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INTELLECTUAL CAPITAL AS AN INDICATOR OF REGIONAL DEVELOPMENT: THE CASE OF THE SLOVENIAN REGION OF POMURJE

Abstract. *One of the key success factors of every region is an adequate level of intellectual capital provided by the human capital of its residents. This article aims to show that low levels of regional development in Slovenia's least developed region of Pomurje corresponds to the low levels of intellectual capital. The article reviews the literature on the concept and measurement of intellectual capital and provides operationalization of intellectual capital suitable for assessing its levels on a regional, subnational level. The results show that Pomurje has lower level of intellectual capital from the national average. Furthermore, the analysis of rates of growth of intellectual capital indicate the systematic lagging of Pomurje region behind Slovenian average. The case study highlights the problem of brain drain as the key contextual factor that influences the size of intellectual capital and negatively affects the performance of the region thus pointing to priorities of a more effective developmental policy.*

Keywords: *Intellectual capital, brain drain, regional development, Pomurje*

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Introduction

In today's knowledge society, increasing amounts of specific knowledge are required for a successful adaptation to social and technological change. With ever more rapid technological progress the usefulness of a given acquired knowledge becomes more short-lived and needs to be constantly renewed and replenished. Therefore companies are increasingly aware of the significance of the adequate competences of their employees', and the dependence of their market success on the quality of intellectual capital that they have at their disposal. As a result, the importance of companies' intellectual capital has already been considerably increased, as knowledge represents the core of intellectual capital.

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Similar emphasis on intellectual capital has been taking place on national and regional levels. Intellectual capital is becoming an increasingly important factor of growth, development, competitiveness, and economic performance of organisations, regions and countries. The investment in the strengthening of intellectual capital and its management is emerging as a key trend in economic development policies. The measurement and the monitoring of the intellectual capital and intangible assets of a nations, regions and companies has become as important as the monitoring of their financial statements or balance sheets.

This article analyses the meaning and the role of intellectual capital for the performance of Slovenia's eastern-most region of Pomurje, representing a topical issue in the context of current economic and developmental challenges of the region. By doing so, this article fills the void in national studies of intellectual capital at the regional level. The article also considers the wider context of this problem, and its potential implications and message for the regional developmental policy of Pomurje. The Pomurje region is considered the country's least developed region, and also one that most lacks intellectual capital. Therefore, the article addresses this research problem and looks for possible solutions for Pomurje as a region struggling to retain and improve its intellectual capital. In this paper we attempt to show the level of intellectual capital of Pomurje compared to the national level in Slovenia. Then we examine that rate of change in intellectual capital in a critical period that includes years before, during, and after the crisis trying to determine the extent to which the region was lagging behind or catching up with the national average. And finally we use contextual factors in trying to determine what are the potential drivers that determine the levels and the rate of change in intellectual capital of Pomurje region.

Economic and regional development

Economic development is a much broader concept than *economic growth*. While economic growth refers to the growth of national well-being measured usually through GDP (and GDP per capita) growth rate, economic development denotes qualitative social changes based on quality of life improvement, structural changes and innovations (Senjur, 2002). There are four distinct approaches to economic development. *Schumpeterian approach* sees innovations generated through "creative destruction" between rival firms and industries as key "engine" of economic development (Schumpeter, 1951). *Neoclassical approach*, on the other side, focusing on growth otherwise states economic development as a result of investment in physical capital (Solow, 1956). The development of the *endogenous growth theory* brought further to the fore the importance of two additional

factors - innovation (Romer, 1986) and education (Lucas, 1988), while *institutional approach* argues for the significance of institutions for economic and regional development (Rodríguez-Pose, 2013).

Regional development could be understood as economic development on a regional level (cf. Cooke and Leydersdorff, 2006) and includes regional developmental factors such as (Kukar, 1995: 9): the existing regional economic structure, natural, human, infrastructural, financial, institutional and organisational potential. In addition, Florida (2002) emphasizes *creativity* as the key factor of economic and regional development stating that only mutual cooperation between actors of “technological creativity” and innovation, “economic creativity” (or entrepreneurship) and “cultural creativity” accelerates economic and social prosperity.

Regional development theories can be divided into five groups. First group is referred to the neoclassical “interregional convergence hypothesis” stating that over time, differences in the price of labour and other factors across regions will diminish and tend toward convergence. Location theory is focused primarily on developing formal mathematical models of the optimal location of industry given the costs of transporting raw materials and final products. The third considers external economies when firms may cluster to take advantage of external economies that result from close proximity to a large number of other firms, while the fourth is built on Hotelling’s models of spatial competition. The fifth is central place theory as a more general theory of the spatial location of firms (Dawkins, 2003).

Alternative theories to the interregional convergence hypothesis mentioned above, embrace export base theory and neoclassical exogenous growth theory. In contrast with more traditional theories the theories of regional economic convergence emphasize the factors that lead to differential levels of regional development. “Divergence” theories include Myrdal’s cumulative causation theory and growth pole theory. Structuralist theories examine regional economic development as a process of structural adjustment both within and outside the region (e.g. stage/sector theories, profit/product cycle theories, industrial restructuring theories, flexible specialization and network theory, Marxist theory of uneven growth and spatial differentiation). There are also few theories that account for the role of politics and political institutions in economic development, i.e. growth machine theory and the new institutional economics (based on theory of transaction costs developed by Coase, Williamson and North). The last group of theories derived from emerging neoclassical perspectives, refer to “Schumpeterian” endogenous growth theory, which makes technological change and innovation endogenous to the model, and Krugman’s “the new economic geography”, e.g. “core-periphery” model where regional clusters of economic activity emerge due to a combination of centrifugal and centripetal forces (for more details see Dawkins, 2003).

In this paper we draw on economic divergence theories as providing a framework for the understanding of the long-term underdevelopment of Pomurje region. Compared with more developed (central) regions, the less developed, *peripheral* regions (e.g. Pomurje) usually exhibit lower regional GDP per capita, lower average wage level, higher unemployment rate, worse infrastructure linked with higher transportation costs as well as financial and qualified human capital outflows to central regions causing regional inequalities and unequal regional development (Armstrong and Taylor, 2000). *Central* regions, in contrast, can achieve either Ricardian comparative advantage or Porter's competitive advantage over other regions by benefiting from "constructed" advantage, i.e. knowledge-based construction which requires interfacing developments in the following knowledge-enhancing areas (Cooke and Leydesdorff, 2006: 10–11):

- a. Economy – regionalization of economic development, 'open systems' inter-firm interactions, integration of knowledge generation and commercialization, smart infrastructures, strong local and global business networks.
- b. Governance – multi-level governance of associational and stakeholder interests, strong policy-support for innovators, enhanced budgets for research, vision-led policy leadership, global positioning of local assets.
- c. Knowledge Infrastructure – universities, public sector research, mediating agencies, professional consultancy, etc. have to be actively involved as structural puzzle-solving capacities.
- d. Community and culture – cosmopolitanism, sustainability, talented human capital, creative cultural environments and social tolerance as well.

All four areas of development enhance knowledge creation and integration in a region and contribute to the regional development by means of increasing intellectual capital to which we turn in the next section.

Conceptualisation of intellectual capital

Intellectual capital encompasses all processes and assets that are usually not shown in the balance sheet (Roos et al., 2000: 17). Knowledge represents the core of intellectual capital. Intellectual capital can be defined as "the end result in the process of knowledge transformation or as the knowledge that is transformed into intellectual property" (Starovic and Marr, 2003: 6). David H. Luthy (1998: 3) claims that even several decades ago intellectual capital had been becoming the "preeminent resource for the creation of economic wealth". By investing in intellectual capital companies are believed to achieve a higher degree of value added, a better reputation, a competitive advantage and faster economic growth and development (Lazuka, 2012:

9–10). In the first, positive definitions, an organisation's intellectual capital was defined as the set of knowledge of all the employees in an organisation and the set of practical use of this knowledge in the form of guaranteed quality symbols, trademarks and processes (Roos et al. in Mihalič, 2009: 15). According to the negative definition, intellectual capital represented everything intangible that could produce value in the company (Mihalič, 2009: 15). Today, numerous authors (Bontis, 2000; Bontis, 2002; Sveiby, 2001 etc.) define intellectual capital mainly as the organisation's intangible and hidden value that creates added value.

In other words, intellectual capital is the sum of all the knowledge within the company that is used for competitive advantage (Nahapiet and Ghoshal in Huang and Wu, 2010: 584). It can be assumed that a company's competitive advantage depends on the efficiency of its building, distribution, upgrading and use of knowledge (Huang and Wu, 2010: 584). Intellectual capital can exist in tangible or intangible forms. In tangible form it can be identified as patents, trademarks, plans, licences, programmes etc. and represents a company's tacit knowledge. The intangible form of intellectual capital exists in the employees' minds in the form of knowledge, capabilities, problem solving, and experiences etc. as an explicit form of knowledge. One of an organisation's aims is that tacit knowledge transforms into explicit knowledge, becomes the organisation's property and is inalienable (Jelčić, 2004: 22).

Components of intellectual capital

Rather than being a homogeneous resource intellectual capital consists of a sum of all intangible assets including knowledge or human capital, structural capital, relational capital and social capital (Bontis, 1999). Following Bourdieu's differentiation between different forms of capital all these forms represent structural elements of intellectual capital (Bourdieu, 1986).

Human capital

In the 1960s the concept of human capital was analytically elaborated by the economists Schultz (1961), Mincer (1958) and Becker (1964) who developed the so called human capital theory that stems from the idea that employees' knowledge and experience can be considered capital. The increased quantity and quality of human capital acquired through the years of education or training increase the marginal labour productivity and the quality of job performance in the company which in turn increases wage level (Becker in Dimov and Shepherd, 2005). In business terminology human capital is defined as the combination of basic factors,

namely individual quality, individual competence and individual motivation (Fitzenz, 2000: 18). Human capital is the intangible resource hiding in the existing individual knowledge and competence, with the extent of its usage depending on the form of management and treatment of people at work in a given company (Edvinsson and Sullivan, 1996: 363; Bec, 2014). All knowledge, experience, personal characteristics, competence, motivation, creativity and adaptability possessed by individuals should be appropriately treated, managed and controlled for these factors of the human capital to be used in practice in the most efficient and effective way to contribute to the creation of a new value added of the company (Mihalič, 2006: 44).

A common feature of different definitions of human capital is that it deals with the quality of labour force as the capital which when invested yields higher returns, both for the individual through higher wages and for the company through increased productivity. Human capital that contains employee knowledge, their skills, abilities, capacities and competences represents an important component of intellectual capital.

Structural capital

Structural capital includes all data bases, organigrams, manuals and intellectual property, along with everything that a company considers higher value than its tangible value. Structural capital is part of intellectual capital that has been created in the organisation by human capital and has become the property of the company; it is what “remains in the company when employees go home at night” (Roos et al., 2000: 30; Bec, 2014). Structural capital offers direct and indirect support to human capital: direct in the form of tangible elements such as office inventory, and intangible elements such as information systems, computer programmes, work procedures, marketing designs and business know-how. Indirect support to human capital includes tangible elements such as buildings, electricity, plumbing, and intangible elements, such as strategic plans, payment systems and cost structure (Sullivan, 2000: 232). Structural capital enables human capital to increase its value added. It is what was created by human capital but is owned by the company (Pučko, 1998: 559).

Social and relational capital

The third component of intellectual capital is social capital occasionally referred to in economic literature as relational capital. Social capital is represented by the relations between members of the family (Coleman, 1988), local communities (Wellman, 1979), urban centres (Portes, 1993), organisations (Burt, 1992) and societies (Putnam, 2000). On one hand social ties

between people serve as levers to access resources owned by people that are related to us (Burt, 1990), which increases the range of resources available to the individual. The complexity of social capital stems from the fact that it only enables access, but not property of resources, which is why the access to our contacts' resources is conditioned by the people to whom we are related. Therefore, while social capital enables access to a wider range of resources, the mobilisation of these resources depends on the strength of the ties and structure of the social network (Burt, 1990; Rus, 1999). Social ties also serve as prisms: our social status in society is largely determined by who is part of our social network (Podolny, 2001). This means that social capital includes direct and indirect components enabling on one hand a direct access to resources, while on the other through our social status opening opportunities for access to resources that exist beyond the limits of our social network. Often, this approach is used in very diverse problems such as the analysis of social support networks (Šadl and Hlebec, 2007), the development of entrepreneurship (Rus and Iglič, 2005) or whole societies (Iglič, 2014).

Bontis considers social capital in organisations as relational capital and defines it as a set of organisational relations consisting of the social network of co-workers, their satisfaction and their loyalty to the company (1996: 42). According to Wiig, organisational relations also include relationships between an organisation and its stakeholders (1997: 401). The firmer, more open and trustworthy these relations are the larger the relational and in turn intellectual capital is. While relational capital stresses the meaning of direct contacts, social capital also includes the value of direct relations. The larger the ramification of a company's contacts with other economic subjects, the larger its social and in turn intellectual capital. In terms of content, relational capital refers to those relationships with buyers, clients, suppliers, employees, customers and business partners that create a new value. These are the relations between the company's internal and external stakeholders that contribute to the creation of its value added (Mihalič, 2009: 40) and are the source of its competitive advantage (Kešeljevič, 2003).

Management and measurement of intellectual capital

The purpose of managing intellectual capital is its building, development, retention and strengthening (Mihalič, 2009: 28). The management of the intellectual capital of a region mainly depends on its management in regional companies and on the coherent operation of national and regional institutions for the promotion of investment in innovation (such as regional developmental agencies).

Management of intellectual capital means that intellectual capital

becomes the focus of all the activities of a company directed toward the future growth and strengthening of its capabilities and simultaneous minimization of its weaknesses. The management of intellectual capital represents the transformation of knowledge into what embodies a direct value to an organisation (Brennan, 2001: 425) or a region. The implementation of intellectual capital management policy is based on the belief that a company's intangible value as such does not create value or generate growth, but can be developed and bring success only in a certain context or through optimum management (Lev and Daum, 2004). In our opinion the management of intellectual capital is the strongest component of operation that creates value added and increases the wealth of organisations, regions or countries. Aiming to satisfy and motivate its employees, efficient management of intellectual capital contributes to the improvement of business processes, the possibilities of creating new value, product development, better use of resources and better corporate design (Branković-Merdžo et al., 2015: 362).

According to Skyrme (2007) only "what gets measured, gets managed". It is by measuring their intellectual capital and publishing the data that innovative companies distinguish themselves from non-innovative ones. Intellectual capital can be measured. There are numerous methods of measuring intellectual capital that can be classified into four main approaches under the name of ABBA – Asset, Benefits, Baseline and Action (Skyrme, 2007). Sveiby's division (Sveiby, 2010), which represents an extension of Luthy's (1998) classification, speaks about four basic approaches for measuring intellectual capital, namely Direct Intellectual Capital methods (DIC), Market Capitalization Methods (MCM), Return on Assets methods (ROA), and Scorecard Methods (SC).¹ Each approach has many variations and refinements.

The selection of the method depends on numerous factors such as the organisation's activity, its development of human resources, and financial position etc. Sveiby (2001) states that no method suits all purposes, which is why the method for measuring intangibles should be selected according to the purpose and situation of measurement and the target audience.

Undoubtedly, the measurement of intangible assets brings certain advantages and benefits to the company, region or country. Many authors think that a company's balance sheets of assets and liabilities do not show the correct state of its assets or its real value (see for example Van Deventer, 2002). The company that makes profit has "something more" that needs to be recognised, measured, and thereby managed, upgraded and also rewarded (Peršak, 2011: 2). With knowledge becoming the most important economic resource in the contemporary conditions of the economy, intellectual

¹ For a more detailed description of these methods see Sveiby (2010).

capital is the economic version of knowledge. To obtain the results that lead to companies' competitive advantage it is therefore necessary to manage and measure both financial and intellectual capital (Bec, 2014).

Regional Intellectual capital

The intellectual capital of a region is defined as the region's ability to create value ensuring the long-term competitiveness of its economy, and to determine the potential for its future growth (Antoljak, 2014). The intellectual capital of a region consists of five components, namely human capital, market capital, organisational-process capital, renewal-and-development capital and financial capital (Lin Yeh-Yun and Edvinsson, 2010: 4).

Human capital is defined as individuals' ability to engage in and carry out activities that are important for regional economic and social development. It represents the intellectual wealth of all the individuals from a certain region (Bontis, 2004: 20). OECD (in Lin Yeh-Yun and Edvinsson, 2010: 254) defines human capital as consisting of the knowledge of facts, laws and principles, knowledge referring to team work, and other specialised and communication abilities. Education is the basis of human capital. Thus, human capital is reflected in the qualified workforce, the degree of education of the employees, the degree of literacy, the degree of enrolment to higher education, and public expenditure for education etc. (ibid: 254).

The human capital of a region is not determined by the educational attainment of its residents but by the extent it is able to retain and develop this human potential and employ it toward economic growth. Human capital of a region is therefore positively affected by education but and negatively affected by the outflow of educated individuals from the region to more developed areas or even other countries. In cognitive theory brain drain belongs under the broader notion of migration. When speaking of migration, we have in mind the movement of people or groups of people from one territory to another, which often leads to a permanent change of place of living (Bevc et al., 2004: 3). One of the most well-known definitions of brain drain was given by Walter Adams (1968: 1), who understands brain drain as the loss of vital resources without replenishment of this loss, which means that human capital leaves the areas, in which it could have had a positive effect on prosperity, for new environments that already have enough trained staff. Docquier and Marfouk (2004) define brain drain as a proportion of the total number of working-age individuals older than 25 years with an educational level not lower than post-secondary education who grew up in one country and now live and work in another.

Market capital is another type of capital that represents the abilities and achievements of a region in providing attractive and competitive solutions

to satisfy the needs of its international clients, and at the same time its capability of exchanging knowledge with the rest of the world (Bontis in Lin Yeh-Yun and Edvinsson, 2010: 254). This is the capital that is needed to maintain good and authentic international relations (Bontis, 2004: 23). This includes cross border investment and achievements in external international relations, export of goods and services, openness to other cultures, and degree of globalisation etc. (Lin Yeh-Yun and Edvinsson, 2010: 254).

Organisational-process capital is defined as the knowledge stock embedded in the infrastructure of a region. These are ICT systems that enable the easier creation of, access to, and dissemination of information (hardware, software, data bases, organisational structures) that support human capital (Bontis, 2004: 21).

Renewal and development capital provides a kind of basis for the continued operation of companies in the region and a support instrument for their start or restart (Južnik, 2004: 60). Renewal and development capital represents the future intellectual wealth of the region and its capability for innovation that maintains its competitive advantage and continual economic growth (Bontis, 2004: 24).²

The Pomurje Region

The Pomurje region lies in the South-East of Slovenia and extends over 1,337 km² or 6.6% of the total surface of the country. It is bordered by Hungary, Austria and Croatia, which provides the region with an attractive geostrategic position. In terms of size it is Slovenia's seventh statistical region. The central town of the region is Murska Sobota. The population of Pomurje amounts to around 120,000 inhabitants which represents 5.8% of Slovenia's total population. There are 27 municipalities in the region (SURs, 2014: 40; RRA Mura, 2015: 16-17).

The Pomurje region belongs to the least developed Slovenian regions. Compared to other Slovenian regions its economic activity is mainly oriented to activities with low added value per employee. The Pomurje economy is characterised by intensive farming, whose development is made possible by the extensive plains³, fertile soils and a favourable continental climate. The region is considered to be very touristically attractive with 10% of overnight stays annually of all tourists that visit Slovenia (SURs, 2014: 40).

However, its remote position adversely affects the region's economic position and the living conditions of its residents. Among other things, this

² Along with all other capitals, another component of regional intellectual capital that needs to be considered is financial capital that is normally expressed in per capita GDP.

³ It is the flattest and most agrarian (80% of all farmland in use) statistical region of Slovenia (RRA Mura).

is reflected in the low GDP per capita (in 2012 amounting to EUR 11,872) and the lowest disposable income per capita (in 2011 EUR 9,008 per capita): Pomurje is also the region with the highest registered unemployment rate reaching over 20% at the beginning of 2014. For several years the region records negative natural population change, which is the largest in the country (RRA Mura, 2015: 17).

Another problem in the region is a poor educational structure of its population that notably falls behind the rest of Slovenia. Pomurje has the lowest percentage of the population with a completed tertiary or post-secondary education, but nonetheless, it consists of the smallest share of unemployed with completed higher education (Toplak Perović, 2012). Most unemployed have a first and second degree of education. Having only some constituent schools of a few post-secondary schools, the Pomurje region has no higher education institution. Thus, young people leave to study in other regions, which for Pomurje represents human capital outflow, with young graduates not returning to the region after they complete their studies (RRA Mura, 2015: 18). All these reasons function as “push” factors for young people to leave for other places, regions, and countries.

Another indicator of brain drain in the region can be obtained from Pomurje Academic and Scientific Union (PAZU), an association that brings together those former or present residents of Pomurje who hold doctorate in science or philosophy. The association which has currently 146 members, estimates, that over half of them have emigrated from the region and now live and work in other parts of Slovenia or abroad. Further evidence points out that out of 450 doctors of sciences from Pomurje, the majority of them now live and work outside of the region (Žunec, 2015).

To determine the reasons for brain drain from the Pomurje region, we conducted a survey among the members of PAZU and other highly educated Prekmurians who have emigrated from the region. We wanted to learn why they emigrated from the Pomurje region? The survey questionnaire provided the respondents with six reasons for emigration, namely: work, family, education, religious reasons, political reasons, and other. The answer that was picked most often was work (42%), followed by education (37%), while only a minority emigrated due to family reasons (16%). Since work was most often the cause of brain drain we were interested in whether they thought it was difficult to get employment in Pomurje. The vast majority of respondents (63%) responded with “yes”, with 29% chose the answer “I do not know”, since they had never looked for work in Pomurje or they emigrated during their study. Only 8% thought that employment was not an issue.

The findings show that work and employment related issues are indeed the main reasons for emigration from the region. They also give substance

to the data from PAZU regarding large majority of émigrés from the region among their members. They also point to the vicious spiral of underdevelopment. On the one hand the underdevelopment of Pomurje is the main cause of brain drain from the region which, on the other hand, reduces intellectual capital of the region and inhibits its economic development.

Methods

Intellectual capital index of a region

The IC index calculation belongs to the group of scorecard methods. Scorecards methods show the non-monetary value of intangible assets through determining their individual components. Four individual components of intellectual capital indicators are determined that monitor the performance of intellectual capital, and are shown in graphs or on scorecards. These indicators are then added up and their sum represents the value of intellectual capital (Sveiby, 2001).

IC index calculation is based on the definition of the human development index (HDI) as the indicator that shows well-being at three levels of social development:

- a. health (life expectancy at birth for the monitoring of lifespan and health conditions),
- b. income or access to resources that allow people a decent living standard (GDP per capita according to purchasing power),
- c. level of education and knowledge: gross inclusion and literacy rate that shows the combined enrolment ratio at different levels of education or adult literacy rate (ARSO, 2010; comp. UNDP, 2014: 33; UMAR, 2013: 174-175; UMAR, 2014: 62).

Since human capital is the constituent part of intellectual capital, and is also encompassed in HDI, then HDI can be understood as a partial correlate of the IC index in the macro model of indicators of sustainable social development (Makaroy, 2010). The IC index can be calculated at different levels such as for profit and non-profit organisations, regions or countries (Maček and Možina and Kovač, 2006: 100; Bontis, 2004). The idea is the same for all three levels, with only individual level indicators requiring somewhat different approach. Literature includes attempts to define the IC index for a region. For example, Nick Bontis (2004) calculated the IC index for Arabian regions. His model was taken here as the basis for the calculation of the intellectual capital index of the Pomurje region. The experimental model of measuring regional intellectual capital has also been used in Slovenia, following the Bontis' methodology (Južnik, 2004). Similar model was also used

by Carol Yeh-Yun Lin and Leif Edvinsson (2010) to calculate the intellectual capital of the Nordic states.

Operationalisation of the four components of the IC index

The regional IC index consists of four components, namely human capital, market capital, renewal and development capital, and organisational and process capital (Bontis, 2004: 17). Indicators are defined for each component of regional intellectual capital to contribute to the discovery, understanding and monitoring of the invisible resources of the region. The selection of indicators was made on the basis of the IC index calculations by several authors (Bontis, 2004; Južnik, 2004; Mihalič, 2009; Lin Yeh-Yun and Edvinsson, 2010). However the list of indicators is somewhat different than in the prior work due to availability issues in Slovenia, conceptual clarifications of some of those indicators for Slovenia and due to inclusion of some other relevant indicators.

We selected 26 indicators that we consider to have the most influence on intellectual capital of a region (see Appendix 1). The 26 indicators were grouped in 4 groups to represent four different components of intellectual capital. Together they constitute the aggregate indicator, i.e. the IC index. The following indicators grouped in four components were:

- *market capital* is measured as 1) trade balance in USD (the ratio of export over import), 2) the number of companies with the acquired ISO certification (ISO 9001 of quality management system standard and ISO 14001 environmental management system standard), 3) the number of tourists, 4) the number of emigrants (emigrant Slovenian citizens) and 5) the number of immigrants (immigrant foreign citizens).
- *Human capital* was operationalised with the following indicators: 6) number of students of post-secondary professional schools, 7) number of students of professional colleges, 8) number of students enrolled at Master or specialization level, 9) number of higher education institutions (public and private), 10) the number of graduates of higher education undergraduate programmes, 11) the number of those with higher education among all employees, 12) the number of libraries (full members of the COBISS system) and 13) the number of the active working population.
- *Organisational-process capital* was measured with indicators: 14) the number of providers of continuing education (people's universities, public and private providers of further education, driving schools), 15) the number of participants of continuing education, 16) the number of (adult) participants in the programmes to acquire education (programmes to acquire lower and secondary vocational, secondary technical, professional and general education for youth and adults), 17) the number of cinemas, 18)

museums, galleries, and exhibition grounds, 19) the number of cultural centres, as well as 20) the number of radio and TV subscribers.

- *Renewal and development capital* is represented in the study by 21) gross domestic expenditure for R&D activities, 22) the number of researchers, 23) the number of research organisations, 24) the number of subjects of innovative environment, the 25) number of newly established enterprises, and 26) the number of fast-growing enterprises.

It needs to be pointed out that one indicator, namely the number of persons who emigrated from Slovenia and Pomurje have a negative impact on the IC index, which is why this indicators was given a negative value and consequently its value was deducted in the calculation of IC index. Due to the complexity of data acquisition some of the data was determined by means of estimation.

Data collection

We used publicly available databases to extract indicators of intellectual capital described above. Two most important sources of the data were the Statistical Office of the Republic of Slovenia and the Employment Service of Slovenia. We complemented those with some other institutional sources, to establish the economic position of the region, and the ensuing state of its intellectual capital. The data were collected for eight years for the period from 2006 to 2013. The period is interesting because it includes both the period of unprecedented growth and the years of economic crisis. We gathered the data for Slovenia and for the Pomurje region in order to compare the intellectual capital of the country with the one of the region across eight years of observation. We managed to gather the data for 26 indicators defined above whose values were obtained directly from the available statistical data or were derived from the analysis of other institutional sources. For example, some of the data for the Pomurje region was not readily available as the Statistical Office does not report all of the data broken down by region. Thus we contacted the Pomurje municipalities that forwarded us information on the number of museums, exhibition grounds, houses of culture, cinemas. We obtained the data on the number of Radio and TV subscribers from the national broadcaster RTV Slovenia. The number of libraries in the region was obtained from national agency IZUM⁴ while the number of entities of innovative environment were obtained from the national agency SPIRIT⁵.

⁴ Institute of Information Science.

⁵ Public Agency for Promotion of Entrepreneurship, Internationalisation, Foreign Investments and Technology formerly known as JAPTI

Calculation of weights

The weighting of different indicators can significantly affect the value of IC. For example, one could argue that the number of museums and the number of researchers are two very different indicators that should be weighted according to their significance. The weighting of different indicators could be derived from theoretical considerations or by means of subjective evaluations of relevant actors in the region. We decided on subjective evaluations. Subjective weights by key actors of development should reflect real differences in the significance of each indicator as perceived by key practitioners in the region. This could be done by the companies in the Pomurje region as they are the key actors of its economic development. An on-line survey questionnaire was sent to the electronic addresses of 90 companies in Pomurje addressed mainly to their human resources offices or general managers. The list was obtained from the regional development agency that maintains a register of 90 biggest companies in the region. The companies in the register were drawn from widely diverse sectors. The most numerous were professional services organisations, followed by the construction industry, the metal processing industry⁶, food and agriculture, and ICT. 31% of companies had over 100 employees. 38% of companies were in existence for a period of 20 to 50 years. As many as 9% of companies were 100% foreign-owned. 74% of companies mainly served the domestic market.

We received 58 questionnaires with valid responses resulting in 64% response rate. The first part of the questionnaire included some general questions (the organisation's activity, number of employees, market share) while the second part dealt directly with intellectual capital. For each of the 26 indicators of IC we asked the respondents to indicate their perceived significance of an indicator on the three-point scale of low, medium or high. We used these responses to calculate the weights for each indicator of IC.

Calculation of the Index of Intellectual Capital and Relative Index of Intellectual Capital

We calculated two measures of IC. In order to compare the *levels* of IC between Slovenia and Pomurje, we normalized the indicators and added them up within each year. The value of an Index of Intellectual Capital IIC has no intrinsic meaning but the normalization allows for comparison between Slovenia and Pomurje region. We made this calculation with unweighted and weighted data. In order to determine the *dynamics of change* of the IIC over years we calculated relative IIC where previous year served as a

⁶ The strongest industry in the region in terms of revenue (PGZ 2014, 17).

baseline for the current year IIC. The relative IIC was calculated for Slovenia and Pomurje region for all the years and allowed the comparison between the two in terms of the growth rates of IIC between the two. The method of calculation of intellectual capital is modelled on Bontis (2004). The method of calculation of annual rates of growth of the IIC follows closely the experimental model presented by Južnik (2004). Again we used both weighted and unweighted data.

For the calculation of Intellectual Capital Index for Slovenia and Pomurje region we had to normalize the data. The raw data were first normalized by dividing the data with population size of Slovenia and Pomurje respectively in order to account for the size of unit under observation. We thus obtained per capita measure of each indicator. Since the indicators were not comparable in terms of their scale, we normalized them by dividing each indicator with the mean value of an indicator in a given year. Indicators were thus brought to a common scale and were summed up by category within each year. Intellectual capital index is a sum of all indicators within a year.

Index of Intellectual Capital IIC is therefore calculated as:

$$IIC_t = \sum_{n=1}^{26} I_{nt}$$

here I_{nt} is a normalized indicator n for a year t and IIC_t is an Index of Intellectual Capital for a given year t .

Index of Relative Intellectual Capital RIIC is similarly calculated as:

$$RIIC_t = \sum_{n=1}^{26} I_{nt}/I_{n(t-1)}$$

were I_{nt} is a normalized indicator n for a year t , $I_{n(t-1)}$ is a normalized indicator n for a prior year $(t-1)$, their ratio expresses the rate of growth in the indicator n and $RIIC_t$ is a Relative Index of Intellectual Capital for a given year t .

Calculation of weighted indices and weighted relative indices follows the same logics with the normalized data multiplied by normalized weights and emulates (Južnik, 2004: 62). However, the weighted results are almost identical to the unweighted ones and are not reported.

Results

Table 1 shows clearly indicate the extent to which Pomurje region lags behind Slovenian average. It is consistent with the concept of intellectual capital to find the IIC over time relatively stable, as intellectual capital reflects both infrastructural investments and human capital that do not change abruptly. The data in the table 1 also reveal the structure of differences

between the national and regional IC. The differences in market component and organizational (i.e. “infrastructural”) component of IC are small relative to the other two components. The largest differences between the national and regional IIC arise in the *human capital* component and *development and renewal* component supporting the hypothesis that the intellectual capital is most critically affected by people in their intellectual potential and their creative and developmental capacity. Interestingly, we note that organizational component exhibits only minor differences indicating that infrastructure per se is not the determining factor in the formation of intellectual capital. This suggests that additional investment in infrastructure might not yield developmental benefits without the enhancement of the human capital (such as prevention of brain drain).

Table 1: INDEX OF INTELLECTUAL CAPITAL BY COMPONENT AND YEAR

		2006	2007	2008	2009	2010	2011	2012	2013
Market capital	Slovenia	3,70	3,74	3,49	3,63	3,41	3,29	3,76	3,68
	Pomurje	2,19	2,08	2,22	2,23	2,39	2,46	2,06	2,22
Human capital	Slovenia	10,02	9,94	9,92	9,85	9,81	9,67	9,73	9,78
	Pomurje	5,98	6,06	6,08	6,15	6,19	6,33	6,27	6,22
Organizational capital	Slovenia	6,89	6,69	6,62	6,41	6,46	6,40	6,49	6,46
	Pomurje	7,11	7,31	7,38	7,59	7,54	7,60	7,51	7,54
Renewal and development	Slovenia	8,05	8,09	8,03	8,17	8,15	8,40	8,28	8,34
	Pomurje	3,95	3,91	3,97	3,83	3,85	3,60	3,72	3,66
IIC (total)	Slovenia	28,67	28,46	28,06	28,06	27,83	27,76	28,26	28,26
	Pomurje	19,22	19,35	19,66	19,80	19,96	19,99	19,56	19,64

Source: Ilič, Bernjak, Rus (2016).

Table 2 provides the comparison between the rates of growth in IIC in Slovenia and Pomurje region. The results reveal that there is a trend of deterioration of intellectual capital from year to year at the national as well as regional level indicated by any number that is lower than 100. This finding is surprising in that the decline is noted also for the two years preceding the recession. The decline in IIC was therefore enhanced rather than caused by at the height of recession in 2010 but the negative year-on-year trend was present in every year of observation.

The second result gleamed from the Table 2 are differences in RIIC between Slovenia and Pomurje. In all but one year the RIIC is smaller in Pomurje region than in Slovenia indicating that the deterioration of IIC in

Pomurje was faster than in Slovenia as a whole. This result points to the lagging of Pomurje region behind Slovenia. Not only that the level of IIC in Pomurje is much lower than the national average. There seems to be also a stronger negative trend toward deterioration of intellectual capital in Pomurje compared with Slovenia. Taken together the results indicate that Pomurje is on the path of a vicious circle. Lower intellectual capital in the region is accelerating its depletion of intellectual capital thus increasingly inhibiting developmental potential of the region. This finding resonates with Myrdal's theory of "cumulative causality" implying on the one hand positive developmental spirals of already successful regions and, on the other hand, mutually reinforcing negative trends leading to divergent regional development with Pomurje increasingly lagging behind Slovenian average (cf. Dawkins, 2003).

Table 2: RELATIVE INDEX OF INTELLECTUAL CAPITAL BY COMPONENT AND YEAR

		07/06	08/07	09/08	10/09	11/10	12/11	13/12
Market capital	Slovenia	66,05	53,10	62,28	48,34	54,22	48,14	65,40
	Pomurje	62,13	61,27	57,64	55,84	59,02	12,82	68,77
Human capital	Slovenia	103,86	105,65	107,68	100,18	103,08	103,19	100,75
	Pomurje	91,96	92,05	93,71	87,21	93,77	88,00	85,74
Organizational capital	Slovenia	98,27	106,01	95,70	98,84	100,50	103,14	103,20
	Pomurje	106,11	107,12	100,11	98,39	102,88	100,16	103,61
Renewal and development	Slovenia	108,85	111,91	104,27	98,91	109,81	104,33	104,35
	Pomurje	108,24	119,57	99,58	95,05	100,78	118,03	102,93
RIIC (total)	Slovenia	94,26	94,17	92,48	86,57	91,90	89,70	93,43
	Pomurje	92,11	95,00	87,76	84,12	89,11	79,75	90,26

Source: Ilič, Bernjak, Rus (2016).

Proposals for regional developmental policy and for the improvement of the situation in the region

Regional developmental policy and the direction of the development of the Pomurje region should follow a faster restructuring and keep pace with the most developed Slovenian regions. Considering our analysis, it implies that the development of the region should move in the direction of the improvement of the economic situation and the reduction of brain drain.

To take the opportunities that are offered, better drawdown and utilization of European funds can help. The residents of the region should be given the opportunity for a quality life, the possibility to develop their own potential and sustainable living within the environment. In achieving this aim the region will face numerous, mainly, environmental challenges in the future.

In the field of demographic development it will be necessary to stop the trend of depopulation and brain drain, increase the employment rate, and improve the educational framework of the region. These issues could be improved by founding new enterprises and a professional school to enable the acquisition of specific knowledge, particularly for professional profiles lacking in the region (engineering and metal processing, medicine, construction, the hospitality industry) in order to reduce the number of young people that leave the region for their education. Considering the geographic position of the region, it could have a certified school that would also be attended by students from other countries.

It is necessary to connect education with the regional economy. Young people from Pomurje are basically forced to leave the region, due to a lack of an educational-entrepreneurial “gravitation centre”. Instead, they are gaining experience through study and looking for employment opportunities in other Slovenian or even border Austrian regions. Attention should be given to occupations with a shortage and retaining young people in the region with scholarships. While on the other hand, while naturally, educated personnel should be ensured adequate job positions, with only a few large companies in the region this presents a problem. Although there is a substantial number of small, medium and micro enterprises in the region, they only offer limited degree of employment.

One of the possibilities to increase employment is to encourage entrepreneurship. The successful Pomurje companies could create an entrepreneurial and research centre where young people could gain experience and practical knowledge. Jobs with high value added would need to be created, which would also raise the economic power of the region, as Pomurje has the status of the region with the cheapest workforce with no value added. Additionally, a closer interconnection between entrepreneurs is needed, particularly in the intergenerational exchange of knowledge and ideas.

In tourism, high value-added offers need to be developed for wealthy guests who are willing to pay more for unique services, while the residents of the region should be encouraged to learn foreign languages for tourism. The central town of Murska Sobota, that presently does not offer much for young people, should be revived as the centre of the region. An improved access to ICT should be provided for marginal communities.

Industrial policy would need a restructuring of traditional industry to a modern, technologically advanced one, that would be interesting for foreign

countries; further, it would need to increase the exports to developed foreign markets⁷, strengthen R&D investment, and most of all increase the degree of self-sufficiency in locally grown food and reduce food imports, as the region has favourable conditions for farming. With possessing sufficient renewable resources, mainly water, wood and geothermal energy, the region can also become self-sufficient in energy. International inclusion in inter-regional co-operation should be strengthened as well.

All these measures would contribute to the increase of intellectual capital, prevention of brain drain and, in turn, the performance of the region. While in statistical terms, Pomurje region always stands out as the weakest region in Slovenia, there are several bright points that are already strengthening intellectual capital in Pomurje. There are several successful companies with strong export orientation (Radenska d. d., Arcont d.d., Chartago d. d. and others). Additionally, many people from Pomurje⁸ hold important positions in business and public sphere both in Slovenia and abroad. There is also a strong awareness of the highly educated who have left the region, that their departure has had harmful consequences for regional development. Pomurje Academic and Scientific Union (PAZU) is one such organization that is reaching out. Its purpose is to establish a creative academic environment promoting interconnections between its members who, even if they do not live in the Pomurje region, could occasionally contribute with their work and knowledge to the development of their home region. PAZU is the promoter of developmental ideas and at the same time the “driving force” that strives to ensure that these ideas be realised.⁹

Conclusion

In contemporary times, intellectual capital increasingly influences the creation of the added value of companies, regions and countries. Its increased significance requires monitoring, measurement and management, either at the level of a company, a region or a country. The study of the components and factors of intellectual capital is rather complex and, at the level of regions, is an insufficiently researched subject that represents a challenge for the creators of economic and regional developmental policy.

⁷ Furthermore the region has a favourable geographical position covering an approximate 12-million market within the diameter of 300 km. The border territory, distanced about 200 km from four capitals (Vienna, Budapest, Bratislava and Zagreb), provides opportunities for a strengthened cross-border integration and co-operation in different fields (RRA Mura, 2015: 63).

⁸ Born in the Pomurje region, but emigrated.

⁹ A member of PAZU can be any doctor of sciences or top artist that is born, lives or has lived in Pomurje or expresses through their production their belonging to the people and landscape of Pomurje (PAZU).

The Pomurje region could become more developed if it succeeded in retaining the highly educated workforce that would (in turn) promote faster development in the region. More investment in research and development is needed, particularly in so called eco-innovation, along with taking the numerous opportunities offered in the sectors of tourism and agriculture that are seen as potentially the most promising fields for the economic performance of the region.

Furthermore, it is also important to retain the knowledge of highly educated and capable young individuals that are already strongly influencing the development of the region. Young people should perceive life in the region as attractive, or they will leave the region, which will further deepen the problem of a lack of regional intellectual capital. With the ageing population, the depopulation of capable individuals will lead the region towards economic stagnation and degradation. Since Prekmurians are leaving for other countries and regions mainly for better work opportunities, a more attractive taxation policy, better housing conditions and more advanced technology should be provided to offer them adequate jobs, satisfactory wages, creative opportunities, and the possibilities of personal development within their region. Young people from the region should be enabled to participate proactively in the formation and implementation of the developmental policy of the region through public tender awards for proposals for improvement, while at the same time bridging the generation gap to connect the young, as the source of ideas and optimism, with the old as the source of experience. Given the importance of intellectual capital for regional development and the detrimental effects caused by brain drain, it should be recognized that investments should not be directed to infrastructural projects but primarily to the measures that would lead to the retention of human capital and renewal and developmental capital.

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Appendix 1: THE LIST OF INDICATORS OF INTELLECTUAL CAPITAL

Market capital	Human capital
<ul style="list-style-type: none"> • trade balance in USD • the number of companies with the acquired ISO certification • the number of tourists • the number of emigrants • the number of immigrants 	<ul style="list-style-type: none"> • number of students of post-secondary professional schools • number of students of professional colleges • number of students enrolled at Master or specialization level • number of higher education institutions • the number of graduates of higher education undergraduate programmes • the number of those with higher education among all employees • the number of libraries • the number of the active working population.
Organisational-process capital	Renewal and development capital
<ul style="list-style-type: none"> • the number of providers of continuing education • the number of participants of continuing education • the number of (adult) participants in the programmes to acquire education • the number of cinemas • museums, galleries, and exhibition grounds • the number of cultural centres • the number of radio and TV subscribers. 	<ul style="list-style-type: none"> • gross domestic expenditure for R&D activities • the number of researchers • the number of research organisations • the number of subjects of innovative environment • the number of newly established enterprises • the number of fast-growing enterprises.

Source: Ilić, Bernjak, Rus (2016).