, skills and experience but motivation, personality type, genes, value system, health and many other personal traits. Similar definition is proposed by Potelienė and Tamašauskienė (2014) that human capital apart its classical components implies motivation, insightfulness, attitudes, behavior, physical and emotional health, energy. All these traits are oriented in order to increase individual productivity and generate income.

Figure 1. Proposed dimensions of expanded concept of human capital at macro level



Source: Authors' creation

However, there is a great lack of empirical attempts to evaluate its level and impacts in the context of human capital theory. In this paper the concept of human capital is expanded and presented in three dimensions at macro level: qualitative, quantitative and value orientation dimensions Fig. 1.

Value orientation presents several critical values recently researched in scientific literature: tolerance, cultural openness and diversity, trust. Recent literature suggest that these values encourage individuals be more initiative, ensures social interactions, treat people from various backgrounds as equal (Florida, 2002; Florida and Tinagli, 2004; Berggren et al., 2016; Berggren and Nilsson, 2015; Berggren and Nilsson, 2013; Berggren and Elinder, 2012; Correia and Costa, 2014; Global Creative index, 2015; Hui et al., 2005). Culturally more diverse environment more intensively create and transfers knowledge. Also these values are important for economic freedom and self expression. It is observed that regions with more tolerant and diverse environment more easily attract creative class and fuel more economic growth.

In the context of human capital, tolerance, trust and openness ensure the access to various people, facilitate the interaction and communication with them. It helps to receive more exchange with more knowledge and stimulate the cognitive skills of human being.

2. RESEARCH METHODOLOGY

The methodology of the research has been planned and carried out based on views of Rajasekar et al. (2013), Ginevicius and Podvezko (2008a, 2008b, 2008c), Singh (2006), Kumar (2005), OECD (2008). The research has been divided into eight parts: in the first part, scientific literature in the area of intangible capital was analyzed and the expanded concept of human capital theory has been proposed. In the second part, preliminary indicators for evaluation have been selected and data has been collected. In the third part, imputation of missing data has been conducted. In the fourth part, normalization of data was done. In the fifth part, after correlation matrix final indicators were selected, weighting and aggregation process was accomplished. In the sixth part, composite indicator of human capital was estimated. In the seventh part, raised hypothesis have been tested. Finally, in the eighth part, results have been interpreted and conclusions have been drawn.

To estimate the level of three dimensions, composite indicator has been constructed for each dimension. Composite indicator (sometimes named as summary or synthetic indicator) is increasingly used method to evaluate complex social and economic phenomena (Novickytė et al., 2016; Sarkar, 2013; Prascevic and Prascevic, 2013; Žvirblis and Rimkevičiūtė, 2012; Jokšienė and Žvirblis, 2011; Simanavičienė 2011; Ginevičius and Podvezko, 2008b; OECD, 2008). OECD (2008) has pointed out the main advantages of the method: can summarize complex, multi-dimensional realities with a view to supporting decision makers; are easier to interpret than a battery of many separate indicators; can assess progress of countries over time; reduce the visible size of a set of indicators without dropping the underlying information base; thus make it possible to include more information within the existing size limit; enable users to compare complex dimensions effectively. However, one of the most important preconditions to avoid mistakes while constructing composite indicator remains that the process must be transparent and sensitivity of selected indicators to final results must be conducted.

The choice of selection of indicators to evaluate multi-dimensional phenomena is subjective process and essentially depended on the author's subjective understanding as well as review of scientific literature (Ginevicius and Podvezko, 2008a; OECD; 2008). Combining both scientific literature review and data availability at macro level, in order to evaluate human capital's level in European countries, indicators have been selected in a way to present three dimensions of human capital: quantity of human capital, quality of human capital and values, attitudes and non-cognitive skills of human capital which was named as value orientation.

To collect necessary indicators, secondary data from following databases were used: World Development Indicators (for indicators X_6, Z_2), UNESCO (for indicator X_4), EUROSTAT and Life Expectancy Database (for indicator X_5) European Value Survey (for indicators, $V_1, V_2, V_3, V_4, V_5, V_6, V_7, V_8$), World Economic Forum reports (for indicators X_1, X_2, X_3), United Nations (for indicator Z_1). All in all, 16 preliminary indicators where integrated in human capital's evaluation system.

The period of analysis was chosen 2008-2010. Mainly it was determined by the latest available indicators of European Value Survey. The arithmetic averages of these three consequent years were estimated in order to identify the level of researched dimensions. The arithmetic averages also contribute in reducing potential negative impact of possible outliers for chosen years. The sample seize of 37 countries based on the continent of Europe was selected. While determining the sample seize, main criteria was following. The states should be as homogeneous as possible. The key criteria for homogeneity is hold relatively similar cultural values, market economy orientation and geographical location in Europe. It is believed that these countries are similar enough in comparison with the rest world's states. The availability of qualitative data was considered as well.

As a result, 1184 observations were taken into account while analyzing primary data.

Table 1. Preliminary formed system of indicators for measuring the level of human capital at macro level in European countries

Dimension	Subdimension	Indicator		
Quality dimension of HC	Cognitive skills	Quality of math and science education	max	X_1
		Quality of the educational system	max	X_2
		Quality of primary education	max	X_3
	Health	Life expectancy at birth	max	X_4
		Life expectancy at 65 age	max	X_5
		Health expenditure by GDP	max	X_6
Quantity dimension of HC	Education attainment	Mean years of schooling	max	Z_1
		Labor force with tertiary education	max	Z_2
Values orientation of HC	Tolerance	People that wouldn't like to have Muslims as neighbours	min	V_1
		People that wouldn't like to have homosexuals as neighbours	min	V_2
	Openness	People that wouldn't like to have people of a different race as neighbours	min	V_3
		People that would say they are not a religious person	max	V_4
	Trust	People that say, generally speaking, most people can be trusted	max	V_5
	Diversity	People that wouldn't like to have immigrants / foreign workers as neighbours	min	V_6
	Motivation Optimism	Degree of satisfaction with one's life	max	V_7
		Degree of satisfaction with one's job	max	V_8

Source: Authors' creation

Selected indicators presented in the Table 1. The indicators had both directions of its values: maximizing and minimizing ones. Indicators $X_1, X_2, X_3, X_4, X_5, X_6, Z_1, Z_2, V_4, V_5, V_7, V_8$ were classified

as maximizing indicators. That means that higher value of indicator presents better performance of analyzed object. Indicators V_1, V_2, V_3 V_6 were classified as minimizing indicators which means that higher value of the indicator presents worse performance of analyzed object. Indicators X_1, X_2, X_3, and V_4 deserve additional explanations. In the analyzed context, regarding to indicator V_4 it is assumed that people that are less religious they are less dogmatic and more open. On contrary, more religious people treated as more conservative, hold traditions and customs. Less religious people are more likely accept new ideas, question accepted social order and will not be afraid to act in a way which is not particular for community. As a result, indicator V_4 was classified as maximizing.

Regarding to indicators X_1, X_2, X_3, primary data was available in rankings from World Economics Forum's reports which value would be interpreted as minimizing. As a result, these indicators were transformed in maximizing interpretation as well. For multi-criteria evaluation all other minimizing indicators must be transformed in a way that higher value of indicator would present better performance for the object. To do such transformations, the formulas 1 and 2 have been applied.

$$\frac{\min_n ri}{rin} = \check{r}_{in} \quad (1)$$

And

$$max_{rin} - r_{ij} = \check{r}_{in} \quad (2)$$

Where $\tilde{r}_{in}$- is normalized indicator in a given country *i* by feature *n*, r_{in} - is an actual value of the indicator in a given country *i* by the feature *n*, max(r_{in}) – the highest value of the indicator of given country *i* of the sample by the feature *n*, min(r_{in})- the lowest value of the indicator of the given country *i* of the sample by feature *n*. However, if the 1 formula is proposed by other authors (Hwang and Yoon, 1981; Podvezko, 2008c) as the correct one for such transformations, it was irrelevant for this research. After transformation, correlation coefficients of newly transformed data and primary one were unacceptable because in all cases coefficient was less than 0.6. Meanwhile correlation coefficient was -1 in all cases using formula 2 proposed by authors of the paper. This means that data transformation was done without loss in data validity.

In some cases, missing data imputation was accomplished. Missing data was filled by the average of nearest neighbor method. In other cases, the averages of indicators where estimated in order to not distort the data (OECD, 2008). Missing data imputation was done less than to 1% of all observations. It is possible to conclude that missing data imputation does not impact deviation of final estimations and only support validity of it. Having selected and transformed necessary data, the further step is the normalization of the indicators. As all indicators are of different measurement units, the data aggregation must be done in order to be able to compare objects among themselves and estimate composite indicator.

In scientific literature, a number of normalization methods exists: ranking (Fagerberg, 2001), standardization (z-scores) (OECD, 2008), methods for cyclical indicators (EC, 2004) etc. However, every method implies bias. One of the most reliable and widely applied normalizations method is mini-max method presented in the formula 3.

$$\tilde{r}_{in} = \frac{r_{in} - \min(r_{in})}{\max(r_{in}) - \min(r_{in})} \quad (3)$$

Where $\tilde{r}_{in}$- is normalized indicator in a given country *i* by feature *n*, r_{in} - is an actual value of the indicator in a given country *i* by the feature *n*, max(r_{in}) – the highest value of the indicator of given country *i* of the sample by the feature *n*, min(r_{in})- the lowest value of the indicator of the given country *i* of the sample by feature *n*.

In this way, the countries could be ranked in respect of other countries. The ranking of performance of one country depends on the ranking of performance of other countries. Using mentioned formula, the highest score is 1, the lowest 0. If a country scored maximum ranks in all dimensions and indicators, it would have maximum score of 1.

For further analysis for estimations of composite indicators, the information value should be assessed. Information value means that indicators should not present the similar information otherwise it might distort estimations. Further, the correlation matrix was applied for each of three dimensions' indicators. In the case of current research work, indicators V_3 and V_6, V_7 and V_8, X_2 and X_3 had high correlation because correlation coefficient was above 0.8 (Hellwig, 1972).

Regarding to X_2 and X_3 indicators, summary statistics have been done. It was identified that these two variables distributed almost by normal distribution because key criteria obey to the rule of normal distribution. To decide which indicator should be left and which should be removed from analysis, the qualitative dimension of human capital was estimated without X_2 but with X_3 and then with X_2 but without X_3. As a result, indicator X_3 was removed since correlation coefficient between X_2 and other indicators was slightly higher. From logical point of view, it was assessed that quality of education system more worth to be introduced to further analysis than quality of primary education system.

Regarding to V_6 and V_3, indicators showed very similar normal distribution results. Consequently, indicator V_6 was removed because indicator V_3 has deeper logical meaning in the analyzed context. It is believed that the value and attitude of an individual can be better presented by neighbor with different race than workers with different race in general since the first one is closer to an individual everyday life. Regarding to indicators V_7 and V_8, high correlation coefficient was observed as well. However, summary statistics proposed that indicator V_8 should be removed from analysis because coefficient of variation and skewness of V_7 was closer to criteria for normal distribution. After these estimations, the weights to composite indicators can be given. A number of methods to estimate weights is used in empirical research: COPRAS, TOPSIS, VIKOR, SAW, PROMETHEE, budget allocation processes, analytical hierarchy processes, "benefit of the doubt" (Bogdanovic and Miletic, 2014; Drejeris, 2014; Podvezko et al., 2010; Ginevičius et al., 2013, 2009, 2008; Tvaronavičienė et al., 2008, OECD, 2008).

All of methods, basically, can be grouped in two categories: objective and subjective ones. Objective methods are based on neutral mathematical estimations eliminating the risk of human mistake or subjective opinion. The subjective methods are based on subjective opinion of experts or groups of people. It may vary according to experts' experience, mood, educational or cultural backgrounds. Particularly, each single method implies advantages and disadvantages for final estimations. A number of authors have compared the validity and sensitivity of each method. Opricovic and Tzeng (2002) compared VIKOR and TOPSIS methods and came to conclusion that TOPSIS is more sensitive to the initial data instability than VIKOR. Another authors came to similar results (Simanavičienė, 2011). V. Podvezko (2011) has performed calculations and claim that SAW and COPRAS methods provide the same results while all indicators are maximizing. However, authors claims that including minimizing indicators, SAW methods becomes more stable than COPRAS. Meanwhile Ginevičius and Krivka (2009) in their analysis concluded that analyzed methods provide coincided results (SAW, VS, COPRAS, TOPSIS).

To conclude, it is important to mention that there is no only one the best method to give weight to composite indictor. However, as many previous discussed authors agree that in most of the cases, there is hardly difference among subjective methods (TOPSIS, COPRAS, VIKOR, PROMETHEE). However, probably the greatest drawback of these methods is that for estimations experts' opinions should be evaluated. In analyzed context, it is believed that these methods are not appropriate.

The significance of quantitative, qualitative and value orientation dimensions in European countries capture different impact on economic and social developments in these countries.

Using subjective methods for weights evaluations, countries should be divided into various groups as clusters and from each cluster representative number of experts should be interviewed. It is estimated that following this methodology more than 50 experts' opinions should be evaluated to have reliable results. Authors of the research paper believe that it is efficient enough to apply less time and cost consuming methods which are reliable, validate and widely used as well. The SAW (*Simple Additive Weighting*) was used to estimate the weights of indicators. All variables are given the same weights. Essentially, this implies that all variables are worth the same in the composite indicator. This method reduces the risk of subjective opinion. Formula of estimations presented in formula 4.

$$S_j = \sum_{i=1}^{m} \omega_n \widetilde{r_{in}} \quad (4)$$

Where S_j – value of composite indicator, $\tilde{r}_{ij}$- is normalized indicator in a given country *i* by feature *n*, ω_n- weight for indicator *n*. Equal weights does not mean that there is no weights at all. Since there are some 13 indicators chosen in total, the weights for each indicator is estimated by formula no 5. It is worth mentioning that equal weights were different for all three dimensions.

$$\omega_n = \frac{1}{\sum_{j=1}^{n} r_{ij}} \quad (5)$$

Where ω_n - weight for indicator *n*, r_{ij} - number of indicators. Finally, hypothesis of the research were formulated as following. (see table 2)

Table 2. Hypothesis of the research

H_1	There is statistically significant relationship between value orientation and qualitative dimension of human capital.	H_0: ρ = 0 H_1: ρ ≠ 0
H_2	There is statistically significant relationship between human qualitative and quantitative dimensions.	H_0: ρ = 0 H_2: ρ ≠ 0
H_3	There is statistically significant relationship between value orientation and quantitative dimension of human capital.	H_0: ρ = 0 H_3: ρ ≠ 0

Source: Authors' creation

The correlation coefficient was interpreted based on views of Čekanavičius and Murauskas (2004) (see table 3). Correlation coefficient can show the relationship between two linearly on each other depended variables. However, correlation relationship does not imply causality explanations. To explain causal relationship other methods should be applied.

Table 3. Interpretation of correlation coefficient

	r	0 < r < 0.3	0.3 < r < 0.5	0.5 < r < 0.7	0.7 < r < 0.9	0.9 < r < 1
Relationship status		Very weak	weak	modest	strong	Very strong

Source: Adopted by Čekanavičius and Murauskas (2004)

All estimations have been completed using Microsoft Excel program and econometrical program GRETL.

3. RESULTS AND DISCUSSIONS

Conducted analysis and estimations presented in table 4. Countries have been grouped in the clusters from 1 to 5 which essentially can be interpreted as following. Countries scored the highest rankings grouped in first cluster with very high dimension values. In the second cluster countries with relatively high scores are grouped. Countries with average scores were classified in third cluster. Low and very low scores were presented in fourth and fifth clusters respectively.

Table 4. Rankings of countries by qualitative, quantitative and value orientation dimension

No	*Qualitative dimension of HC*			*Quantitative dimension of HC*			*Value orientation of HC*		
	Country's name	*C**	*Value*	*Country's name*	*C*	*Value*	*Country's name*	*C*	*Value*
1.	Switzerland	1	0,93	Russian Feder.	1	0,91	Norway	1	0,89
2.	Norway	1	0,84	United Kingdom	2	0,76	Sweden	1	0,85
3.	Iceland	1	0,83	Norway	2	0,73	Denmark	1	0,85
4.	Denmark	1	0,83	Ireland	2	0,72	Iceland	1	0,82
5.	Sweden	1	0,80	Switzerland	2	0,72	Switzerland	1	0,81
6.	Belgium	2	0,79	Lithuania	2	0,70	Netherlands	2	0,78
7.	France	2	0,77	Estonia	2	0,68	United Kingdom	2	0,76
8.	Netherlands	2	0,77	Denmark	2	0,67	Finland	2	0,74
9.	Ireland	2	0,77	Luxembourg	2	0,66	France	2	0,73
10.	Finland	2	0,77	Germany	2	0,66	Spain	2	0,71
11.	Luxembourg	2	0,76	Belgium	2	0,65	Belgium	2	0,70
12.	Austria	2	0,70	Cyprus	2	0,65	Germany	2	0,68
13.	Malta	2	0,67	Sweden	2	0,63	Ireland	2	0,67
14.	Cyprus	3	0,66	Netherlands	2	0,62	Luxembourg	2	0,65
15.	United Kingdom	3	0,65	Latvia	3	0,57	Czech Republic	3	0,55
16.	Germany	3	0,62	France	3	0,55	Hungary	3	0,55
17.	Slovenia	3	0,60	Finland	3	0,55	Austria	3	0,53
18.	Czech Republic	3	0,59	Slovenia	3	0,54	Portugal	3	0,51
19.	Montenegro	4	0,49	Poland	3	0,53	Malta	3	0,50
20.	Albania	4	0,46	Hungary	3	0,50	Greece	3	0,47
21.	Greece	4	0,46	Czech Republic	3	0,48	Italy	3	0,47
22.	Estonia	4	0,46	Iceland	3	0,48	Slovak Republic	3	0,45
23.	Spain	4	0,46	Bulgaria	3	0,45	Montenegro	3	0,44
24.	Poland	4	0,45	Spain	3	0,45	Estonia	3	0,44
25.	Italy	4	0,43	Slovak Republic	3	0,43	Croatia	3	0,42
26.	Bosnia and Herz.	4	0,42	Montenegro	3	0,43	Poland	4	0,39
27.	Macedonia	4	0,42	Greece	3	0,43	Bosnia and Herz.	4	0,39
28.	Croatia	4	0,40	Croatia	4	0,39	Slovenia	4	0,38
29.	Serbia	5	0,38	Austria	4	0,38	Latvia	4	0,37
30.	Romania	5	0,35	Serbia	4	0,35	Bulgaria	4	0,36
31.	Lithuania	5	0,35	Romania	4	0,32	Russian Feder.	4	0,36
32.	Russian Fed.	5	0,33	Italy	4	0,27	Romania	4	0,35
33.	Hungary	5	0,33	Malta	4	0,27	Cyprus	4	0,32
34.	Bulgaria	5	0,33	Albania	5	0,17	Macedonia, FYR	4	0,28
35.	Portugal	5	0,32	Macedonia, FYR	5	0,15	Serbia	4	0,28
36.	Latvia	5	0,29	Portugal	5	0,10	Lithuania	5	0,23
37.	Slovak Rep.	5	0,28	Bosnia and Herz.	5	0,00	Albania	5	0,16

*the number of clusters

Source: Authors' estimations

Cluster analysis was conducted using k-means method. All variation was divided into 5 equal intervals taking maximum and minimum values of the variation into account. After that, the center points of each cluster was estimated. The differences of the nearest object of two clusters' middle points were estimated.

The country was grouped in that cluster where it had smaller difference between two nearest cluster's centers. Having newly clustered objects, the centers and differences between centers and objects where re-estimated. In this case, only two countries had to change primary clusters. For qualitative dimension, Croatia was classified from 5th cluster to 4th cluster and for value orientation dimension, Lithuania was classified from 4th cluster to 5th cluster.

For qualitative dimension, Switzerland and all Scandinavian countries presented very high scores. This group can be treated as benchmark group for the rest variation.

Apparently, through very well established all level of education systems, these countries developed cognitive skills. Cognitive skills may lead people to live healthier life style which reflects in longer duration of life. On contrary, poorly developed education systems are not able to generate outcomes as human capital with high cognitive skills and reflects in less rational life living. Such countries grouped in 4th and 5th clusters.

It is important to note that a great number of countries have scored higher rankings on quality of math and science education and less on quality of education systems. These are some countries that had high differences and mismatch by these two indicators: Bulgaria, Bosnia and Herzegovina, Croatia, Greece, Hungary, Lithuania, Romania, Slovak Republic and Serbia. Very likely that inefficient and ineffective education systems and institutions can hinder the organic potential of human capital of these countries and stimulate brain drain.

For quantitative dimension, the variation of countries are more polarized. On one hand, some countries have reached knowledge based economic development stage and possess high qualitative dimensions. On other hand, countries experience the development stage by increasing its quantitative potential which can be transformed later into higher qualitative dimension. However, countries in 4th and 5th clusters can be at high risk while transiting to the next stage of economic development.

In value orientation dimension, countries have split similarly as in qualitative dimension. The 1st and 2nd clusters are strictly formed only by Scandinavian and Western European countries leaving Central, Eastern and Southern European countries in the rest three clusters. Societies of the countries in these first two clusters are more open, more tolerant, trust people more, and accept diversity of values of other people, being more optimistic and motivational. It seems that qualitative and value orientation dimensions may have reasonable correlation. However, the statistical relationship of them are analyzed below.

It was doubted whether Russian Federation quantitative dimension can be interpreted as outlier or not and whether it can hinder the results in further analysis or not since only one country formed one cluster. To test possible impact on results, correlation matrix has been done with and without Russian Federation's observed values (see table 5).

Table 5. Correlation coefficient comparison

Correlation coefficients, using the observations 1 – 37			*Correlation coefficients, using the observations 1 – 36*			
Quality	Quantity	Values	Quality	Quantity	Values	
1,0000	0,4336	0,7864	1,0000	0,5491	0,7814	Quality
	1,0000	0,4458		1,0000	0,5367	Quantity
		1,0000			1,0000	Values

Source: Authors' estimations

Since after analysis the correlation coefficients has changed even by 0.1 points, it was decided to remove this observation from hypothesis testing procedures while testing H_2 and H_3.

The correlation coefficient for value and quality orientation has not changed significantly so in further analysis this object has been left.

Table 6. Descriptive statistics of estimated composite indicators

Variable	Mean	Median	Minimum	Maximum
quality	0,561118	0,494547	0,280000	0,955993
quantity	0,501080	0,528353	0,00000	0,908333
values	0,536454	0,500000	0,160000	0,893017
Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
quality	0,197116	0,351292	0,221275	-1,33420
quantity	0,201889	0,402908	-0,531997	-0,0843308
values	0,199536	0,371953	0,161902	-1,10753
Variable	5% Perc.	95% Perc.	IQ range	Missing obs.
quality	0,289000	0,851599	0,383024	0
quantity	0,0869223	0,773184	0,267414	0
values	0,223000	0,855881	0,345000	0

Source: Authors' estimations

Descriptive statistic and distribution of estimated composite indicators is presented in the table 6.

Finally, hypothesis has been tested.

First hypothesis stated that there is statistically significant relationship between value orientation and qualitative dimension of human capital. H_0: $\rho = 0$ H_1: $\rho \neq 0$

It was identified that correlation coefficient is 0.78 which presents strong and positive relationship between two variables and two tailed p-value 0,0000. As a result, under the null hypothesis of no correlation, hypothesis H_0 must be rejected and alternative H_1 accepted.

Second hypothesis stated that there is statistically significant relationship between human qualitative and quantitative dimensions. H_0: $\rho = 0$ H_2: $\rho \neq 0$

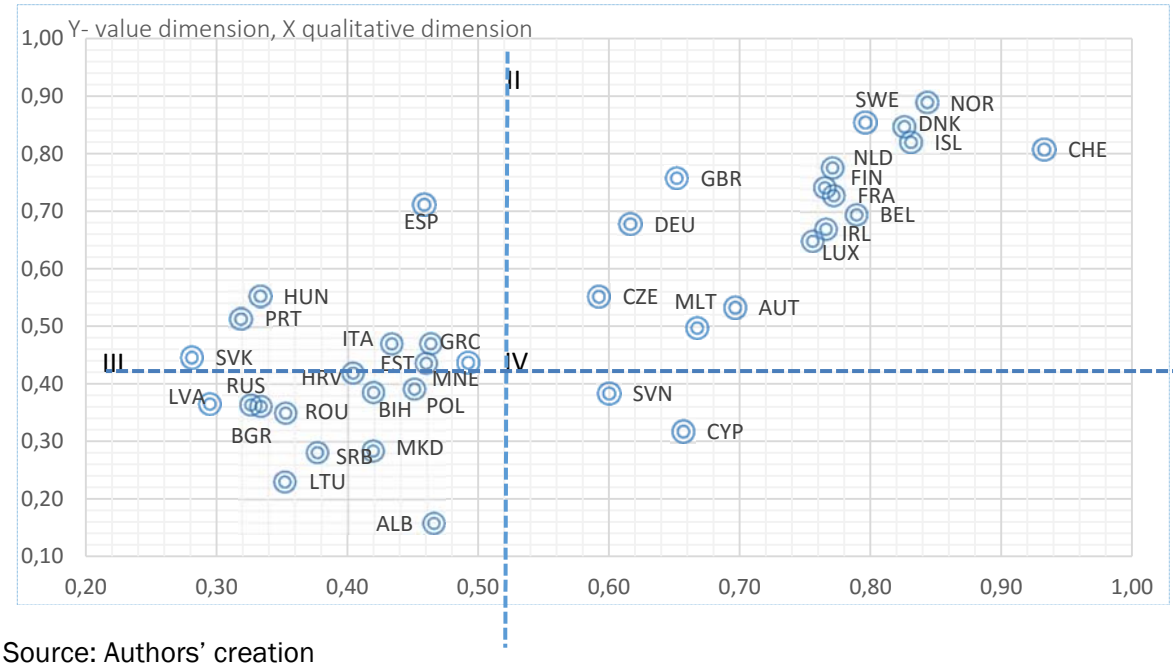
It was identified that correlation coefficient is 0.55 which presents modest and positive relationship between two variables and two tailed p-value 0,007. As a result, under the null hypothesis of no correlation, hypothesis H_0 must be rejected and alternative H_2 accepted even if relationship is modest.

Third hypothesis stated that there is statistically significant between value orientation and quantitative dimension of human capital. H_0: $\rho = 0$ H_3: $\rho \neq 0$

It was identified that correlation coefficient is 0.53 which presents modest and positive relationship between two variables and two tailed p-value 0,005. As a result, under the null hypothesis of no correlation, hypothesis H_0 must be rejected and alternative H_3 accepted even if relationship is modest.

Figure 2 shows the visual distribution of countries by qualitative (X axis) and value orientation (Y axis) dimensions. The chart is relatively divided into four quadrants by middle points in each axis.

Figure 2. Combination of value orientation and qualitative dimension of human capital



Source: Authors' creation

In the I quadrant countries appear with higher value orientation than quality orientation. In the second quadrant both value orientation and quality dimensions are very high. In the third quadrant both value orientation and qualitative dimensions are low. Meanwhile in the fourth quadrant quality are higher than value orientation.

A great discussion of the matrix lies how countries can move from one quadrant to another. Namely it is very important for countries being in the third and fourth quadrants. Cognitive skills and value orientation cannot be improved over short period of time. Basically, it can be the matter of a few generations.

Recent literature studies and conductive empirical research can propose that people with higher cognitive skills are more open, tolerant and more trust people in general. Perhaps this is because people are more confident and feel that they are able to behave in a way to protect themselves and reduce the level of uncertainty in the life.

People possessing less knowledge and having less cognitive skills feel uncertainty and fear more and attempt to isolate themselves from social interaction with others. Societies with less qualitative dimension are more archaic and conservative. It is more believed in the traditions and customs, societal structure are more hierarchical, it is more believed in the fatality.

Apparently, such societal structure and values embedded in individuals do not stimulate creativity, knowledge creation and transfers. Having access to smaller number of informational sources do not empower cognitive skills of individuals. And on contrary, more open societies sharing their knowledge and information which diversify the source of received knowledge and that stimulate cognitive skills of individuals.

CONCLUSIONS

To sum up, the objective of the paper was to propose expanded concept of human capital as intangible resource at macro level by dividing human capital into three dimensions: quality of human capital, quantity of human capital and value orientation. It was claiming that skills and knowledge -as it is understood in classical concept of human capital – alone does not form the complete concept of human capital.

Values, attitudes, personal traits and behavior of human can be as significant as gained skills and attained education. It is believed that values and attitudes are embodied in individual.

It was discovered that value orientation and qualitative dimension of human are closely interact with each other. On one hand, more open, more tolerant, diverse societies who trust other people more possess with higher cognitive skills and better health. On other hand, people with more developed cognitive skills and better health more willing to accept diverse people with different cultural background. This leads to higher level of communication, idea and knowledge generation and exchange. The multi polar sources of knowledge encourage the improvements of cognitive skills.

For the time being it is too early to suggest the causal relationship between these two dimensions. It should be understood as complementary ones. The analysis of causality relationship is seen as future research.

Apparently, Scandinavian countries with Western European countries possess the highest level of human capital which lay foundation for economic development especially for knowledge based economy. Meanwhile Eastern, Central and Southern European countries need almost double its human capital in order to achieve current level of human capital of Scandinavian and most of Western European societies.

REFERENCES

Akbari, N., Moayedfar, R., Jouzaryan, F. (2012), "The study and analysis of short run and long run effects of human capital on the economic growth in Iran", *Economics and Finance Review*, Vol 1, No. 11, pp. 1–9.

Alan, K. M. A., Altman, Y., Roussel, J. (2008). Employee Training Needs and Perceived Value of Training in the Pearl River Delta of China: A Human Capital Development Approach", *Journal of European Industrial Trainning*, Vol. 32, No. 1, pp. 19-31.

Azzi, C., Ehrenberg, R. (1975), "Household allocation of time and church attendance", *Journal of Political Economy*, Vol. 38, No. 1, pp. 27–56.

Balcerzak, A. P. (2016), "Multiply-criteria evaluation of quality of human capital in the European Union countries", *Economics and Sociology*, Vol. 9, No 2, pp. 11-26.

Barney, J. (2011), *Gaining and Sustaining Competitive Advantage*, 4th Edition, Prentice Hall.

Beach, M. J. (2009), "A Critique of Human Capital Formation in the U.S. and the Economic Returns to Sub-Baccalaureate Credentials Educational Studies", *A Journal of the American Educational Studies*, Vol. 45, No. 1, pp. 24–38.

Becker, G. S. (1996), *Accounting for Tastes*, Harvard University Press, Cambridge, MA.

Becker, G. S., Murphy, K. M. (1988), "A theory of rational addiction", *Journal of Political Economy*, Vol. 96, No. 4, pp. 675–700.

Berggren, N., Elinder, M. (2012), "Tolerance and Growth: Modeling the Empirical Relationship", *Public Choice*, Vol. 153, No. 3-4, pp. 495-502.

Berggren, N., Nilsson, T. (2013), "Does Economic Freedom Foster Tolerance?", *Kyklos*, Vol. 66, No. 2, pp. 177-207.

Berggren, N., Nilsson, T. (2015), "Globalization and the Transmission of Social Values: The Case of Tolerance", *Journal of Comparative Econo*mics, Vol. 43, No. 2, pp. 371-389.

Berggren, N., Sven-Olov, D., Jörgen H. (2016), "Does Social Trust Speed Up Reforms? The Case of Central-Bank Independence", *Journal of Institutional Economics*, Vol. 12, No. 2, pp. 395-415.

Bogdanovic, D., Miletic, S. (2014), "Personnel Evaluation and Selection and Selection by Multicriteria Decision Making Method", *Economic Computation & Economic Cybernetics Studies & Research*, Vol. 48, No. 3, 179-197.

Borghans, L., Huub M., Bas, W. (2008), "The role of noncognitive skills in explaining cognitive test scores", *Economic Inquiry*, Vol. 46, No. 1, pp. 2-12.

Bourdieu, P. (1977), *Outline of a Theory of Practice*, transl. Richard Nice, Cambridge, UK.

Bourdieu, P. (1986), "The forms of capital", In J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education*, New York, Greenwood, pp. 241-258.

Bourdieu, P. (1988), "Homo Academicus", Stanford, Stanford University Press.

Bowles, S., and Gintis, H. (2001), "Schooling in Capitalist America Revisted", *Cambridge Journal of Economics*, Vol. 18, No. 6, pp. 529–46.

Castelfranchi, C., Falcone, R., Marzo, F. (2006), *Being trusted in a social network: trust as relational capital*, Instituto di Scienze e Tecnologie della Cognizione, Roma.

Čekanavičius, V., Murauskas, G. (2004), *Statistika ir jos taikymai*, I knyga, TEV, Vilnius.

Coleman, J. S. (1988), "Social capital in the creation of human capital", *American Journal of Sociology*, Vol. 94 (Suppl.), pp. 95–120.

Coleman, J. S. (1990), *Foundations of Social Theory*, Harvard University Pres, Cambridge, MA.

Correia, C. M., Costa, J. S., (2014), "Measuring creativity in the EU member states", *Investigaciones Reg*ionales, 30 – Páginas 7 a 26 Sección Artículos.

De la Fuente, A., Ciccone, A. (2002), "Human capital in a global and knowledge-based economy", Final report, *UFAE and IAE Working Papers* 562.03.

Drejeris, R. (2014), "Multi-Criteria Assessment of Agricultural Buildings Sustainability Behavior", *Management Theory and Studies for Rural Business and Infrastructure Development,* Vol. 36, No. 2, pp. 264–274.

Edvinsson, L., Malone, M. S. (1997), "Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower", *European Industrial Training*, Vol. 32, No. 1, pp. 19-31.

Fagerberg, J. (2001), *Europe at the crossroads: The challenge from innovation-based growth in the Globalizing Learning Economy*, Oxford University Press, Oxford.

Florida, R. (2002), "The rise of the creative class", *The Washington monthly*, May.

Florida, R., Tinagli, I. (2004), *Europe in the creative age*, Co-published in Europe with Demos.

Frank, R. H., Bernanke, B. S. (2007), *Principles of Microeconomics,* 3rd ed., McGraw- Hill/Irwin, New York.

Garavan, T. N. (2001), "Human Capital Accumulation: The Role of Human Resource Development", *Journal of European Industrial Training*, Vol. 25, No. 2, pp. 48-68.

Ginevičius, R., Krivka, A. (2009), "Konkurencinės aplinkos oligopolinėje rinkoje daugiakriterinis vertinimas", *Business: Theory and Practice*, Vol. 10, No. 4, pp. 247–258.

Ginevičius, R., Podvezko, V. (2008a), "Multicriteria Evaluation of Lithuanian Banks from the Perspective of Their Reliability for Clients", *Journal of Business Economics and Management*, Vol. 9, No. 4, pp. 257–267.

Ginevičius, R. and Podvezko, V. (2008b), "Daugiakriterinio vertinimo būdų suderinamumas", *Business: Theory and Practice*, Vol. 9, No. 1, pp. 73–80.

Ginevičius, R., Podvezko, V. (2008c), "Daugiakriterinio vertinimo taikymo galimybės kiekybiniam socialinių reiškinių vertinimui", Verslas: teorija ir praktika.

Gižienė, V., Simanavičienė, Ž. (2012), "Žmogiškojo kapitalo vertinimo koncepcija", *Business systems and economics*, No. 2 (1), pp. 116-133.

Grossman, M. (1972), "On the concept of health capital and the demand for health", *Journal of Political Economy*, Vol. 80, No. 2, pp. 223–55.

Hanushek, E. A., Woessmann, L. (2012), "Do better schools lead to more growth? Cognitive skills, economic outcomes and causation", *J Econ Growth*, No. 17, pp. 267–321.

Hanushek, E. A., Ruhose, J., Woessmann, L. (2015), "Human capital quality and aggregation income difference: development accounting for U.S. States", *Economics Working Paper* 15112, Stanford University.

Hellwig, Z. (1972), "On the Optimal Choice of Predictors", in Z. Gostkowski (Ed.), *Towards a System of Human Capital Resources Indicators for Less Developed Countries*, Papers Prepared for a UNESCO Research Project, Ossolineum, Polish Academy of Sciences Press, Wrocław, pp. 69-90.

Hui, D., Chun-hung, N., Mok, P. (2005), *A study on Creativity index*, Hong Kong special administrative region government.

Hwang, C. L., and Yoon, K. (1981), *Multiple attribute decision making: methods and applications*, Springer, New York.

Jokšienė, I., Žvirblis, A. (2011), "Ekonominių ir socialinių veiksnių įtakos investiciniams fondams vertinimo principai", *Current Issues of Business & Law*, Vol. 6, No. 2, pp. 335–348.

Kagochi, J. M., Jolly, C. M. (2010), "R&D Investments, human capital, and the competitiveness of selected U.S. agricultural export commodities", *International Journal of Applied Economics*, Vol. 7, No. 1, pp. 58–77.

Kautz, T., Heckman, J J., Diris, R., ter Weel, B., Borghans, L. (2015), *Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success*, OECD.

Kumar, R. (2005), *Research methodology a step by step guide for beginners*, 2nd ed., Sage Publications Ltd., London.

Laabas, B., Razzak, W.A. (2011), *Economic growth and the quality of human capital*, Arab Planning Institute, Kuwait.

Lundberg, S. (2015), *Non-cognitive skills as human capital*, University of California, Santa Barbara.

Mouzelis, N. (1995), *Sociological Theory: What Went Wrong? Diagnosis and Remedies*, London.

Novickytė, L., Rabikauskaitė, V., Pedroja, G. (2016), "Social security issues: II pillar pension fund's performance in Lithuania", *Journal of Security and Sustainability issues*, Vol. 5 No. 3, 329-354.

Nureev, R. M. (2010), "Human Capital and Its Development in Present-Day Russia", *Russian Education & Society*, Vol. 52, No. 3, pp. 3-29.

OECD, (2008), *Handbook on constructing composite indicators: methodology and user guide*, Paris.

Oliver, C. (1997), "Sustainable comparative advantage: combining institutional and resource based view", *Strategic Management Journal*, Vol. 18, No. 9, pp. 697-713.

Opricovic, S., Tzeng, G., H. (2002), "Compromise Solution by MCDM Methods: A Comparative Analysis of VIKOR and TOPSIS", *European Journal of Operational Research*, No. 156, pp. 445–455, University of Pittsburgh Press, Pittsburgh.

Ottati, G. (1994), "Trust, interlinking transactions and credit in the industrial district", *Cambridge Journal of Economics*, Vol. 18, No 6, pp. 529-46

Podvezko, V. Mitkus, S., Trinkūnienė, E. (2010), "Complex Evaluation of Contracts for Construction", *Journal of Civil Engineering and Management*, Vol. 16, No. 2, pp. 287–297.

Potelienė, S., Tamašauskienė, Z. (2014), "Žmogiškojo kapitalo konceptualizacija: raida, samprata ir formavimas", *Business systems and economic*, Vol. 4, No. 1, pp. 89-106.

Prascevic, Z. and Prascevic, N. (2013), "One Modification of Fuzzy TOPSIS Method", *Journal of Modelling in Management*, Vol. 8, No. 1, pp. 81–102.

Putnam, R. D. (1995), "Tuning in, tuning out: the strange disappearance of social capital in America", *Political Science and Politics*, Vol. 28, No. 4, pp. 664–683.

Rajasekar, S., Philominathan, P., Chimnathambi, V. (2013), *Research methodology*, Bharathidasan University, India.

Rastogi, P. N. (2002), "Knowledge Management and Intellectual Capital as a Paradigm of Value Creation", *Human Systems Management*, Vol. 21, No. 4, pp. 229-240.

Rescher, N. (1989), *Cognitive Economy: The Economic Dimension of the Theory of Knowledge*, Routledge.

Romer, P. M. (1990), "Endogenous Technological Change", *Journal of Political Econo*my, Vol. 98, No. 5, pp. 71–102.

Sarkar, A. (2013), "A TOPSIS Method to Evaluate the Technologies", *International Journal of Quality & Reliability Management*, Vol. 31, No. 1, pp. 2–13.

Segal, C. (2012), "Working when no one is watching: Motivation, test scores, and economic success", *Management Science*, Vol. 58, No. 8, pp. 1438-1457.

Sik, E. (1994), "Network capital in capitalist, communist and post-communist societies", *International Contributions to Labour Studies*, Vol. 4, pp. 73–93.

Simanavičienė, R. (2011), *Kiekybinių daugiatikslių sprendimo priėmimo metodų jautrumo analizė*, daktaro disertacija, Technika, Vilnius.

Singh, Y.K., (2006), *Fundamental of research methodology and statistics*, New age international publishers Ltd, New Delhi.

Sullivan, A., Sheffrin, S. M. (2003), *Economic Principles in Action*, Pearson Prentice Hall, New Jersey.

Thomas N., Garavan M., Morley P., Gunnigle, E. (2001), "Human capital accumulation: the role of human resource development", *Journal of European Industrial Training*, Vol. 25, Iss 2/3/4, pp. 48 – 68.

Tvaronavičienė, M., Ginevičius, R., Grybaitė, V. (2008), "Baltijos šalių išsivystymo palyginimas: praktiniai kompleksinio požiūrio taikymo", *Business: Theory and Practice*, Vol 9, No. 1, pp. 51–64.

Veljanovski, C. G., Whelan, C. J. (1983), "Professional negligence and the quality of legal services: an economic perspective", *Modern Law Review*, Vol. 46, No. 6, pp. 697–713.

Verter, B. (2003), "Spiritual capital: theorizing religion with Bourdieu against Bourdieu", *Sociological Theory*, Vol. 21, No. 2, pp. 150–174.

Youndt, M.A., Subramaniam, M., Snell, S. A. (2004), "Intellectual Capital Profiles: An Examination of Investments and Returns", *Journal of Management Studies*, Vol. 41, No. 2, pp. 335-361.

Žvirblis, A. and Rimkevičiūtė, V. (2012), "Lietuvos investicinių fondų rodiklių ir makroveiksnių vertinimas", *Social Science Studies*, Vol. 4, No. 1, pp. 111–123.