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Intellectual Capital as a Key Factor of Socio-Economic Development of Regions and Countries

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Abstract

The main goal of the paper is to present the concept of intellectual capital (IC) from regional perspective and define intangible assets as knowledge that can be converted into value or profit. Most of the measurement methods designed by now apply for measuring the intellectual capital at corporate level. Some efforts are being made to present the IC concept in the regional perspective. Development of research on a new regional approach to the intellectual capital theory has been noticed. A sample model of IC for countries and its main sub-components have been presented as well. Some selected knowledge indicators for measuring intellectual capital at national level have been illustrated. The paper also introduces one of the methods for the assessment of countries’ knowledge economy – Knowledge Assessment Methodology (KAM).

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1. Introduction

In the face of progressing globalisation and liberalisation processes in the world economy, the chance for countries or regions to get a competitive advantage is to take advantage of their endogenous growth factors. Wisely constructed regional development policy is considered as a defence tool against the possible threats made by globalisation. The competitiveness of countries in attracting foreign investors is more often determined by their specific and unique intangible resources. Intangible investments in research and development and innovation are viewed as the most important sources of performance. The development potential of any kind of organisation is

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embedded in its knowledge-based assets. Knowledge is considered as a basic resource for value creation both at the corporate and regional level. For the last decade, the corporations all over the world have been implemented new knowledge management systems. At the same time, most of the European Union’s regions and countries try to introduce regional and national innovation strategies in order to achieve the Lisbon Strategy’s aims to make the European economy the most competitive knowledge-based economy in the world. Inevitably, the time has come for a new economy – the knowledge-based economy.

It is widely believed that knowledge is the main production factor in today’s economic environment. It has also been proved beyond doubt that knowledge-based assets play a major role in the value creation process. Investments in intangible assets are viewed as the most important sources of performance. Resources that are valuable, rare, and impossible to copy or replace are the source of long-lasting competitive advantage (Kozak M., 2007). And this regards both knowledge-based corporations and geographical areas, which build their competitive advantage on the implementation of national and regional innovation systems (Kozak M., 2011).

It is in this context that many scholars and practitioners look at the concept of intellectual capital (IC) from the perspective of nations, regions and cities. In the knowledge economy, the value of countries, regions, organisations and individuals is directly related to their knowledge and intellectual capital (Edvinsson L., Bounfour A., 2004). A quite new IC concept primarily introduced at the corporate level is still evolving and embracing the macro-level analysis. Most of the measurement methods designed by now apply for the company IC rating. Some efforts are being made to present the IC concept from the regional perspective. In view of IC theory evolution, the regional approach still remains the least recognized area of research. The same thesis was presented by P. Pachura who points out the role of networks and clusters in the development of EU regions. According to the above author the EU regional cohesion is based on intangible networking like clusters that supports the effectiveness of transformation in EU regions (Pachura P., 2010).

This article reviews the literature and some research projects on the regional approach to the intellectual capital. The selected definitions, components and measures of regional intellectual capital will be introduced. The paper also presents a method for the measurement of knowledge resources of developed and developing countries, which was developed by the World Bank. The Knowledge Assessment Methodology (KAM) has been presented as a tool for assessment of countries readiness for the knowledge economy. The basic contribution of the article lies in unpacking the sub-components and measures of intellectual capital at the regional level. The review on IC methods and models forms an essential foundation for the future research on the concept of regional intellectual capital from the perspective of the knowledge economy challenges.

2. Intellectual capital (IC) in the knowledge economy

The expansion of knowledge-based activities and technological revolution has led to the economic transformation at corporate and national level. In today’s economy the main sources of growth and development are not raw materials and labour but mainly the capability to create and utilise knowledge resources. As Bounfour points it out, the Smith model, improved by Taylor, is no longer relevant under different angles, especially the economics of scale and standardisation (Bounfour A., Edvinsson L., 2005). Drucker pointed to knowledge as the primary resource for individuals and for the economy overall. In the author’s view “land, labour and capital – the economist’s traditional factors of production – do not disappear, but they become secondary” (Drucker P., 1992). Contemporarily, there has been a growing interest of researchers in the theory of knowledge and its role in the productivity growth and competitiveness and consequently in its contribution to the sustainable long-term economic development.

The knowledge economy (KE) is identified with economy where knowledge is the main engine of growth. It is defined as the economy where knowledge is acquired, created, disseminated and used effectively to enhance economic development (Derek H. C. Chen and Carl J. Dahlman, 2006). According to the World Bank, the KE framework encompasses elements such as education and training, innovation and technological adoption, the information infrastructure, and a conducive economic incentive and institutional regime. On this view investments in the above pillars of economy leads to the availability of knowledge and its effective use for economic production. It has been indicated that the successful transition of industrial-based economy to the knowledge economy involves activities in the above areas. And all of these activities are supposed to result in sustained economic growth.
According to such a way of new economic thinking, nowadays knowledge is considered as the most important and productive factor of production.

As mentioned above the four pillars of the knowledge economy framework are (Drucker P., 1992):

An economic incentive and institutional regime that provides good economic policies and institutions that permit efficient mobilization and allocation of resources and stimulate creativity and incentives for the efficient creation, dissemination, and use of existing knowledge;

Educated and skilled workers who can continuously upgrade and adapt their skills to efficiently create and use knowledge;

An effective innovation system of firms, research centers, universities, consultants, and other organizations that can keep up with the knowledge revolution and tap into the growing stock of global knowledge and assimilate and adapt it to local needs;

A modern and adequate information infrastructure that can facilitate the effective communication, dissemination, and processing of information and knowledge.

A review of the literature on knowledge economy reveals a tendency to focus on the technology and the information infrastructure as the main factors for the transition to the knowledge society and the new economy. In the author’s view the role of human mind needs to be more emphasized. That is to say, a human brain is the most important factor for innovation and knowledge creation. This view was advocated by Weber saying that “the location of the new economy is not in the technology, be it the microchip or the global telecommunications network. It is in the human mind” (Schwartz P., Kelly E., Boyer N., 1999).

As the transition to the knowledge economy has been taken place for the last decades, the new disciplines and areas of study were developed. Practitioners and academics were trying to conceptualise the knowledge about knowledge and the new disciplines of study has emerged. The new concepts of knowledge management and intellectual capital have been popularised among academics and practitioners. The way of valuation and visualising processes based on knowledge were of their main interest. The greatest challenge for researchers were the measurement of knowledge assets that are still considered as extremely hard to quantify. The fact is that at the heart of knowledge economics is the entire notion of intangible value, the role of intangible assets in value creation (Edvinsson L., 2002). The phenomenon of knowledge based resources or intangibles is the core point of interest of the intellectual capital concept.

A clearer understanding of intellectual capital is being developed by identifying the various components of it. The most popular sub-components of IC include human capital, social capital, structural capital also referred to as organisational capital and customer capital.

The Organisation for Economic Cooperation and Development (OECD) identifies two categories of IC at a company level: organisational capital or structural capital and human capital. That is, organisational capital includes the intangible aspects of a firm such as its processes, culture, relationships and intellectual property. Examples of the above IC sub-component include: manufacturing methods, distribution systems, expectations, rituals, myths, relationships with customers, brand, trademark, copyright. Human capital refers to a combination of factors possessed by individuals working for the firm. It encompasses: knowledge, information and data, skills and technical ability, personal traits such as intelligence, energy, attitude, reliability, ability to learn, imagination and creativity, and the desire to share information, participate in a team and focus on the goals of the firm (Guthrie J., Abeysekera I., 2004).

Other classification systems also identify customer capital as a sub-component of IC. That classification was primarily applied to Skandia – the company that initiated measuring and reporting intellectual capital in the business world. According to the Scandia’s model introduced by Edvinsson, customer capital is provided by structural capital and in a very general way it can be described as the relationships with key customers (Bontis N., 1999).

Some authors advocate that social capital should be considered as one of the IC categories or at least it is justified to include this form of capital in the taxonomy of IC. The above view has been primarily popularised in the IC literature by Nahapiet and Ghoshal and McElroy. The former define social capital as “the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” (Nahapiet J., Ghoshal S., 1998). McElroy finds fault the Scandia’s IC model and indicates that it fails to take into account social capital – another major component of the company’s intangible value. In the author’s opinion, “social capital points to the value of relationships between people in firms, and
between firms and other firms. Trust, reciprocity, shared values, networking and norms are all things that, according to social capital theories, add value in a firm, or between firms, by speeding the transfer of information and the development of new knowledge”. He indicates further that social capital can take other forms, the combination of which adds value to a firm and that it is intangible and clearly warrants a prominent place in the taxonomy of IC (McElroy M., 2002).

It should be pointed out that the two basic approaches to the definition of intellectual capital are presented in the literature. And as Swart indicates, the difference in the various definitions lies in the level of analysis applied, its temporal dimension and the qualitative nature of IC. According to him, many authors regard IC purely as an individual level construct akin to knowledge and skills that individuals have. Such a view assumes that IC equals the human capital. Other authors view IC as functioning at the collective level and regard it as a meta-competence. Such an approach is used by Mouritsen et al. who view IC as organisation-wide knowledge resources that, in combination, are constitutive for capabilities, making it possible for the organisation to take action (Swart J., 2006). Swart is right indicating that both sets of definitions differ in their temporal approach to IC. That is, some argue that IC is something that can create value in the future, or has the potential to create value whilst others argue that IC is central to firm performance because it is of value in itself.

Regional intellectual capital can be understood as the common knowledge capabilities of regional stakeholders to implement strategies that aim at long-term sustainable development. These capabilities to exploit common knowledge resources are determined by collective activities inducing intellectual synergy. In order to convert the knowledge of individual regional actors into the common value, some driving factors need to be engaged, for instance the attributes of social capital that foster knowledge processes (Kozak M., 2011).

Most of the literature on IC makes a set of claims that its main resource is knowledge viewed as an essential element for the creation of economic value. Prusak defines it as intellectual material that has been formalized, captured and leveraged to produce a higher-valued asset (Edvinsson L., Sullivan P., 1996). Most of the IC definitions agree that it is knowledge that can be converted into value or profit (Sullivan P.H., Harrison S., 2000). Despite the fact of a very broad character of the above definition it seems to be sufficient for the purpose of this article where IC is considered both at corporate and regional level.

3. Intellectual capital at regional level

In accordance with the current evolution of the IC concept, some attempts have been made to transform and apply it for regions and countries. Researchers extrapolated the initial company level to also include nations. Bontis argues that the expectations from finding reliable measures of knowledge assets at a national level is that such measures can help governments better manage the intangible resources that increasingly determine the success of their economies (Bontis N., 2004).

A regional approach to the IC fills in the guidelines of innovation development policy promoted by many developed and developing countries in the European Union and North American countries. At the same time, the issues of effective and efficient regional innovation strategies have become strategically important (Pachura P., Hájek P., 2013). Currently, a challenging issue is to develop a methodology for evaluating the effectiveness of both innovation policy and programming strategy. Several models and measurement methods for regional IC have been introduced in the literature. The most frequently cited projects in that field of study were done by the World Bank’s researchers, Nick Bontis, Ante Pulic, Jose Viedma Marti and Edna Pasher. The above authors presented very novel views of measuring and reporting knowledge resources at regional or national level. Many different sets of intellectual capital measures have been developed. It is also important to point to the key role of international organisations in the development of new tools and indicators for the valuation of knowledge economy. The analyses and reports on the knowledge economy and information society made by the OECD and the World Bank were the mile stones in the development of new statistical data bases.

Because there is no universal and generally accepted definition of regional intellectual capital, the more difficult it is to look at the concept from such a perspective and to find out the right characteristics of the term. Intellectual capital for a region is identified with the future earnings capabilities. In other words it is the capability to generate sustainable wealth for its citizens. Intellectual capital for a city is described as the future earnings capabilities in terms of people, infrastructure, and relationships. Edvinsson further points to some characteristics of a knowledge
city and defines it as a city purposefully designed to encourage nourishing of collective knowledge as a capability to take efficient action to create a sustainable wealth (www.knowledgeboard.com, 27/01/05). Another key definition which falls within this framework is that of Bontis who indicates that „the intellectual capital of a nation includes the hidden values of individuals, enterprises, institutions, communities and regions that are the current and potential sources of wealth creation. These hidden values are the roots for nourishment and the cultivation of future wellbeing” (Bontis N., 2004).

Most of the methods categorising intellectual capital at regional level are based on the models primarily applied in companies. It has been done the same way by Bontis who presents the measurement system of intellectual capital, which is supposed to capture the statistics and describe the constructs of national intellectual capital. It is a modified version of IC value tree described by Edvinsson and applied in Skandia (figure 1). The following construct has been transformed from a firm level to national level perspective: market value in this case is national wealth, financial capital is now financial wealth, customer capital is now market capital, innovation capital is now renewal capital. And the remaining sub-components are labelled the same way. The same approach to the categorisation of national IC is used by Malhotra who views it in a very similar way (Malhotra, 2000).

![Fig. 1. Skandia's value tree transformed to national level](source: Bontis N., „National Intellectual Capital Index. A United Nations initiative for the Arab region”, Journal of Intellectual Capital, Vol. 5, No 1/2004, p. 15.)

According to the above model, human capital is defined as the knowledge, education and competences of individuals in realising national tasks and goals. The human capital of a nation begins with the intellectual wealth of its citizens. The author next indicates that its metrics should include the quality and quantity of individual stores of knowledge as well as that of the collective knowledge stores found in organizations. Another sub-component is the process capital described as non-human storehouses of knowledge of a nation which are embedded in its technological, information and communications systems as represented by its hardware, software, databases, laboratories and organizational structures which sustain and externalize the output of human capital. Market capital is defined as the intellectual capital embedded in national intra-relationships. This form of capital represents a country’s capabilities and successes in providing an attractive, competitive solution to the needs of its international clients, as compared with other countries. It is social intelligence created by elements such as laws, market institutions and social networks. The last sub-component – renewal capital – includes nation’s capabilities and actual investments in renewal and development for sustaining competitive advantage. A key element in renewal capital is research and development. Some of the key measures that were used by Bontis to assess intellectual capital for Arab countries are presented in table 1.

| Human capital | Structural capital | Process capital | Organizational capital | Market capital | Financial wealth | Intellectual capital | National wealth |
|---------------|-------------------|-----------------|------------------------|----------------|------------------|---------------------|-----------------|

Table 1. Intellectual capital metrics for countries
Another interesting set of knowledge indicators for countries were developed by the World Bank and applied in the Knowledge Assessment Methodology (KAM). The above method was designed by the Institute Knowledge for Development (K4D) to provide a basis assessment of countries readiness for the knowledge economy. The KAM is a benchmarking tool is designed to indicate countries’ strenghts and weaknesses based on the four knowledge economy pillars.

Comparisons in the KAM are made on the basis of 80 structural and qualitative variables that serve as proxies for the four knowledge economy pillars. Currently, there are 128 countries and 9 regional groupings that are available in the KAM. The comparisons are presented in a variety of charts and figures that visibly highlight similarities and differences across countries. The data on which the KAM is based are all published by reputable institutions that are at the forefront of gathering and producing country statistics that is reliable and internationally consistent. The interactive tool is able to provide assessments of a country or region position in terms of knowledge economy on (Derek H. C. Chen and Carl J. Dahlman, 2006):

- a global scale, when compared to all 128 countries that are available in the KAM database,
- a regional scale, when compared with countries in the same region,
the basis of human development, when compared with other countries in the same category of human development.

the basis on income levels, when compared with other countries of the same income level category.

The KAM contains of 80 structural and qualitative variables that span over different ranges of values and that’s why they are normalized from 0 (weakest) to 10 (strongest) and all the countries and regions are ranked on an ordinal scale. The variables are to measure countries’ performance on the following knowledge economy pillars: economic incentive and institutional regime, education, innovation, information and communications technology. The methodology allows to generate country’s overall knowledge economy index. One of the six possible modes of the KAM is a basic scorecard, which uses fourteen key variables as proxies to benchmark countries on the KE pillars. There are also two extra variables for overall economic and social performance. Basic scorecard was applied to the comparative analysis of knowledge economy for two countries – Poland and Slovakia, and the set of indicators is presented in table 2. The measures were generated by the interactive internet-based tool available on the World Bank website. It is important to note that the data includes average annual GDP growth for the period 2000 – 2004, and most of the remaining data is for 2003 or 2004.

Table 2. Knowledge economy variables for Poland and Slovakia according to the KAM, Source: generated by the on-line KAM interactive tool

| Variable                                      | Poland actual | normalized | Slovakia actual | normalized |
|-----------------------------------------------|---------------|------------|-----------------|------------|
| GDP Growth (%)                                | 3.08          | 3.07       | 4.08            | 5.04       |
| Human Development Index                       | 0.858         | 7.30       | 0.849           | 6.83       |
| Tariff & Nontariff Barriers                   | 2.00          | 7.04       | 2.00            | 7.04       |
| Regulatory Quality                            | 0.64          | 6.64       | 1.15            | 7.97       |
| Rule of Law                                   | 0.51          | 6.41       | 0.49            | 6.33       |
| Researchers in R&D / million                  | 1468.57       | 5.35       | 1706.82         | 6.05       |
| Scientific and Technical Journal Articles / mil. pop. | 148.65 | 7.32      | 177.54          | 7.48       |
| Patent Applications Granted by the USPTO / mil. pop. | 0.50          | 5.78       | 0.93            | 6.56       |
| Adult Literacy Rate (% age 15 and above)      | 100.00        | 8.19       | 100.00          | 8.19       |
| Secondary Enrolment                           | 101.27        | 8.28       | 89.46           | 6.17       |
| Tertiary Enrolment                            | 59.51         | 8.48       | 32.11           | 5.60       |
| Telephones per 1,000 people                   | 917.60        | 6.48       | 1022.00         | 6.95       |
| Computers per 1,000 people                    | 191.00        | 6.83       | 294.60          | 7.50       |
| Internet Users per 10,000 People              | 2334.57       | 6.48       | 4209.36         | 7.97       |

4. Conclusions

Development potential of countries and regions is mainly based on intangible resources and hidden capabilities. It seems that a key issue is to reveal the key success factors creating the value for nations and determining its competitive advantage. Intellectual capital can be viewed as such a success factor that decides about nation’s future socio-economic development. The identification of knowledge capital will allow to fully utilize all the intellectual resources embedded in a nation. In order to meet the requirements of knowledge economy, methods and indicators for measuring intellectual capital for countries need to be developed. The key contribution of the article therefore lies in unpacking the definitions and measures of intellectual capital for countries. It illustrates some efforts made by the researchers and practitioners to build methodologies for IC valuation at regional level. It should be noted that the concept of IC measuring at this level still remains in embryonic stage of development and some more future research is suggested. The pivotal suggestion for future work is to be sensitive to the way of direct transforming company IC models to regional level. It must be pointed out that a company does not equal a country and those two have different characteristics, which should be taken into consideration when constructing such measuring models.
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