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The impact of intangible resources on economy in the EU

Žaneta Karazijienė, Artūras Jurgelevičius

Mykolo Romerio universitetas
Ateities st. 20 LT-08303 Vilnius, Lithuania

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Abstract. *To maintain the growth rate and insure the secure and sustainable development of economies, EU countries have to come up with and manage a new source of growth – intangible resources. The intangible resources are relatively a new concept analyzed in scientific literature. A diverse, multi-angle and complex nature of intangible resources can be treated as a new factor in production function. In the knowledge based economy, creativity, generation of knowledge and transmission of it must interact with each other and be combined with entrepreneurship skills. Only interaction between these three key intangible resources could ensure the transition of economy to a new stage of economic development. The purpose of the research paper is to reveal econometrical relationship between intangible resources and its impact on economy in the EU. As a result of analysis, the theoretical framework to evaluate intangible resources has been provided and the accumulation level of intangible resources in EU countries has been estimated. The econometrical relationship suggests the intangible resources have a very important impact on GDP accumulated level. The findings reveal that highest level of intangible resources is observed in Finland, Sweden, Germany, Denmark and Luxembourg. The lowest rate of intangible resources is observed in Cyprus, Romania, Poland, Bulgaria, Lithuania, Latvia and Greece. The conducted research also revealed that there is a strong statistical relationship between input and output of intangible resources. The constructed econometrical model suggests that the modern economic growth much depends on the level of accumulated intangible resources in the country. The change of estimated composite indicator of intangible resources by 1% influences the change of GDP by 0.954%.*

Keywords: *Intangible recourses, economic growth, knowledge, creativity, entrepreneurship skills, creative class.*

Reikšminiai žodžiai: *nematerialieji ištekliai, ekonomikos augimas, žinios, kūrybiškumas, verslumo įgūdžiai, kyrubinė klasė.*

Introduction

To thrive in this new age, economies have to be prepared to cope with the flow and accumulation of intangible resources. Proliferation of innovations in technologies, the growth of the creative class as well as the ability to attract and keep talents have become of a great importance in EU member states.

Recent literature on economic growth has pointed out the significance of innovation for economic growth. However, sluggish economic growth and empirical studies show that innovations are not easy to create and commercialize in a market economy. So far it has been only partly understandable what can stimulate innovations or new high-tech end products. Scarce literature on creativity tries to explain its importance in the process of creating an economic value.

Contributing as a primary source to an economic value, the concept and nature of creativity has been discussed in scientific literature in recent years. The phenomenon of creativity has been analyzed by psychologists, sociologists, cultural scientists and lately by economists. Even if scholars lack a common understanding of its nature, there is a strong agreement among them of its importance for organizations, communities, societies and economy in general.

Various researches show that more creative regions are capable of maintaining a better quality of life, a higher level of technological progress and economic growth. However, this paper claims that creativity alone is not enough for the successful creation of a value in a market economy. Creativity works as a prerequisite for the further creation of an economic value. Only the interaction between creativity, knowledge and entrepreneurship can create a sustainable value for the market or society.

The research paper is structured as follows. In theoretical part the nature and concept of creativity is described as well as its interaction and relationship with knowledge and entrepreneurship. The framework which would represent the level of three intangible resources units is set. The framework consists of two subcategories: inputs and economic effects (outputs). This is followed by methodology formulation in the research. The composite indicator is estimated in a way to better present the level of accumulation of creativity, knowledge and entrepreneurship in the European Union's economies. The results are interpreted and ultimately insights for the improvement of the theoretical concept and methodology are suggested as well as future research directions are discussed.

Theoretical background

A number of various scholars attempting to analyze from different aspects the nature and source of creativity and innovations 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 is a disagreement on the concept and many hypotheses. The great challenge lays in

the nature and definition of creativity. A broad, complex and multi-angle concept of creativity can take many forms in various contexts from cultural to economic or technological ones.

The definition of creativity typically is described as generation of new knowledge or ideas by individuals or a group of people (Sosa, 2011). Some literature (KEA, 2009) suggests that creativity can be contrasted to intelligence since it is characterized by divergent thinking rather than by algorithmic or convergent thought process. According to Sternberg and Lubart (2007) creativity involves a combination of cognitive elements that include the ability to connect ideas, to see similarities and differences, be unorthodox, be inquisitive and to question social norms. Meanwhile Kaufman and Sternberg (2006) claims that creativity is a cultural concept.

Creativity has been questioned by many authors and the importance of social environment has been emphasized. Creativity is often defined and associated with novelty, however, novelty alone is not enough. The expressed new ideas should attain a certain level of social recognition and create a value for social environment and community (Sawyer, 2006). M. Csikszentmihalyi (1996) stated that creativity does not happen inside people's head but in the interaction between a person's thought and a socio-cultural context. According to the author, it is a systematic rather than individual phenomenon. In figure 1, the nature of creativity is presented.

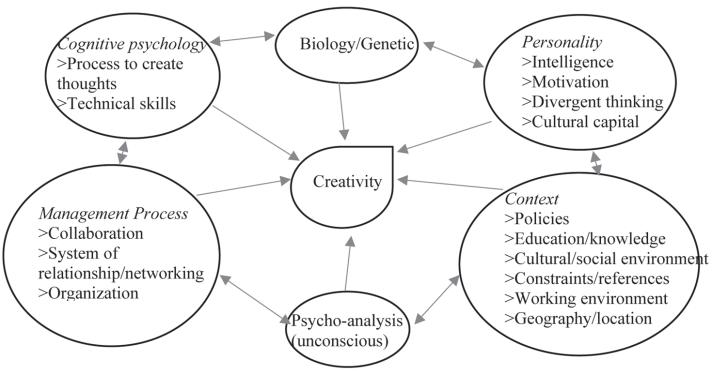


Figure 1. **Nature of creativity**

Source: adopted according to KEA (2009)

Creativity can be viewed as a prerequisite of innovation (Cokpekin and Knudsen, 2012). A number of previous research claims that diverse source of knowledge and developing novel linkages between them are significant preconditions to generate creativity (Sosa, 2011, Lora et al., 2015).

Literature suggests that individual can be creative in their economic activities and in this way they can generate new ideas and knowledge (Perry-Smith and Shalley, 2004). By many scholars, creativity is understood as the raw material of innovation (Chang and Chiang, 2010; Shalley et al., 2004; Oldham and Cummings, 1996).

On the other hand, a number of research shows that being more educated or having access to more diverse sources of knowledge, individuals can be more creative and productive and able to generate creative outcomes (Lora et al., 2015; Rietzchel et al., 2007; Simonton, 1999; Amabile et al., 1996).



Figure 2. **Interaction between creativity and knowledge models**

Source: created by the authors

Figure 2 presents the relationship between creativity and knowledge. It is worth mentioning that in literature a) and b) models are being described more often. However, in many cases, it is really hard to separate this process. The interaction can be added by c) relationship model.

Creativity is a multi-dimensional phenomenon. Florida (2002; 2004) claims that creativity can be divided into technological creativity which is expressed through inventions, economic creativity expressed through entrepreneurship and cultural creativity expressed through cultural activities. Later KEA (2009) and Martinaityte and Kregzdaite (2013) added scientific creativity which can be expressed through R&D.

Technological, economic, cultural and scientific creativity interact with each other and stimulate the functioning of each other. Cultural and scientific creativity lay the foundation for new inventions and technological progress. Economic creativity connects the recourses with the needs of the customer in the market by creating an added value. Moreover, economic creativity provides insights on demand and needs in the market and this new knowledge can be used to create new products. Economic creativity helps to seize new opportunities of new markets, look for new partners, negotiate and implement ideas. All this can be named as entrepreneurial knowledge.

Another important concept that emerged in literature which arguing divergent aspects of creativity is the concept of the creative class. The first scholars that pointed out to the importance of creative economy and creativity presented the concept of the creative class from an occupational point of view was Florida (2002). As the author stated (2002), the creative class is a key factor in economic development and those regions capable of attracting creative people are more likely to succeed because this class includes those who are more innovative, more entrepreneurial and attract creative enterprises. The core distinctive feature of the creative class among others is that representatives of the creative class use knowledge and critical thinking in everyday work. The primary job function of the creative class is to think of and create new approaches to problems.

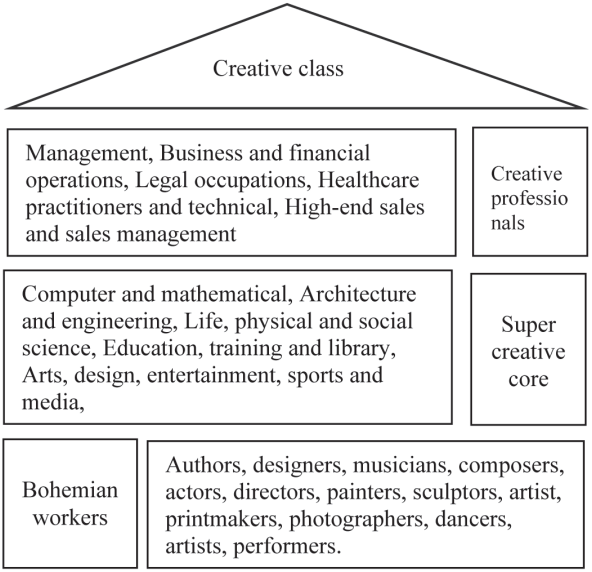


Figure 3. **The concept of the creative class**
Source: adopted by Florida (2002; 2004)

Florida separates the creative class from the rest workers featuring it as a demographic segment working with intellectual and innovative consumer goods and services. In figure 3 the composition of the creative class is shown. Despite the criticism of Florida's creative class logics and concept, numerous studies using similar definitions and understandings have found strong correlation between economic growth and the creative class.

Combining creativity, knowledge and entrepreneurship

In this research paper, it is assumed that creativity, knowledge and entrepreneurship tightly interact with each other and only interacting with each other it creates a value in a market economy. Creativity as a primary source generates new knowledge. Creative ideas and new knowledge should create value for either the market or society. Creative ideas alone do not create a value for social environment. Only connected with entrepreneurial skills, which can be understood as bounding skills, these creative and new ideas can be put into products that create a value for society. On the other hand, entrepreneurial knowledge attains feedback and can generate creativity and new ideas (figure 4).

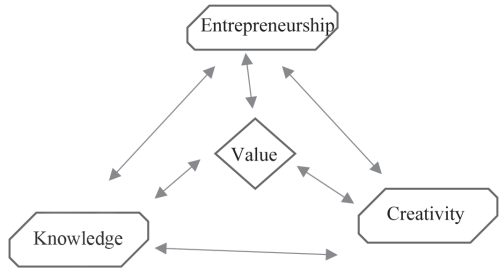


Figure 4. **The interaction among creativity, knowledge and entrepreneurship model**
Source: created by the authors

In this context, the framework has been set in order to evaluate the level of above mentioned intangible resources figure 5. The concept has been divided into two subcategories: input and economic effects as output. Input is composed of the creative class and finance on R&D only in business enterprise sector as the best dimensions reflecting market economy.

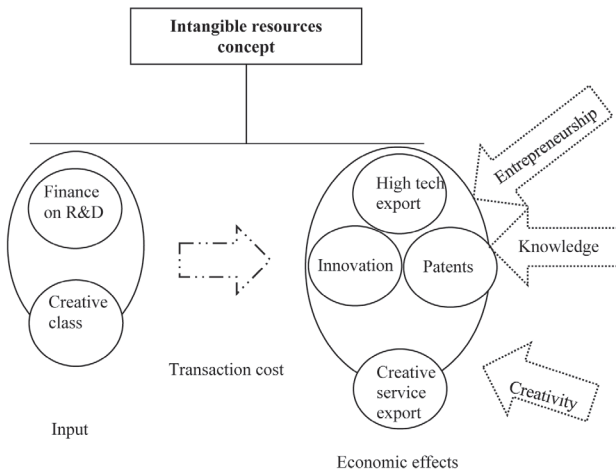


Figure 5. **Theoretical framework for the evaluation of intangible resources**

The added value of these variables is presented as economic effects or output: high-technology export, innovation creation, patents and creative sector exports. All these dimensions include a high level of intangible resources. For instance, high-technology exports present all three dimensions. Creativity combined with knowledge generates new products in high technology industries and export presents the skills of entrepreneurship. Export shows the ability to create market-oriented products, conduct market and partnership research, marketing, negotiating

and realization skills as well as successful competition in international markets. Other dimensions can be explained analogically. To maintain economic logic, only those variables have been chosen which present business enterprises. It is assumed that the behavior of actors in a real market can represent the quality of intangible resources. The transaction cost should explain the efficiency of the economy.

Research methodology

The research has been planned and carried out based on the views of Rajasekar et al. (2013), Ginevicius and Podvezko (2008), Singh (2006), R. Kumar (2005), OECD (2008). The research has been divided into eight parts: in the first part, scientific literature in the area of intangible resources was analyzed and the framework for intangible resources has been suggested. In the second part, variables 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, weighting and aggregation process was accomplished. In the sixth part, a composite indicator of intangible resources was estimated. In the seventh part, the estimated composite indicator of intangible resources was linked with the econometric model in order to estimate its impact on the EU's economies. Finally, in the eighth part, the conclusions have been drawn and insights for further improvements have been provided.

The theoretical framework to evaluate intangible resources has been suggested in the theoretical part of the paper. Theoretical framework is divided into two parts: input and output. Variables categorized as input, represent the factors which is being used in the economic value creation process as a source. Variables categorized as output, represent the economic effects of the input factors. All factors selected in a way to represent market-oriented economic activities. This logical framework suggests that the behavior of players in the market economy should be best reflected in this way. Selected indicators are presented in table 1.

Indicators have been selected typically from knowledge intensive industries as well as service sectors. It is assumed that the above mentioned intangible resources are accumulated in medium and high technology sectors rather than low technology sectors.

High technology products are defined according to SITC Rev.4 as the sum of the following products: Aerospace, Computers-office machines, Electronics-telecommunications, Pharmacy, Scientific instruments, Electrical machinery, Chemistry, Non-electrical machinery, Armament. The total exports for the EU do not include the intra-EU trade.

The definition of high- and medium-high technology manufacturing sectors and of knowledge-intensive services is based on a selection of relevant items of NACE Rev. 2 on 2-digit level and is oriented on the ratio of highly qualified working in these areas.

The definition of high-technology patents uses specific subclasses of the International Patent Classification (IPC) as defined in the trilateral statistical report of the EPO, JPO and USPTO.

Table 1. **Description of data**

	Dimension	Indicator	Measurement unit	Direction of the indicator	Source	Period
		Input				
a	R&D	R&D expenditure of BES*	% of GDP	max	Eurostat	2003–2014
b		Gross domestic expenditure on R&D (GERD)	% of GDP	max	Eurostat	2003–2014
c	Creative class	R&D personal of BES	% of labor force	max	Eurostat	2003–2014
d		Employment in high and medium technology manufacturing	% of labor force	max	Eurostat	2008–2014
e		Employment in knowledge intensive services	% of labor force	max	Eurostat	2008–2014
		Economic effects (outputs)				
f	High tech exports	High-tech exports	% of total exports	max	Eurostat	2007–2014
g	Innovations (as new products)	Turnover from innovation	% of total turnover	max	Eurostat	2004, 2006, 2008, 2010, 2012
h	Patents	Patents granted by the United States patent and trademark office	Per million inhabitants	max	Eurostat	1999–2010
i		Patent applications to the European patent office	Per million inhabitants	max	Eurostat	2002–2013
j		High-tech patent applications to the European patent office	Per million inhabitants	max	Eurostat	2003–2012
k	Creative service	Creative services exports	% of GDP**	max	UNCTAD	2003–2012

*BES – business enterprise sector
** authors estimations

The definition of creative services is based on a selection of relevant indicators of UNCTAD. The creative services are defined as a sum of following products: advertising, market research and public opinion polling, architectural, engineering and other technical services, audiovisual and related services, as well as other personal, cultural and recreational services.

Table 2. **Data availability**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
a																
b																
c																
d					x	x	x	x	x							
e					x	x	x	x	x							
f					x	x	x	x								
g					x		x		x		x		x		x	
h													x	x	x	x
i																x
j															x	x
k															x	x

Table 2 presents the availability for needed data. Missing data imputation should be accomplished in order to estimate composite indicator. Missing data can often hinder the development of robust composite indicator. Unfortunately, as seen from the table 2 some data is not missing at random and there is no reliable statistical test for that (OECD, 2008).

In order to keep data reliable as possible three consequent years of 2008-2010 has been chosen. Since there is missing data only for one indicator and missing only period of one year, the average of the nearest neighbors method was used to fill the missing data.

Having selected and transformed the 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.

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 normalization methods is mini-max method presented in the formula no 1.

$$\tilde{r}_{in} = \frac{r_{in} - \min(r_{in})}{\max(r_{in}) - \min(r_{in})} \qquad (1)$$

Where 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 the mentioned formula, the highest score is 1, the lowest 0. If a country scored maximum ranks in all indicators, it would have a maximum score of 1.

The formula is used estimating various composite indicators by the United Nations, the World Bank, the European Commission and other authorities and scholars.

Having normalized data, the weights to indicators can be given. A number of methods to estimate weights are used in empirical research: COPRAS, TOPSIS, VIKOR, SAW, budget allocation processes, analytical hierarchy processes, "benefit of the doubt".

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.

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 2.

$$S_j = \sum_{i=1}^{m} w_n r_{in} \qquad (2)$$

Where S_j – value of composite indicator, $\bar{r}_{in}$ - is normalized indicator in a given country *i* by feature *n*, w_n - weight for indicator *n*.

Equal weights does not mean that there is no weights at all. Since there are some 11 indicators chosen in total, the weights for each indicator is estimated by formula no 3.

$$w_n = \frac{r_{ij}}{\sum_{j=1}^{n} r_{ij}} \qquad (3)$$

Where w_n - weight for indicator *n*, r_{ij} - number of indicators.

Having evaluated the level of intangible resources, the impact on economy of using the econometric model was tested. Estimated composite indicator of level of intangible resources was hold as independent variable. It was estimated for all selected 29 countries (EU28 and Croatia). To have a valid and reliable model, descriptive statistics of depended variable was estimated. It was observed that calculated composite indicator was normally distributed (excess kurtosis and asymmetrical coefficients fall in interval of acceptance). The dependent variable was GDP per capital in PPP.

The model was estimated using the least square method. Calculated coefficients of dependent variable in the regression model was statistically significant because p-value was less than level of taken significance (p-value < α =0.005).

Estimated coefficient of standard error of regression (S.E.R.) model was 0.6. S.E.R. represents the average distance that the observed values fall from the regression line. Smaller values are better because it indicates that the observations are closer to the fitted line. According to literature, coefficient of S.E.R. must be <= 2.5 to produce a sufficiently narrow 95% prediction interval. With calculated coefficient of 0.6, the estimated model is accurate enough.

Estimated residual sum of squares (RSS) which measures discrepancy between the data and an estimation model showed that model fits to the data because coefficient was 9.4.

Both variables were transformed to natural logarithm in order to give regression model following interpretation: one unit change in the independent variable results in the respective regression coefficient change in the expected value of the dependent variable while all the predictors are held constant.

Estimations were carried out by econometrical program GRETL.

Results and discussions

Estimated composite indicator illustrates the level of intangible resources in the EU. All countries relatively could be grouped in 5 blocks. In the first group countries that scored the highest value could be placed. These countries are Finland, Sweden, Germany, Denmark and Luxembourg. In the second group France, Austria, Belgium, Netherlands, Malta and Ireland are. The third group is consisted of Slovenia, UK, Czech Republic, Hungary, Iceland and Italy. Spain, Slovakia, Estonia, Portugal, Croatia form the fourth group and the fifth group is composed of Cyprus, Romania, Poland, Bulgaria, Lithuania, Latvia and Greece.

Composite indicator presents how three dimensions (knowledge, creativity and skills of entrepreneurship) interact with each other and to which extant they can bring economic effects into the place in market economy.

Worth mentioning Luxembourg performance on the accumulation of intangible resources. Even if Luxembourg has scored 0.03 points and took 26th place out of 29 countries in employment high and medium high technology manufacturing, Luxembourg remains one of the leader in intangible resources accumulation. On the other hand, Luxembourg took the highest score in employment in knowledge intensive services which employ on average 55% of workforce. This illustrates that intangible resources could be embodied in manufacturing sectors as well as in service sectors.

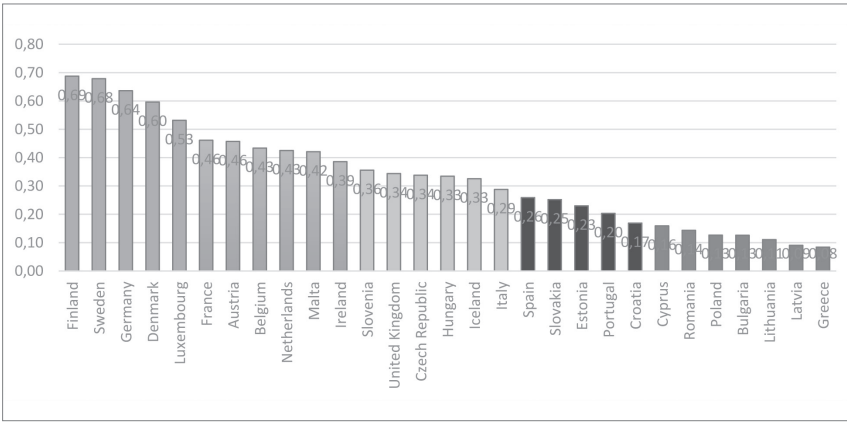


Figure 6. **The level of intangible resources in EU countries**

Figure 7 illustrates the output and input ratio of intangible resources. Only four countries exceed 1 which means that their output is higher than input. Cyprus's ratio is the highest because Cyprus has scored the lowest rates on input except employment in knowledge intensive sector. Cyprus has shown average rankings on output variables such as high tech exports and turnovers from innovations. This enormous deviation could be explained by the fact that Cyprus is seen as offshore economy for companies to optimize their finance because of a favorable taxation environment. In addition to this, Cyprus is heavily depended on tourism which is interpreted as the knowledge intensive sector. Cyprus' GDP per capita in PPP is 58 of EU average (EU28=100).

Malta is another example worth to consider. Malta has scored less than average on input, however, the economic effects were significantly high of several variables. After Luxembourg, Malta took the highest ranking for high tech exports as % of GDP and the highest ranking for creative sector exports. Malta is known for the export of chemistry, electronic and machinery products. On the other hand, tourism is a key sector in Malta. Even if Malta lacks R&D and personnel in R&D, Malta has accumulated the high level of intangible resources. Similarly as Cyprus, Malta has a favorable taxation system that without additional input stimulates the accumulation of intangible resources by attracting foreign capital. Apparently, it may lay foundations for efficiency of the economic system in the country. Malta's GDP per capita in PPP is 89 of EU average (EU28=100).

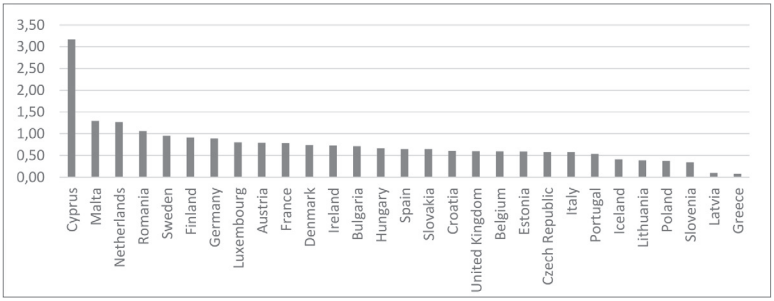


Figure 7. **Input and output ratio**

Five countries have reached less output than a half of input that makes these countries the least efficient in the selected sample: Lithuania, Poland, Slovenia, Latvia and Greece. The countries performed poorly for all analyzed variables.

Estimated correlation coefficient between input and output presents statistically strong correlation because determination coefficent is 0.84 and p-value is less than taken significant level 0.05 (alfa=0.05>p=0.00001) with two taled p-value. As a result, the linear dependancy of two variables could be observed.

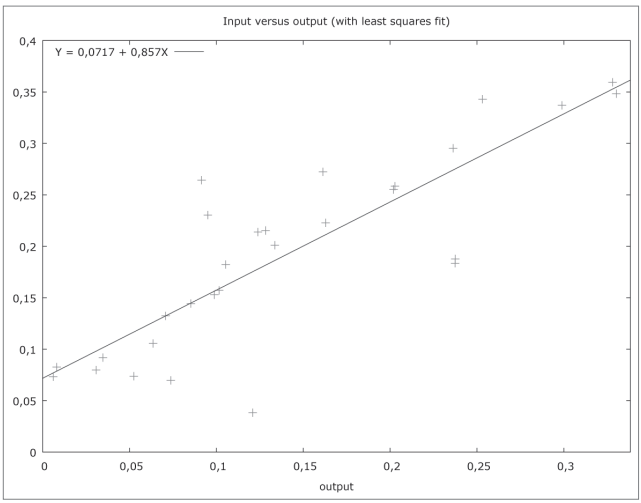


Figure 8. **Relationship between input and output of intangible resources**

Having estimated the level of intangible resources in EU countries, the impact of intangible resources on the economy could be estimated. For the analysis two variables are used: the estimated composite indicator of level of intangible resources and GDP per capita in PPP. Firstly, the correlation coefficient is estimated. The correlation coefficient is equal to 0.64 which presents average correlation between two variables.

It was observed that Luxembourg is an outlier in the analysis with too high GDP per capita in PPP rate. It was decided to remove this outlier from the further analysis in order not to distort the validity of the data. Re-estimated correlation coefficient is equal to 0.73 and it's observed a strong statistical relationship between two variables. Under the null hypothesis of no correlation, the null hypothesis is rejected and alternative hypothesis is submitted because p-value is less than 0.05 ($\alpha = 0.05 > p = 0.0000$).

$$Ln(Y) = 0.396 + 0.954 \ln(x) \qquad (4)$$

Formula 4 demonstrates the model of impact of estimated intangible resources on economy in the EU. It shows that a 1% change in composite indicator (x) results in the change of GDP per capita (when EU28=100) by 0.95%.

Conclusions

1. Firstly, the main stream literature suggests only two interaction directions: creativity stimulates new knowledge and access to more sources of knowledge stimulates creativity. In this paper it is suggested that creativity can influence creation of new knowledge, on the one hand, and knowledge can stimulate creativity simultaneously, on the other hand. These processes are hard to differentiate.
2. Secondly, it is supported that knowledge or creativity alone does not create a value, especially in a market economy. It is a necessary but not sufficient prerequisite for value creation. To achieve a value for individuals or society in a market economy, entrepreneurial skills must be combined with the former two. Only such interaction model can be treated as successful. The theoretical framework to combine all these three dimensions has been suggested.
3. Thirdly, from the methodological point of view, the estimation of composite indicator is a reliable tool to measure such multidimensional concepts as above mentioned intangible resources. This method allows combining various dimensions reflected by different indicators with different measurement units. In this analysis, SAW weighting method was applied which reduces the risk of subjectivity.
4. Fourthly, the composite indicator of intangible resources has been estimated in EU economies. Findings suggest that higher input contributes to higher output of intangible resources. The higher ratio of the creative class leads to the higher ratio of economic effects. The ratio between input and output provided with most and least efficient economies. Greece, Lithuania, Latvia, Iceland, Slovenia's accumulation of intangible resources should be interpreted as least knowledge, creativity and entrepreneurship intensive. These countries scored only half output of that input they provided.

Meanwhile Sweden, Finland, Denmark, Germany and Luxemburg can be interpreted as economies that have accumulated most analyzed intangible resources. The economic structure of these economies is favorable to R&D and apparently for the formation of the creative class.

Some economies have scored exclusively high input and output ratio namely Cyprus, Malta, Netherlands and Romania. Cyprus, Malta and Romania scored less on inputs as well, perhaps due to a number of factors that influence the creation of economic effect more than the creative class and R&D alone. Cyprus scored 0 point on R&D, employment of research personnel and employment in high and medium technology manufacturing rankings. Meanwhile it took 14th place out of 29 by economic effect (output).

5. Fifthly, the estimated econometric model suggested that modern economic growth depends significantly on knowledge, creativity and entrepreneurship. The change of estimated composite indicator by 1%, results in the value change of 0.95% of GDP per capita in PPP (when EU28=100).
6. To sum up, this research should be considered as a contribution to a better comprehension of relationship among creativity, knowledge, entrepreneurship and economy. Nevertheless, this is only a primary tentative study as a first step towards further research on expanding the input and output variables and analysis of its impact on socioeconomic context and vice versa.

Suggestions

A research area is very challenging and implies a number of limitations that should be overcome in order to carry out a deeper analysis. To do so, following suggestions could be worth to consider.

1. Firstly, economists should come up with common understanding on the concept of creativity and the source of the nature of it.
2. Secondly, the concept of the creative class as a steady growing socioeconomic category should be expanded. Apparently, it can be broader than data is available so far.
3. Thirdly, in evaluating the level of intangible resources more indicators could be involved, related not only to R&D.
4. Fourthly, regarding to methodology, various weighting methods could be applied in order to test the sensitivity of various indicators to final rankings.
5. Finally, having evaluated the level of intangible resources, it would be possible to research its impact on socioeconomic environment and vice versa. This would lead to better understanding for economic policy makers, which is important for the stimulation of high and medium value creation.

References

1. Amabile, T. M. Creativity in context: update to the social psychology of creativity, 1996, Westview press.
2. Amabile, T. M. How to kill creativity. Harvard Business Review, 1998, September: 77–87.
3. Chang, W. C.; Chiang Z. H. A study on how to elevate organizational creativity in Taiwanese design organization. International Journal of Innovation Management, 2010, 12(4):699.
4. Çokpekin, O., Knudsen, M. P. Does organizing for creativity really lead to innovation? Creativity and Innovation Management, 2012, 21 (3): 304–314.
5. Csikszentmihalyi, M. Creativity: flow and the psychology of discovery and invention, 1996, New York, Harper/Collins 107–126.
6. Del-Corte-Lora, V.; Molina-Morales, F.X.; Vallet-Bellmunt, T. M. Breadth of knowledge, creativity and their effects on the innovation in the ceramic cluster of Castellon. International conference on regional science: new approach and evidence, 2015.
7. Fagerberg, J. Europe at the crossroads: The challenge from innovation-based growth in the Globalizing Learning Economy, 2001, Oxford University Press.
8. Florida, R. The rise of the creative class. The Washington monthly, 2002, May.
9. Florida, R.; Tinagli, I. Europe in the creative age. Co-published in Europe with Demos, 2004.
10. Ginevičius, R.; Podvezko, V. A feasibility study of multicriteria methods‘ application to quantitive evaluation of social phenomena. Business: theory and practice, 2008, 9(2): 1–87.
11. Kaufman, J.; Stemberg, R.J. The international handbook of creativity. Cambridge University Press, 2006.
12. KEA, The impact of culture on creativity. A study prepared for the European Commission, 2009.
13. Kumar, R. Research methodology a step by step guide for beginners 2nd ed. – London: Sage Publications Ltd, 2005.
14. Lubart, T. The concept of creativity: prospects and paradigms. Handbook of creativity. Edited by R. J. Sternberg, 2007.
15. Martinaitytė, E.; Kregždaitė, R. Kūrybinių industrijų įtaka ekonomikos plėtrai Societal studies, 2013, 5(4) 1094–1108.
16. OECD. Handbook on constructing composite indicators: methodology and user guide. Paris. 2008.
17. Oldham, G. R.; Cummins, A. Employee creativity: personal and contextual factors at work. Academy of management journal, 1996, 39(3): 607-634.
18. Perry-Smith, J. E.; Shalley, C.E. The social side of creativity: a dynamic social network perspective. The Academy of Management Review, 2003, 28 (1): 89-106.
19. Rajasekar, S.; Philominathan, P.; Chimnathambi, V. Research methodology. Bharathidasan University, India, 2013.
20. Rietzschel, E. F.; Nijstad, B. A.; Stroebe, W. Relative accessibility of domain knowledge and creativity: the effects of knowledge activation on the quantity and originality of generated ideas. Journal of experimental social psychology, 2007, 43(6): 933–946.

21. Sawyer, R. K. Explain creativity – the science of human innovation. Oxford University Press, 2006.
22. Shalley, C. E. et al. The effects of personal and contextual characteristics on creativity: where should we go from here? Journal of management, 2004, 30(6): 933-958.
23. Simonton, D. K. Scientific genius: Darwinian perspective on creativity. New York, Oxford University Press, 1999.
24. Singh, Y. K.; Fundamental of research methodology and statistics. New age international publishers Ltd, 2006.
25. Sosa, M. E. Where do creative interactions come from? The role of tie content and social networks. Organization Science, 2011, 22(1): 1–21.

Nematerialiųjų išteklių poveikis Europos Sąjungos šalių ekonomikoms

Žaneta Karazijienė, Artūras Jurgelevičius

Anotacija

Šiame straipsnyje analizuojama nematerialiųjų išteklių samprata. Mokslinės literatūros analizė rodo, kad žinių, kūrybiškumo ir verslumo įgūdžių tarpusavio sąveika yra būtina žiniomis grindžiamoje ekonomikoje. Darbe yra keliamas tikslas nustatyti priklausomybės ryšį tarp Europos Sąjungos šalių ekonomikos išsivystymo ir nematerialiųjų išteklių akumuliacijos lygio. Šiam tikslui pasiekti taikomas daugiakriterinio vertinimo metodas, skaičiuojant nematerialiųjų išteklių indeksą. Taip pat nustačius tiesinę priklausomybę tarp minėtų dviejų kintamųjų, yra apskaičiuotas porinis tiesinis regresijos modelis. Tyrimo rezultatai rodo, kad Skandinavijos šalys yra akumuliavusios daugiausiai nematerialiųjų išteklių, o priklausomybė nuo ekonomikos lygio – stipri. Pateikto modelio interpretacija teigiama, kad apskaičiuoto nematerialiųjų išteklių indekso pokytis vienu procentiniu punktu daro poveikį BVP (kai BVP=100) 0,95%.

Žaneta Karazijienė, Mykolo Romerio universiteto Ekonomikos ir verslo fakulteto Ekonomikos instituto docentė.
El. paštas: zkarazijiene@mruni.eu

Žaneta Karazijienė, Associated Professor of the Institute of Economics, Faculty of Economics and Business, Mykolas Romeris University.
E-mail: zkarazijiene@mruni.eu

Artūras Jurgelevičius, Mykolo Romerio universiteto Ekonomikos ir verslo fakulteto Ekonomikos instituto doktorantas.
El. paštas: jurgeleviciusarturas@yahoo.co.uk

Artūras Jurgelevičius, Phd student of the Institute of Economics, Faculty of Economics and Business, Mykolas Romeris University.
E-mail: jurgeleviciusarturas@yahoo.co.uk

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