INTELLECTUAL CAPITAL AS A DRIVER OF ECONOMIC DEVELOPMENT

Sandra Jednak[1], Veljko Dmitrović[2], Vesna Damnjanović[3]

ABSTRACT:

There are different factors for obtaining economic development. In contemporary economics, knowledge and intellectual capital have become necessary for achieving economic development. Management and development of intellectual capital bring benefits and advance the economy. The main aim of the paper is to present the concept of intellectual capital as a driver of economic development. Selected indicators for measuring intellectual capital and knowledge and their influence on the economic development have been presented. The impact of intellectual capital on economic development is different based on the level of national economy development. Intellectual capital is a driver of economic development in advanced economies, while in developing countries it is not so dominant.

Key words: intellectual capital, knowledge, economic development, knowledge based economy

JEL Classification: O10, O30, J24

1. INTRODUCTION

According to Lisbon strategy (2000) under which the European Union (EU) becomes "the most competitive knowledge based economy in the world", followed by Europe 2020 strategy (2010) that aims to obtain smart, sustainable and inclusive growth, factors that lead to economic development are directed to knowledge and intellectual capital (IC). Knowledge and IC become resources for obtaining economic development and competitiveness in developed countries (Ilic et al. 2016, Herciu and Ogrean 2015) and less developed countries (Seleim & Bontis 2013). Investments in education, research and development, new technology and innovation bring positive economic performances like higher productivity, economic growth, prosperity, job creation, and competitive advantages.

The aim of the paper is to present IC as a driver of economic development. It is based on IC of nation as a resource of economic development in different countries. The observed countries are selected developed and developing countries. Even though the main limitation is the lack of many studies of IC of the nation in these countries as well as the measurement of IC, the correlation is performed between IC and indicators of economic development (GDP per capita, inflation, unemployment, HDI, and WEF Global competitiveness index) in the observed countries. The analysis shows that IC is a driver of economic development and there is a correlation between national IC and indicators of economic development. Furthermore, IC is a driver in advanced economies, while in developing countries it is not so dominant because there is no statistical significance to confirm it.

After Introduction, Section 2 gives an overview of the concept of knowledge and IC. Section 3 focuses on economic development of the observed countries. Section 4 provides correlation analysis between IC and indicators of economic development in the selected countries. Summary and final marks of the analysis are given in Conclusion.

[1] University of Belgrade, Faculty of Organizational Sciences; Jove Ilica 154, 110000 Belgrade, Serbia; Email: sjednak@fon.bg.ac.rs

[2] University of Belgrade, Faculty of Organizational Sciences; Jove Ilica 154, 110000 Belgrade, Serbia; Email: dmitrovic.veljko@fon.bg.ac.rs

[3] University of Belgrade, Faculty of Organizational Sciences; Jove Ilica 154, 110000 Belgrade, Serbia; Email: damnjanovic.vesna@fon.bg.ac.rs

2. THE CONCEPT OF KNOWLEDGE AND INTELLECTUAL CAPITAL

Developed countries are directed and depend on information, knowledge and skills at a higher level. Their aim is the establishing of the knowledge (based) economy. They run a continuous process of transforming their economies towards activities and knowledge-based sectors. Economic activities in the knowledge (based) economy are primarily focused on manufacturing and services, especially in knowledge based industries. These activities are based on intangible assets i.e. knowledge and intellectual capital. According to endogenous growth theory, economic growth and development are obtained thought the rise of knowledge and innovation. Creation, movement and application of knowledge bring innovation, growth and development (Marcin 2013). Moreover, investments in knowledge create new knowledge and ideas that improve other production factors, productivity and income rise. In this way, there is an opportunity for using the knowledge as a factor of economic growth and development. In the knowledge-based economy, knowledge can be analyzed through production (R&D), transmission (education and training) and transfer/application (disseminating knowledge, providing inputs for problem-solving, and innovation) (OECD 1996, p.21), and be resource, product or system. In conclusion, knowledge has direct or indirect effects on the economic growth and development.

Besides this, knowledge can be explicit and tactic (Nonaka and Takeuchi 1995). Explicit knowledge rests on the tactic knowledge (Collins 2010, p.5). Explicit knowledge is a codified knowledge embodied in documents, books, journals, system, process, etc. It is obtained by education, so it is available to anybody and can be transferred to others (Nonaka and Takeuchi 1995). Tactic (implicit) knowledge is based on the experience and intuition. It isof personal nature based on person's experiences and it is hard to get it (Jednak and Kragulj 2015). According to Dhanaraj et al. (2004) tactic knowledge is accumulative and helps to explain explicit knowledge. Knowledge management creates, transfers, uses and accumulates knowledge in order to improve companies' performances (Tilchin and Essawi 2013).

Generally, knowledge management creates and maximizes IC. IC covers both explicit and tactic knowledge (Akpinar and Akdmeir 2000, p.338). Knowledge, IC and knowledge management are related. Knowledge is source of IC therefore IC is source of innovation. Innovation increases productivity, income, living standard and prosperity of a nation.

IC is "the value of company`s employee knowledge, business training and any proprietary information that may provide the company with a competitive advantage" (Investopedia 2017). There are different structures and sub categories of IC. According to Edvisson and Malone model (Bontis 2001) IC has two key sub categories: Human capital and Structural capital. Structural capital comprises Market (also denoted as Consumer or Relation) capital and Organizational capital, while Organizational capital has two sub components: Process capital and Renewal (Innovation) capital. Human capital is the stock of knowledge, habits, skills and personal attributes and competencies in performing labour activities. Structural capital refers to non-human storehouses as infrastructure, hardware, software, process and databases that provide work of human capital. Organizational capital is organisational philosophy and capability; it is organisational structure, patents, trademarks. Market (Consumer or Relation) capital refers to relationships with customers, vendors and others. Process capital presents procedures, programs and techniques, while IC is intellectual property, patents, copyrights (Marcin 2013, p. 290). Human, relation, process and innovation capitals usually act together on economic performances and have multiple effects.

Intellectual capital (IC) is mostly analysed at the business level, and its role is to enhance financial capital and other business outcomes. However, some studies cover research of IC at the national level. National IC is "knowledge based capital which influences on the economic growth and development" (Bontis 2001). The value and ranking of national IC provide a direction for economies to benchmark and invest in appropriate intangible assets and influence further economic development (Lin & Edvinsson 2010, p. 8, Wisniewski & Wildowicz-

Giegiel 2014). Marcin (2013) and Rusu-Tanasă (2015) present IC concept from a regional perspective. Ståhle (2008) describes tools and methods of identifying and measuring IC and its economic impact. Seleim & Bontis (2013) show the relationship between national IC and economic performances in less developed countries. They claim that relational capital is a critical component in obtaining economic performance. In studies by Stam & Andriessen (2009) and Andriessen & Stam (2005), the authors compose IC index and find the following: investment in IC pays off; human and structural capital go together; the high value of IC does not guarantee increased productivity; there is the growth of value of IC in all EU (EU-15 and EU-19) countries. Furthermore, the EU observed countries are behind Japan and the USA. Nordic EU countries have the best performance of the value of IC. Lin & Edvinsson (2008) got similar results about Nordic countries.

However, there are some limitations in research of relation between IC and economic performance. The first limitation is the lack of the study of impact of national IC on economic development. The second limitation is the measurement of national IC as well as the lack of the data for many countries. IC cannot be measured directly, but rather through a set of indicators that present sub components - human, relation, process and innovation capital. Several measurement and assessment of IC are developed by UN, World Bank, EU, OECD, WEF as well as personal composite index because there is no single and unique index. Some countries are provided with their own measurement.

3. ECONOMIC DEVELOPMENT

The level of economic development is different in various countries. The goal of economic development is the availability of goods and services, increasing the standard of living and rise of social and economic choices for individuals. There are economic (land, labour, capital, technology) and non-economic factors (institutional, social and value) that influence the achievement of economic progress. Based on these factors, there are strategies based on natural resources, capital or labour. Also, each economy starts its development from

traditional society (low productivity and agriculture sector) across industry to service sector that enhances productivity and income.

In developed countries economic development is based on knowledge. Traditional factors as land, labour and capital are not the primary source of economic growth and development. However, these factors are still dominating in developing countries. Due to rapid changes and new technologies, developed countries have focused on the service sector, while developing countries focus on agriculture and manufacturing sector. Agriculture and manufacturing do not enable high value added, higher employment, productivity, income and living standard. To obtain a higher level of development, developing countries should utilise the practice, capital and technologies from developed countries as well as establish institutions. Due to lack of domestic capital, foreign capital is seen as the main force of economic development. Furthermore, developing countries should be coherent with the EU and the world. In order to achieve this aim, developing countries or those in transition should provide the knowledge based economy. They should invest in knowledge, education, research and development, and new advanced technologies. In this way, innovation could be obtained and raise productivity, income and living standard. However, this path is not possible for all developing countries because of the lack of capital, saving and external sources for financing economic development. Investments are mostly present in traditional factors (land, labour and capital) and sectors (agriculture and industry).

Economic development is a broader category than economic growth. Since the process of economic development is multidimensional, there are many indicators of economic development. No single indicator measures economic development. Gross domestic product (GDP) is still the primary indicator. However, there are others that need to be taken into consideration to show the right level of economic development. Besides GDP, there are: GDP per capita, inflation, unemployment, Human Development Index (HDI), WEF Global competitiveness index, poverty, inequality, literacy, etc.

4. INTELLECTUAL CAPITAL AND ECONOMIC DEVELOPMENT

Since the late 1990s, IC has started to be explored as a factor for enhancing economic performances and creation of wealth. Different models are applied at national level (Stam & Andriessen 2009, Pulic 2005, Lin, C. Y. Y. & Edvinsson, L. 2010). IC bears advantage for a country and it influences economic performances and creation of wealth especially in developed countries such as the Nordic ones. Human capital is an input of economic growth. It is followed by structural capital that gives support to human capital in infrastructure, databases, processes, patents, structure and innovation in order to implement and obtain certain goals. Appropriate measurement of each capital and its use can enable better guidelines and direct investments as well as the performance of a company or a nation.

However, as it has been noticed, neither IC nor economic development have a single indicator. For IC, the most used indicators are the composed indicators that contain IC sub categories. For each sub category, there are sets of indicators.

The approaches to finding appropriate and single indictors are complicated and multidimensional. Different types of composite index are created and used by Andriessen & Stam (2005), Ståhle (2008), Lin & Edvinsson (2010), Užienė (2014), Edvinsson (2017). Edvinsson (2017) is created the National Intellectual Capital (NIC) index and presented it for the selected countries as the driver of country's economic growth (http://bimac.fi/nic/). This approach and data are used in a few studies.

The aim of this paper is to calculate the correlation between NIC and economic development. NIC was used from Edvinssons' (2017) database and the available data for 2011 for 47 countries (http://bimac.fi/nic/). For the same year, indicators for economic development were taken from the World Bank data, including GDP per capita PPP, Inflation (annually %) and Unemployment (Total %). Human development index (HDI) was taken from the UN while the Global Competitiveness Index (GCI) was taken from the World Economic Forum Report 2011-2012. Table 1 provides the correlation between NIC and selected indicators of economic development forall the countries.

Table 1. Correlation between NIC and selected indicators of economic development, all countries

		NIC	GPD_pc_PPP	Inflation	Unemployment	HDI	GCI
NIC	Pearson Correlation	1	.010	-.484(**)	-.240	.806(**)	.905(**)
	Sig. (2-tailed)		.949	.001	.104	.000	.000
	N	47	47	47	47	47	47
GPD_pc_PPP	Pearson Correlation	.010	1	-.107	-.241	-.079	.066
	Sig. (2-tailed)	.949		.474	.103	.599	.657
	N	47	47	47	47	47	47
Inflation	Pearson Correlation	-.484(**)	-.107	1	.000	-.377(**)	-.543(**)
	Sig. (2-tailed)	.001	.474		.998	.009	.000
	N	47	47	47	47	47	47
Unemploy-ment	Pearson Correlation	-.240	-.241	.000	1	-.123	-.387(**)
	Sig. (2-tailed)	.104	.103	.998		.409	.007
	N	47	47	47	47	47	47
HDI	Pearson Correlation	.806(**)	-.079	-.377(**)	-.123	1	.615(**)
	Sig. (2-tailed)	.000	.599	.009	.409		.000
	N	47	47	47	47	47	47
GCI	Pearson Correlation	.905(**)	.066	-.543(**)	-.387(**)	.615(**)	1
	Sig. (2-tailed)	.000	.657	.000	.007	.000	
	N	47	47	47	47	47	47

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

There is a correlation between NIC and economic development. However, statistical strong positive correlation is between NIC and HDI (r=0.806) and GCI (r=0.905), p< 0.01. Also, there is a statistical negative correlation between NIC and Inflation (r=-0,240), p< 0.01. Furthermore, there is a positive correlation between NIC and GDP per capita PPP (r=0,010), but not statistically significant. Correlation between NIC and Inflation is negative and not statistically significant due to p value (p=0.104).

When developed and less developed countries are analyzed, the results are not statistically significant. It should be emphasised that most observed countries include developed or less developed countries while the number of those that are not developed is very small (Tables 2 and 3). Due to this, the results could be unusual.

According to Bimac NIC (2014), NIC explains GPD formation and GDP growth. The results show that intangible capital accounts for 45 % of the world GDP. In the USA it is about 70 %, while in the EU 52%. Nordic countries have the highest parts of NIC in their GDP. According to all databases, Nordic countries (Denmark, Sweden, Finland, Norway, the Netherlands) and Switzerland have the highest NIC, development, HDI and GCI. These countries have oriented their economies towards the knowledge economy. The service sector and knowledge based industries are important for obtaining economic growth and development. Also, sub categories of IC take part in achieving GDP (Bilen-Katić & Radovanović 2014). NIC contributes to innovation and economic growth. According to Andriessen & Stam (2005), most developed countries improve the value of IC and register the growth of investment in IC. The strategies for growth at national, regional and business levels are necessary due to the direction of further activities and development. The concepts and strategies of innovation in SMEs have a role in enhancing performances (Milutinović et al. 2015).

Table 2. Correlation between NIC and selected indicators of economic development, developed countries

		NIC developed	GDPpcPPP developed	Inflation developed	Unemployment developed	HDI developed	GCI developed
NIC developed	Pearson Correlation	1	.066	-.250	-.267	.158	.637(**)
	Sig. (2-tailed)		.777	.274	.241	.495	.002
	N	21	21	21	21	21	21
GDPpcPPP developed	Pearson Correlation	.066	1	-.237	-.257	.244	-.144
	Sig. (2-tailed)	.777		.301	.260	.287	.533
	N	21	21	21	21	21	21
Inflation developed	Pearson Correlation	-.250	-.237	1	.028	-.451(*)	-.190
	Sig. (2-tailed)	.274	.301		.903	.040	.410
	N	21	21	21	21	21	21
Unemploy-ment developed	Pearson Correlation	-.267	-.257	.028	1	-.107	-.407
	Sig. (2-tailed)	.241	.260	.903		.644	.067
	N	21	21	21	21	21	21
HDI developed	Pearson Correlation	.158	.244	-.451(*)	-.107	1	-.218
	Sig. (2-tailed)	.495	.287	.040	.644		.342
	N	21	21	21	21	21	21
GCI developed	Pearson Correlation	.637(**)	-.144	-.190	-.407	-.218	1
	Sig. (2-tailed)	.002	.533	.410	.067	.342	
	N	21	21	21	21	21	21

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

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

Table 2 shows developed countries and NIC positively correlated with the variables GDP per capita PPP (r = 0.066), Unemployment (r = -0.267), HDI (r = 0.158) and GCI (r=0.637), except with inflation (r = -0.260). There is no statistical significant except to GCI (p< 0.01). These results are associated with the research of Lin & Edvinsson 2010. Table 3 presents less developed countries with NIC positively correlated with variables GDP per capita PPP (r = 0.130), Unemployment (r = 0.111), HDI (r = 0.228), GCI (r=0.725), except with inflation (r = -0.482). There is no statistical significant except to GCI (p< 0.01). These results for developing countries are similar as it is in the research of Seleim & Bontis (2013). Still, NIC and unemployment are positively correlated in developing countries even though that is not the case in developed countries. The knowledge is used for creating innovation (new product, technology, process, etc.) and it should raise production so as to decrease unemployment to. If other traditional resources have been taken in the analysis, the results would probably show that they have a dominant role in economic development. It could be concluded that IC is a driver of economic development in developing countries, but it is not such a dominant resource.

Table 3. Correlation between NIC and selected indicators of economic development, developing countries

		NIC developing	GDPpcPPP developing	Inflation developing	Unemployment developing	HDI developing	GCI developing
NIC developing	Pearson Correlation	1	.130	-.482	.111	.228	.725(**)
	Sig. (2-tailed)		.687	.113	.732	.477	.008
	N	12	12	12	12	12	12
GDPpcPPP developing	Pearson Correlation	.130	1	-.252	-.170	-.242	.422
	Sig. (2-tailed)	.687		.430	.597	.448	.172
	N	12	12	12	12	12	12
Infaltion developing	Pearson Correlation	-.482	-.252	1	-.067	.150	-.839(**)
	Sig. (2-tailed)	.113	.430		.837	.641	.001
	N	12	12	12	12	12	12
Unemplyment developing	Pearson Correlation	.111	-.170	-.067	1	-.206	-.034
	Sig. (2-tailed)	.732	.597	.837		.520	.916
	N	12	12	12	12	12	12
HDI developing	Pearson Correlation	.228	-.242	.150	-.206	1	-.173
	Sig. (2-tailed)	.477	.448	.641	.520		.591
	N	12	12	12	12	12	12
GCI developing	Pearson Correlation	.725(**)	.422	-.839(**)	-.034	-.173	1
	Sig. (2-tailed)	.008	.172	.001	.916	.591	
	N	12	12	12	12	12	12

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

5. CONCLUSION

Rapid changes in technologies affect the growing importance of information, knowledge and intellectual capital. Many countries transform their economies towards knowledge (based) economies. They invest in knowledge and intellectual capital to obtain a high value of the intangible assets that leads to economic prosperity and competitiveness. Intellectual capital is first analysed in the company and then on the regional and national level. Intellectual capital has sub categories – human, relation, process and innovation capital. Each of these sub categories influences business and economic performances. The value of a company rests in its people with their knowledge and skills, efficient processes and good reputation that will lead to innovation, productivity and prosperity. The same effects are applied at national level. Due to this, there is interaction among sub categories of intellectual capital, they are mutually enhancing factors and have multiple effects and results (Andriessen & Stam 2005).

Still, there is no single assessment and measurement of intellectual capital. Many authors developed their own assessment, such as Andriessen & Stam (2005), Ståhle (2008), Lin & Edvinsson (2010), Seleim & Bontis (2013), and Užienė (2014) in order to see the role of intellectual capital and economic performances, growth and development. In this study, intellectual capital is analyzed as a driver of economic development. The correlation between national intellectual capital (NIC) and indicators of economic development is made. The results show a positive correlation between NIC and indicators of development. Based on the correlation, NIC could influence GDP per capita, unemployment, inflation and competitiveness. The role of NIC is higher in developed than in developing countries, which indicates the rank of these countries in reports on development and competitiveness. The limitation of this study lies in the lack and availability of the data for all countries and period. Further work will be directed towards making a composite index of NIC in the West Balkan countries and examining the relationship between NIC and economic development.

REFERENCES

1. Akpinar, A., & Akdmeir, A. (2000). *Intellectual capital*. First International Joint Symposium on Business Administration "Challenges for business administrators in the new millennium", 1-3 June 2000, Turkey, pp. 332-341 http://info.opf.slu.cz/vvr/akce/turecko/pdf/Akpinar.pdf

2. Andriessen, D., & Stam, C. (2005, January). Intellectual capital of the European Union. In *McOaster World Congress on the Management of Intellectual Capital and Innovation* (pp. 19-21).

3. Bilen-Katić, B., & Radovanović, N. (2014). The Role of Intellectual Property in Developing a Knowledge-Based Society. Management: Journal Of Sustainable Business And Management Solutions In Emerging Economies, 19(70), 87-93.

4. Bontis, N. (2001). Assessing knowledge assets: a review of the models used to measure intellectual capital. *International journal of management reviews*, *3*(1), 41-60.

5. Collins, H. (2010). *Tacit and explicit knowledge*. University of Chicago Press.

6. Dhanaraj, C., Lyles, M. A., Steensma, H. K., & Tihanyi, L. (2004). Managing tacit and explicit knowledge transfer in IJVs: the role of relational embeddedness and the impact on performance. *Journal of International Business Studies*, *35*(5), 428-442.

7. Edvinsson, L. (2017). NIC as a driver of countries economic growth. Available at http://bimac.fi/nic/

8. Europe 2020 strategy (2010)

9. Herciu, M., & Ogrean, C. (2015). Wealth, competitiveness, and intellectual capital–sources for economic development. *Procedia Economics and Finance*, *27*, 556-566.

10. Ilic, B., Bernjak, S., & Rus, A. (2016). Intellectual Capital As An Indicator Of Regional Development: The Case Of The Slovenian Region Of Pomurje. *Teorija in Praksa*, *53*(3), p. 579.

11. Investopedia (2017). Intellectual capital. Available at http://www.investopedia.com/terms/i/intellectual_capital.asp

12. Jednak, S., & Kragulj, D. (2015). Achieving Sustainable Development and Knowledge-Based Economy in Serbia. Management: Journal Of Sustainable Business And Management Solutions In Emerging Economies, 20(75), 1-12.

13. Lin, C. Y. Y., & Edvinsson, L. (2008). National intellectual capital: comparison of the Nordic countries. *Journal of Intellectual Capital*, *9*(4), 525-545.

14. Lin, C. Y. Y., & Edvinsson, L. (2010). *National intellectual capital: A comparison of 40 countries.* Springer Science & Business Media.

15. Lisbon strategy (2000)

16. Marcin, K. (2013). Intellectual capital as a key factor of socio-economic development of regions and countries. *Procedia Economics and Finance*, *6*, 288-295.

17. Marcin, K. (2013). Intellectual capital is a key factor in socio-economic development of regions and countries. *Procedia Economics and Finance*, *6*, 288-295.

18. Milutinović, R., Stošić, B., & Mihić, M. (2015). Concepts And Importance of Strategic Innovation in SMEs: Evidence from Serbia. Management: Journal Of Sustainable Business And Management Solutions In Emerging Economies, 20(77), 35-42.

19. Nonanko, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation.* Oxford University Press

20. OECD (1996).The knowledge based economy. OCDE/GD(96)102

21. Pulic, A. (2005). Value creation efficiency at national and regional levels: case study–Croatia and the European Union. *Intellectual Capital for Communities, Elsevier, Oxford.*

22. Rusu-Tanasă, M. (2015). Intellectual Capital a Strategic Factor of Socio-Economic Development of Regions and Countries. *Procedia Economics and Finance*, *27*, 369-374.

23. Seleim, A., & Bontis, N. (2013). National intellectual capital and economic performance: empirical evidence from developing countries. *Knowledge and Process Management*, *20*(3), 131-140.

24. Ståhle, P. (2008). National intellectual capital as an economic driver–perspectives on identification and measurement. *Inspired by Knowledge in Organizations, Swedish School of Economics and Business Administration, Helsinki*, 94-121.

25. Stam, C., & Andriessen, D. (2009). Intellectual Capital of the European Union 2008: Measuring the Lisbon Strategy for Growth and Jobs. *Electronic Journal of Knowledge Management*, *7*(4).

26. Tilchin, O., & Essawi, M. (2013). Knowledge management through organizational culture change. *International Journal of Business Administration*, *4*(5), 24.

27. Užienė, L. (2014). National intellectual capital as an indicator of the wealth of nations: the case of the Baltic States. *Procedia-Social and Behavioral Sciences*, *156*, 376-381.

28. Wisniewski, P., & Wildowicz-Giegiel, A. (2014). National Intellectual capital (nic) new metrics. *Review of Business and Economics Studies*, (4).