SIGNIFICANCE OF HIGHER EDUCATION IN CREATING OF INTELLECTUAL CAPITAL

AGNIESZKA JAKUBOWSKA, ANNA ROSA

Abstract
Economy based on knowledge requires such capital which would be first of all creative capital. In the era of knowledge based economy, education constitutes the basic and the simplest way to increase the intellectual capital possessed in the system. A higher quality of human abilities in socioeconomic aspects and in the sphere of professional competences will undoubtedly contribute to an increase of the social and economic potential of a state. There is a strong connection between investments in the intellectual capital and the socio-economic transformations of a state, as a higher level of the human capital guarantees an economic growth and supports social development. Thus, the significance of learning and education is growing; this determines the processes of creation and investing into human capital, which constitutes an element of intellectual capital; it is higher education that is of a particular importance in the creation of this capital. The purpose of this article is to assess the significance of higher education in the formation process of intellectual capital in national economies.

For the purpose of an analysis of the development of the higher education system in the EU Member States, a relative assessment was conducted both of the structure of the society education level in the individual Member States and the level of expenditures aimed at higher education and a widely understood research and development (R&D) sphere. By using the OECD and Eurostat statistical data, an assessment was conducted of the diversification degree of the parameters examined in the EU Member States. An attempt was undertaken to correlate the processes that occur in the area of higher education in the states under examination with the economic effects measured by means of the GDP value. The assessment of the specificity of activities of the Member States in the area of higher education was based on a spatial and temporal analysis using those statistical measures that define the variability scope of the features examined. The scope of the measures used was determined by the availability of comparable statistical data. In the last part of the study, references were made to the objectives of the Europe 2020 Strategy aimed at an improvement of the competitiveness of the European dimension of higher education and the R&D sector on the international arena.

Key words: high level education, intellectual capital, human capital, Europe 2020 Strategy.

Classification JEL: I23 – Higher Education, Research Institutions; O15 – Human Resources, Human Development, Income Distribution, Migration.

1. Introduction

In the present-day economy based on knowledge, intangible factors such as abilities, competences, information or knowledge are gaining on an increasing significance. Intangible assets and investments are seen as essential elements to value creation in companies *(Santos-Rodrigues, Figueroa Dorrego & Jardon, 2010, pp. 53–63).* In this sense, knowledge-based resources have grown in importance because knowledge has become a critical ingredient for gaining a competitive advantage *(Grant, 1996).* This economy based on knowledge requires such capital which would be first of all creative capital, one that is able to use information resources to increase among others the effectiveness of tangible resources. Therefore the source of economic value and wealth is the creation and management of intangible assets, frequently grouped under the generic term ‘knowledge’, ‘intangibles’, or ‘intellectual capital’.

The purpose of this article is to assess the significance of higher education in the formation process of intellectual capital in national economies. For the purpose of an analysis of the development of the higher education system in the EU Member States, a relative assessment was conducted both of the structure of the society education level in the individual Member States and the level of expenditures aimed at higher education and a widely

understood R&D sphere. By using the OECD and Eurostat statistical data, an assessment was conducted of the diversification degree of the parameters examined in the EU Member States. An attempt was undertaken to correlate the processes that occur in the area of higher education in the states under examination with the economic effects measured by means of the GDP value. The assessment of the specificity of activities of the Member States in the area of higher education was based on a spatial and temporal analysis using those statistical measures that define the variability scope of the features examined. The scope of the measures used was determined by the availability of comparable statistical data.

In the last part of the study, references were made to the objectives of the Europe 2020 Strategy aimed at an improvement of the competitiveness of the European dimension of higher education and the R&D sector on the international arena. The fundamental part of the analysis is preceded by a review of theoretical conceptions that identify the idea of intellectual capital in the context of expectations on the part of the present-day economy.

2. Intellectual capital

It was A. Smith who presented his discussion in the following work: Research into the Nature and Causes of the Wealth of Nations, which was published in the year 1776, and who stated that education and learning are to be defined as investment in people; A. Marshall emphasized that the capital that is the most valuable of all is the one invested in *people (Dobija, 2003, p. 118)*. Thus, the significance of learning and education is growing; this determines the processes of creation and investing into human capital, which constitutes an element of intellectual capital; it is higher education that is of a particular importance in the creation of this capital *(Jakubowska & Rosa, 2011, pp. 63–80)*.

In the present days, it became a well-known fact that it is not only financial and tangible assets that decide about the company's success but also such factors as the qualifications of the personnel employed, the recognized brand that is on the market or contacts with customers *(Szałkowski, 2005, p. 29)*. It became evident that knowledge and specialist abilities of the personnel enable the creation of products and technologies. They form the so-called human capital of a given organization while the expenditures that are incurred in relation to it should be treated as investments, which will bring about notable economic benefits in the future. The human capital constitutes the primary element of the intellectual capital, which is created among others by employees, customers or suppliers.

The chief role in the creation of the intellectual capital is attributed to the personnel hired by the company who, to a growing extent, is decisive for its economic results *(Sveiby, 1997, p. 12)*. This capital constitutes the sum of experiences and knowledge, which consists not only of the ideas and abilities of the personnel but also systems and procedures, research units, marketing assets and different innumerable aspects of the company's culture, all of which contribute to its success *(Grzywacz & Lorek, 2005, p. 124)*. Apart from the financial capital, this capital constitutes the second pillar based on which the company can operate *(Bagieńska, 2007, p. 98)*.

In the literature on the subject, it is emphasized that the intellectual capital constitutes one of those factors that decide to a growing extent about the developmental potential of the society and economy, one which has an influence on the economic growth and contributes to the social prosperity. It constitutes a non-observable resource of all the entities that function on its territory: residents, economic entities, institutions and organizations, but also communities and administrative units *(Bontis, 2004, pp. 13–39; Węziak, 2007)*. T. A. Stewart observes that the intellectual capital is "something one cannot touch but which can make them rich," *(Stewart, 1991, pp. 44–60)*. W. I. Hudson is of a similar opinion, and he states that this capital is the sum of the individual components which include genetic heritage, experience, attitude to life as well as business and education *(Hudson, 1993, p. 16)*.

Higher education is perceived as the main component of the formation of the intellectual capital, which is composed of human and structural capitals (also known as the organizational capital) (that takes into account the capital of relations) *(Edvinsson & Malone, 1997; Suciu, Picirus & Imbrisca, 2012, p. 223; Onzález-Loureiro & Figueroa Dorrego, pp. 239–274)*[12]. Nevertheless, the capital of relations (known as the capital of customers) and additionally the social capital are presented as the third and fourth equal components of the intellectual capital *(Brooking, 1996; Lerro, Carlucci & Schiuma, 2008, pp. 283–300; Pascher & Shachar, 2005, pp. 139–149, Bontis, op. cit; Bonfour & Edvinsson, 2005)*. In the first order, higher education has an influence on the level of the human capital, and in the further order it forms the structural capital and the capital of relations *(Rószkiewicz, 2013a, p. 10; 2013b, p. 82)*. Between the individual elements of the capital, there occur interactions and cooperation. This has an influence on the creation of the company's value. The greater the number of mutual connections and relations is, the larger the value of the company is. The relations between the elements of the intellectual capital are presented in Figure 1.

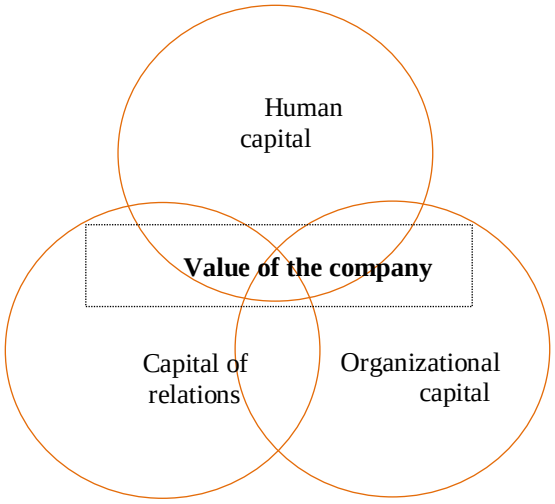

Figure 1: Relation between the intellectual capital and the company's value (Petrash, 1996)

The notion of the human capital is connected with the theory by T. W. Schultz and G. S. Becker. According to this theory, the human being with their abilities, qualifications, health and motivation is perceived as a source of a success an individual (personal), an individual company but also the whole economy *(Domański, 2000, p. 32)*. Petrasha has defined the human capital in a similar fashion. In his opinion, these are abilities, skills, experience and knowledge possessed by each single individual in a given organization. In the opinion of Domański, the human capital is a resource of knowledge, abilities, health and vital energy included in a society which can be extended through investments *(Domański, 1993, p. 19)*.

To sum up, it may be stated that the human capital is the whole of predispositions, knowledge, abilities, skills and possibilities of their exploitation in the form of competences in the course of the realization of specific tasks. It involves two separate groups of elements: the individual capital of specific people and the resources that are the effect of the organization and the occurrence of team work *(Bal-Woźniak, 2006, p. 77)*. It also needs to be emphasized that this capital is not only skills but also know-how, the organization's culture, values and interpersonal relations (Figure 2).

[12] There is no consensus about the categorization of the different elements of the Intellectual Capital. The debate about the components of the Intellectual Capital is still partially open.

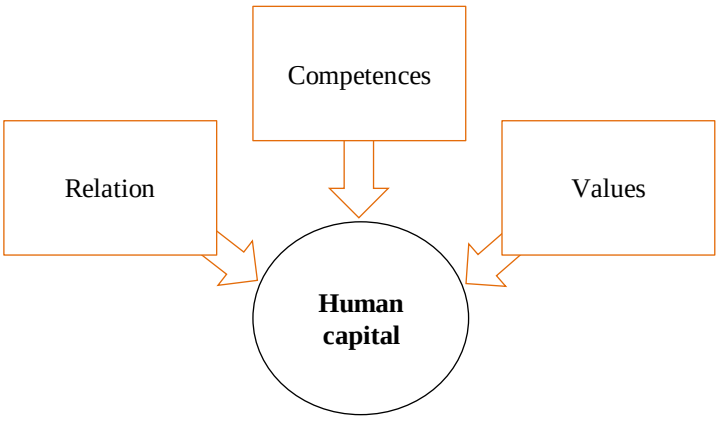

Figure 2: Elements of human capital (Skuza, 2003, p. 202)

The human capital constitutes the basis for the creation of an organizational (structural) capital, and it forms the capital of relations in cooperation with it. The organizational (structural) capital is determined by the social and technical infrastructure. Technologies, patents, copyrights, methodologies and also infrastructural assets such as financial relations, an information system, organizational culture or those processes which enable the functioning of an organization *(Dzinkowski, 2000, pp. 32–36).*

The capital connected with customers concerns connections and relations with the environment. The capital is perceived from the angle of customers and the relations of the company with them. These market, social or hierarchic relations form the base of the social capital *(Adler & Kwon, 2002, pp. 17–40).* This capital is a social and economic category that describes those values that result from the creation of the networks of social relations. According to Schuller & Helliwell, the social capital determines social and legal norms and values recognized by the society as well as customs that build social and economic relations *(Petrash, 1996, pp. 365–373).*

To sum up, it may be stated that the individual elements of the intellectual capital are linked with one another and they may support one another, yet they can also decrease one another *(Stewart, 1997).*

3. Higher education and intellectual capital: perspective of EU States

In the light of the conceptions presented above, it can be recognized that the present-day approach to the issue of the human capital effectiveness was inseparably connected both with the question of the widely understood productivity of the education system and also with the so-called ‘productivity’ of the R&D sphere in real economic processes. This redefinition in the approach to resources simultaneously posed a huge challenge to education, which was acclaimed as a tool of the creation of the so-called ‘knowledge-based economy’ and as a source that generates ‘a learning society’. The burden of the production of new knowledge was attributed to higher education. This, as an assumption, is to constitute the main characteristics of this level of education from among the other forms of education. Imposing the responsibility on higher universities for the economic progress and the innovativeness of a state caused a growing pressure of an increase of the effectiveness and an improvement of the quality of the activities pursued by universities.

The special features of universities as the places where “knowledge“ is created simultaneously posed a challenge to those researchers that intended to present and assess their effectiveness in a quantitative manner. The difficulty in the use of classical measuring

techniques that are based on effectiveness indexes is mainly determined by the complexity of the 'expenditures/results' relation as well as by a high sensitivity of the behaviours of the sector of higher education entities to external factors *(Jakubowska, 2013, pp. 113–128)*.

To depict the scale of diversification in the approach to the system of higher education in the world, measures were used that allow one to define differences both in the structure of the education of society and on the scale of funding of this system.

In the groups of OECD states, the average level of expenditures in relation to higher education taking into consideration expenditures on research and development per one student was an average of USD 13,528.00 in the year 2010 (using PPPs) with a standard deviation on the level of USD 8,111.00. The difference of the value observed was USD 19,075.00. This was the result of the fact that in the country with the highest level of expenditures per one student (the United States: USD 25,575.00), this index was on the level that was almost four times higher than in the country with the lowest level of financing (Estonia: USD 6,500.00). The changeability index of this parameter was 60%. This serves to confirm a very high diversification level of the scale of financing related to higher education and the R&D area among the group examined. Figure 3 presents the distribution of differences in the level of expenditures on higher education taking into consideration expenditures on research and development per one student in relation to the OECD average for selected states.

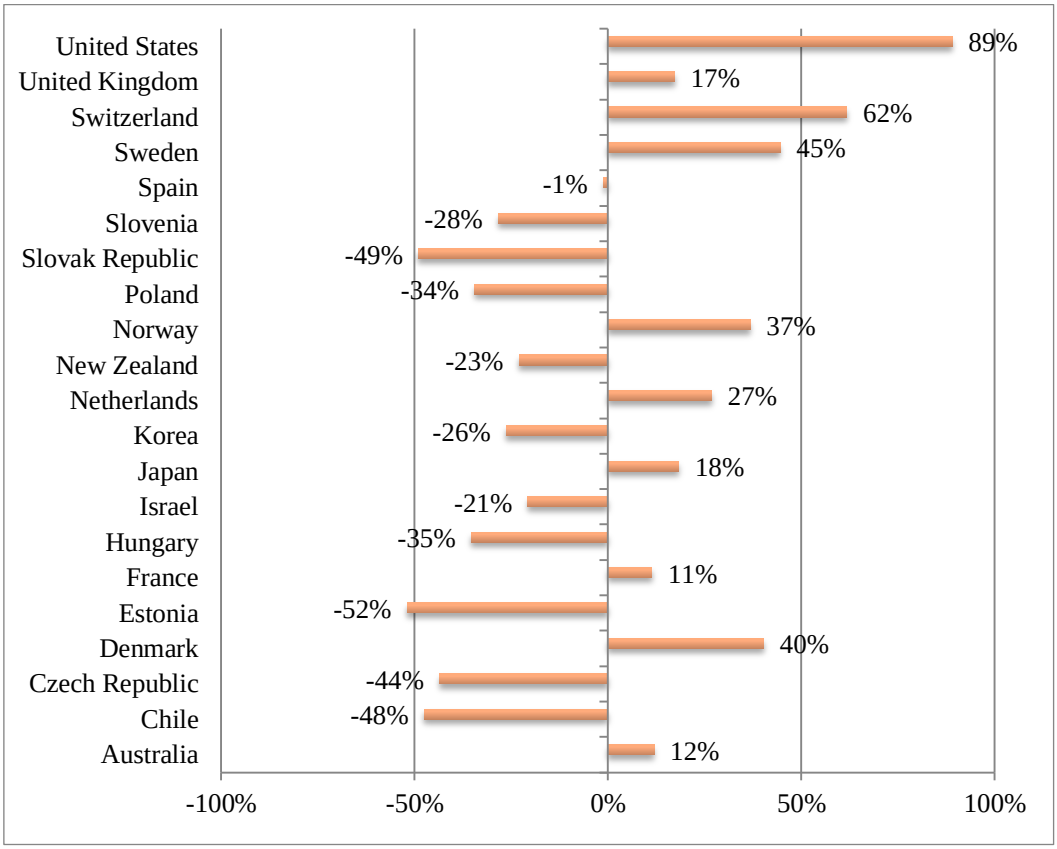

Figure 3: Expenditure per student, tertiary education including R&D activities (annual, equivalent USD using PPPs) in relation to the OECD average for selected states (own study based on data from OECD.Stat, 2014)

Significant divergences in the educational system can also be observed when analyzing the structure of financing of the higher education sector in individual states. In the group of OECD states, the average participation of the public sector in the financing of higher education institutions was 61% with a standard deviation of 31%. The difference of the value

observed was 74%. This was the result of the fact that in the state with the highest participation of the public sector in financing of higher education institutions (Norway: 96%), this index was over four times as high as in the country with the lowest participation (Chile: 22%). The changeability index of this parameter was 45%. This confirms the high diversification of the scope of the public sector participation in financing of higher education institutions among the group of the states under examination. Figure 4 presents the diversification of the participation scale of the public sector in financing of higher education institutions and changes in the level of the funds spent in the years 2000–2010 for selected OECD states.

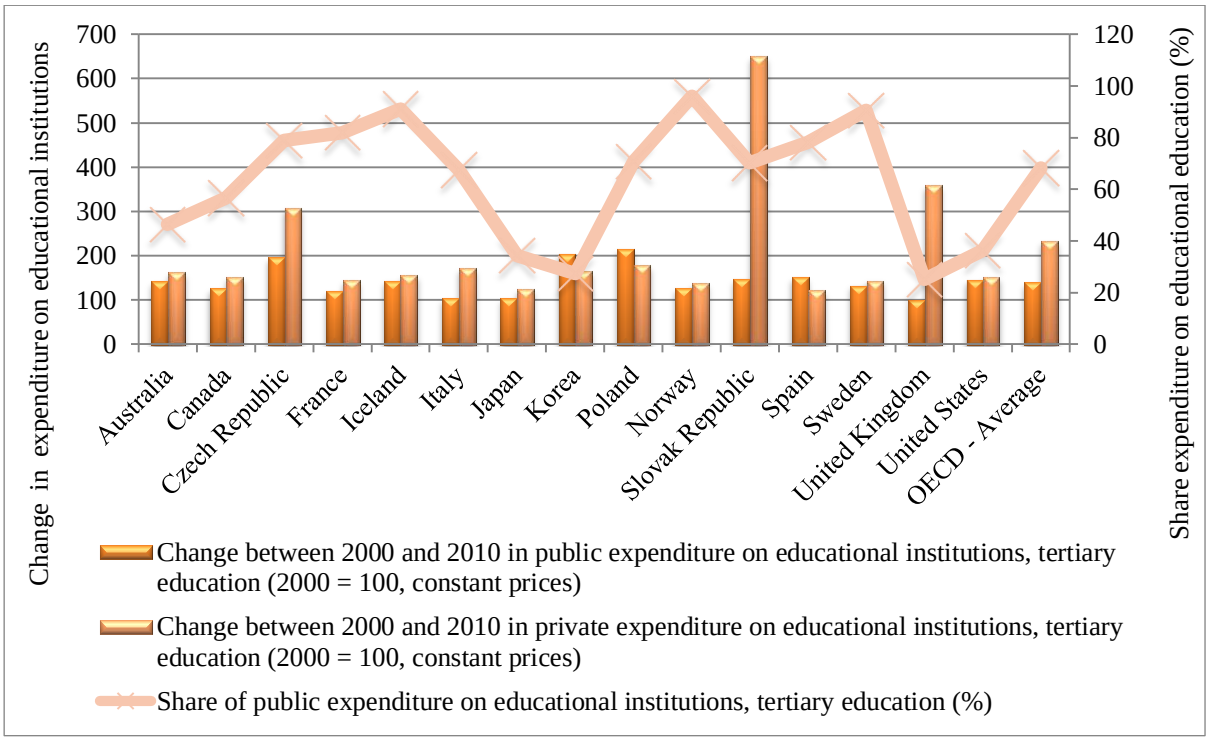

Figure 4: Share of public expenditure on educational institutions, tertiary education and change between 2000 and 2010 in public and private expenditure on educational institutions, tertiary education 2010 for selected OECD states (own study based on data from OECD.Stat, 2014)

The structure of the education of the society also demonstrates a high level of diversification among the states under examination. The average participation of people with higher education in the total number of the population aged 25-34 in the group of the OECD countries covered by the research was 37.7%. However, in this group, there are countries with the levels of the index under examination ranging from 17.5% (Turkey) to 65% (Korea). The participation of people with higher education in the total number of population aged 25-64 was 31.5% on the average in the group of states under examination, whereas the lowest level was analogically observed in Turkey: 14%, while the highest level was observed in the case of Canada: 51.3% (cf. Figure 5).

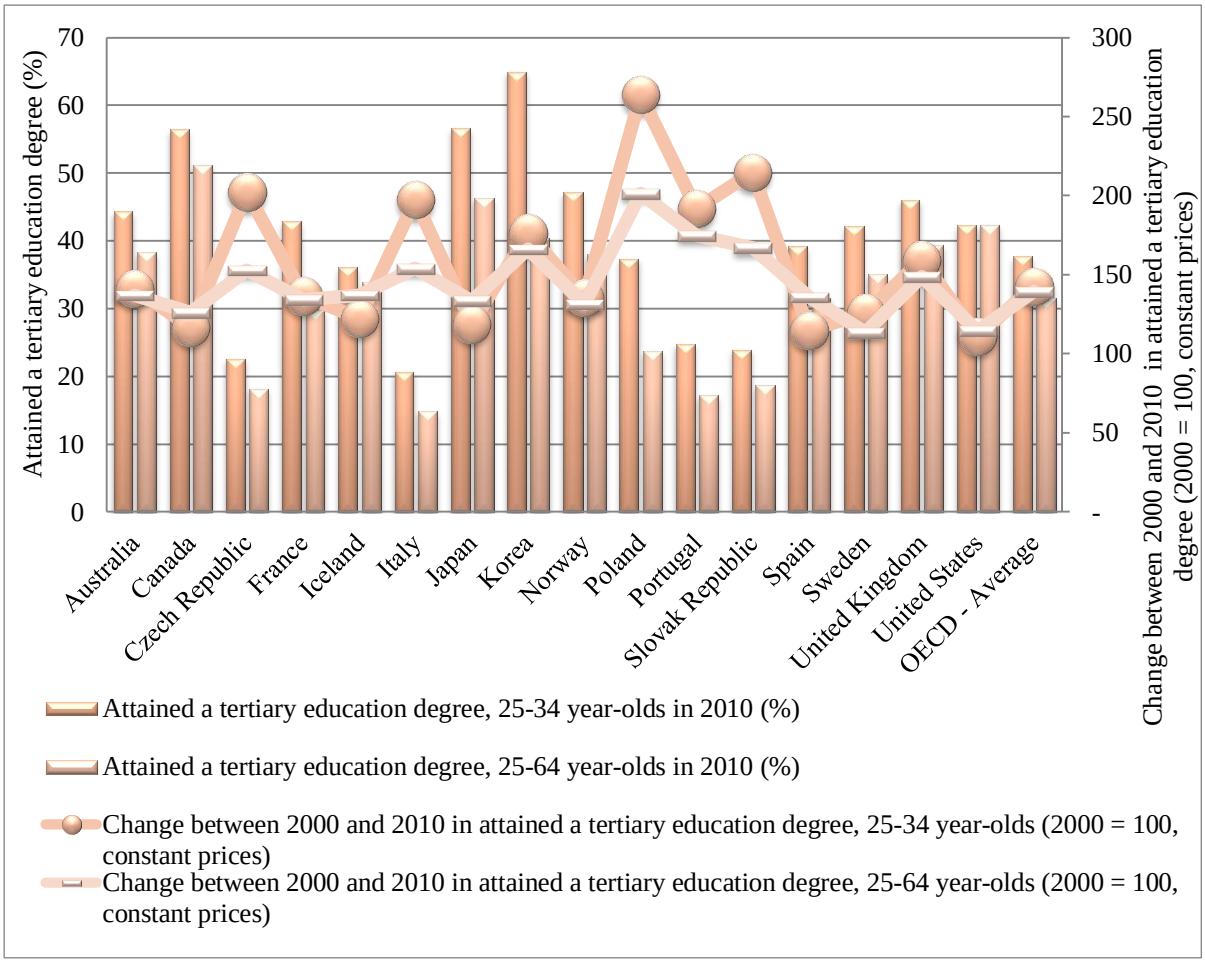

Figure 5: Attained a tertiary education degree, 25-34 and 25-64 year-olds in 2010 and change between 2000 and 2010 2010 for selected OECD states (own study based on data from OECD.Stat, 2014)

To define the specificity of the higher education sector management in the group under examination, positioning was carried out of selected states taking into consideration two parameters: the average level of expenditures on higher education taking into consideration expenditures on R&D per one student and the participation of those with higher education in the total number of population aged 25–64. The results of positioning are presented in Figure 6.

The positioning conducted of higher education systems for individual OECD countries demonstrates a relatively poor level of financing assigned to the majority of European higher education systems and the R&D sector. This unquestionably is becoming one of the main causes of the lost competitiveness of the EU on world markets. The expenditures on research and developmental activities in the European states are below 2% (Figure 7), while in the United States of America, they amount to 2.6% of the GDP value; in Japan, this is 3.4%. From EU Member States only France, Germany, Austria, Sweden and Finland spend 2.1–3.9% of GDP in 2010. Ireland, UK, Belgium and Netherland spend 1.62–2.1; Portugal, Spain, Italy, Czech Republic and Estonia spend 1.17–1.62; Poland, Lithuania and Hungary spend 0.66–1.17; Latvia, Slovakia, Romania and Bulgaria spend only 0.46–0.66% of GDP. This is chiefly the result of the low private sector investments levels. As few as ca. 31% EU citizens aged between 25 and 34 possess higher education in comparison with 40% in the United States of America and over 50% in Japan. According to the ranking by the University of

Shanghai Jiao Tong, there are only two European Universities among the 20 best universities of the world. Selected statistics for the tested EU states shows Table 1.

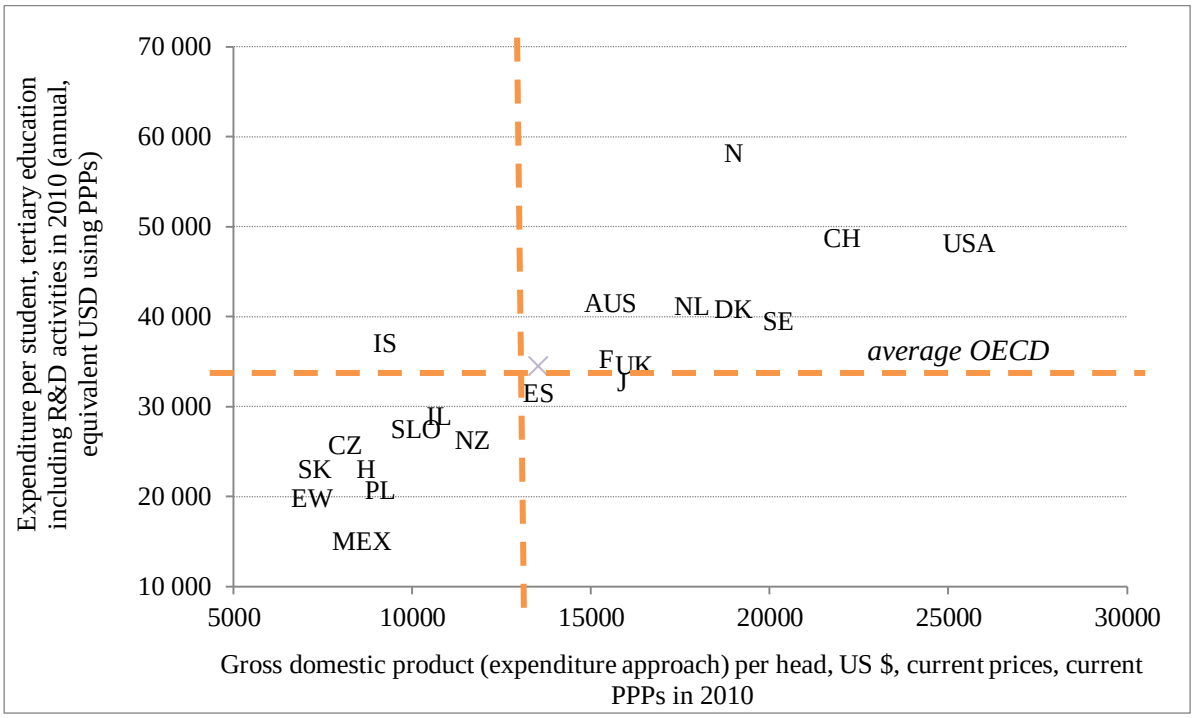

Figure 6: The relationships between the expenditure per student, tertiary education including R&D activities in 2010 (annual, equivalent USD using PPPs) Gross domestic product (expenditure approach) per head, US $, current prices, current PPPs in 2010 for selected OECD state (own study based on data from OECD.Stat, 2014)

Table 1: Selected statistics for the tested EU states in 2010 (own study)

Specification	Average	Interval	Minimum	Maximum	Standard deviation	Coefficient of variation
Gross domestic expenditure on R&D in 2010 (% of GDP)	1.60	3.44	0.46 (Romania)	3.90 (Finland)	0.94	59%
Change between 2000 and 2010 in Gross domestic expenditure on R&D (2000 = 100, constant prices)	136	178	91.52 (Luxembourg)	270 (Estonia)	41.91	31%
Tertiary educational attainment, age group 30-34 in 2010 (%)	34.18	32.00	18.10 (Romania)	50.10 (Ireland)	10.13	30%
Change between 2000 and 2010 in attained a tertiary education degree, 30-34 year-olds (2000 = 100, constant prices)	166	188	103 (Lithuania)	291 (Malta)	47.40	29%

4. Development of intellectual capital in Europe 2020 Strategy

In the light of the situation of the low competiveness both of higher education and the R&D area in Europe, the issue of the creation and optimal use of the society's intellectual capital was raised in numerous discussions at international forums, and this problem is more and more frequently being presented as one of the priority areas of the operations of the EU

Council. In the European Commission announcement released in March 2010 and entitled: 'Europe 2020. Europe 2020: Strategy for Smart, Sustainable and Inclusive Growth', it was accepted that an adequate use of the abilities and creativity of EU citizens constitutes the most effective way to overcome the crisis and to face global challenges. An intelligent and sustainable economy of the European Union is to favour the achievement of high employment and productivity indices.

The so-called 'intelligent development' understood as a development of an economy based on knowledge and innovations constitute one of the three priorities of Europe 2020 Strategy. Its primary objective is an increase of the role of knowledge and innovation as the driving forces of the future development of the European Union. This will be implemented among others by an increase of the quality of education, an improvement of research results, a support of the transfer of innovation and knowledge in EU Member States. Europe needs to see to it that innovative ideas are turned into new products and services that would contribute to an accelerated growth, a creation of new jobs and solutions of social problems in Europe and all over the world.

The intelligent development policy includes those actions that the European Union is to undertake in the area of innovation in order to obtain a level that is equal to that of world powers such as USA or Japan. What is important is a verification of the structure of expenditures on research and development and on an improvement of activities in the private R&D sector, as well as an increased role of the society education, including lifelong learning and education.

Under the Europe 2020 document, actions to be undertaken under this priority will release the European innovation potential; they will improve the results of the educational process as well as the quality and results achieved by educational institutions. Nevertheless, their implementation needs to occur on the EU, national and regional levels (Europe 2020 Strategy).

On the national level, the Member States will have to reform their systems of research and development activities and innovation activities in order to have them more than ever be favourable to the development of intelligent specialization, bring about closer cooperation between universities, the research community and the business. There must be an improvement of cooperation in those areas where the European Union can offer added value and adequately adapt national financing rules so that these could guarantee the possibility of the dissemination of technologies over the whole EU territory. Actions are required to ensure a proper number of those that possess degrees in science, who are graduates of mathematical and engineering departments as well as an introduction of creativity, innovation and enterprise elements in school curricula. EU Member States must promote private spending on knowledge, including the use of tax benefits and other financial instruments to facilitate a growth of private investments in the R&D sector.

Within the confines of the orientation of EU actions onto intelligent and sustainable development, a specific number of measurable objectives to be implemented by the year 2020 was agreed. One of these, in the area of investment in R&D activities, is the achievement of the average level of financing in the amount of 3 per cent of the EU GDP value. This entails the necessity to improve the conditions of private research and development activities in the EU and to form a coherent approach to research and development activities and innovation that would translate more effectively into business operations and those factors that stimulate productivity.

The second objective that is foreseen for implementation under Europe 2020 strategy is related to higher education. This concerns an increase among EU citizens of an average participation of those aged 30–34 and those have higher education. An increase is assumed from the current 31 per cent to at least 40 per cent by the year 2020. The level of the goals

accepted and the degree of their fulfilment for selected Member States as per the data from the years 2000 and 2012 is presented in Figure 7 and Figure 8.

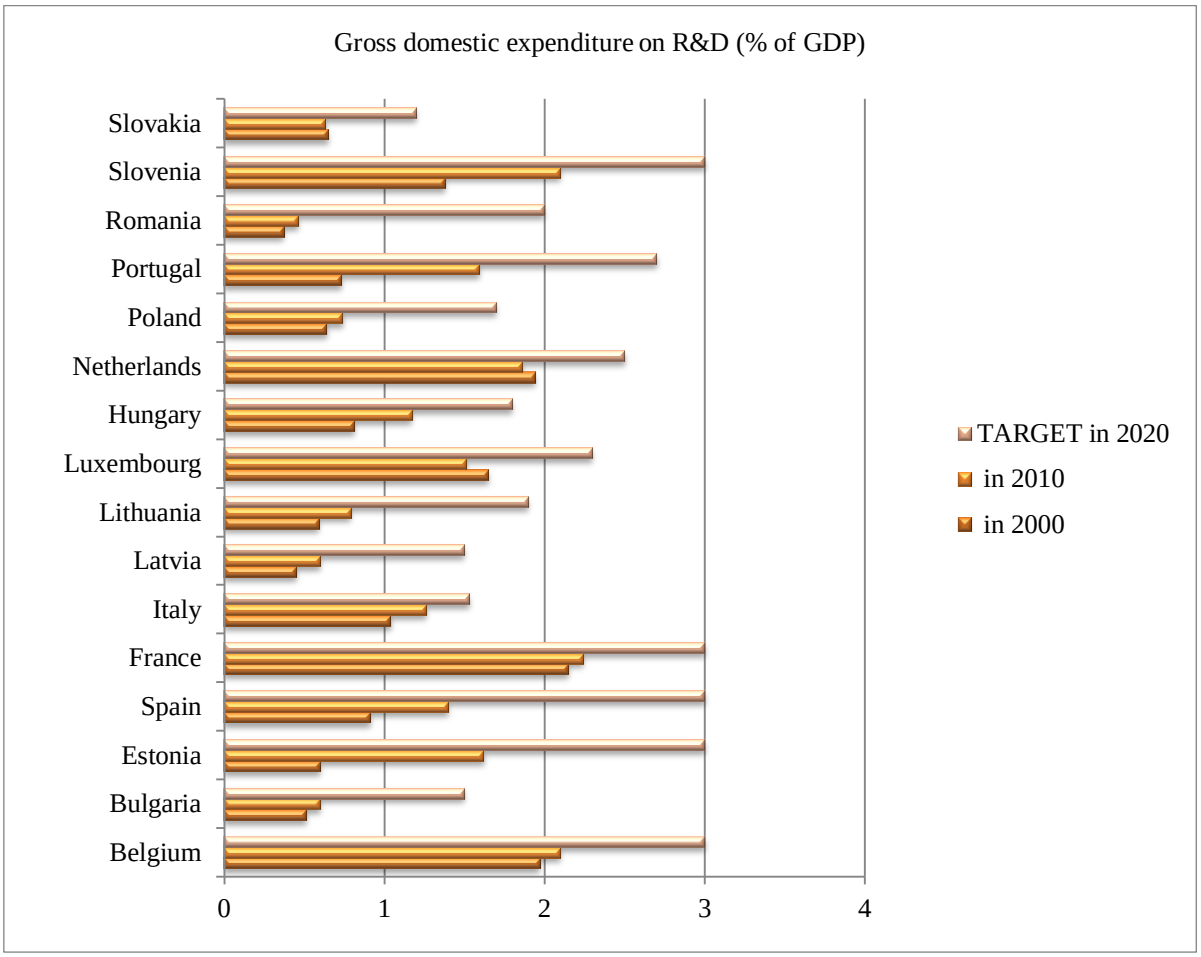

Figure 7: The expenditures on research and developmental activities (% of GDP) – in 2000, 2010 and target 2020 for selected EU states (own study based on data from European Commission, Eurostat, 2014)

7. Conclusion

The analysis presented of theoretical achievements explicitly confirms that in the era of a knowledge based economy, it is education that should be treated as the primary and the simplest way to increase the potential possessed in the intellectual capital system. A higher quality of human abilities in socioeconomic aspects and in the sphere of professional competences should unquestioningly contribute to an increase of the social and economic potential of a state. World-wide research into the effectiveness of investments in the human capital fundamentally confirms their positive influence both in the macro scale: on the economic growth pace of a given area, as well as in micro perspective: on the profitability level of individual entities.

It can be found based on the research conducted that there is a significant diversification in the society education structure in the individual OECD states (the level of the index from 17.5% to 65%). This diversification follows from the different levels of expenditures (which include spending on research and development) on higher education per one student and from the different level of the participation of the public sector in financing education institutions.

The analysis presented in this study of the dependence between the level of expenditures

on higher education and on the R&D sphere shows that no simple dependence between an increase of expenditures on education and an improvement of the level of social and economic development of a state can be accepted. A number of specific factors are of a key significance that determines the effectiveness of the absorption process of knowledge into the structures of the so-called real economy.

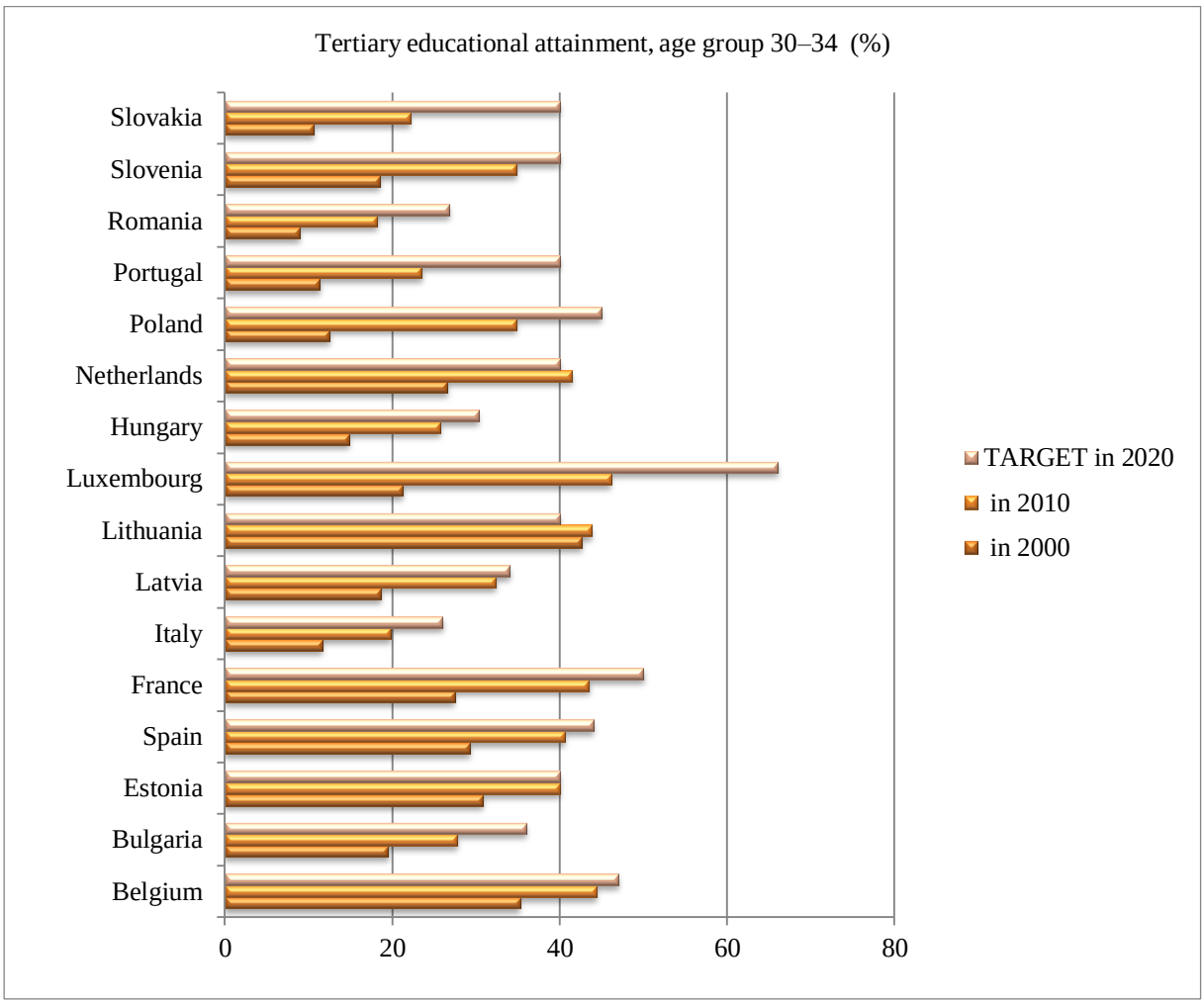

Figure 8: Tertiary educational attainment, age group 30–34 (%) in 2000, 2010 and target 2020 for selected EU states (own study based on data from European Commission, Eurostat, 2014)

The analysis of data demonstrated that EU states spend less on higher education and the B+R sphere that the USA or Japan (in the state with the highest level of spending per one student, this index was almost four time higher than the one in the state with the lowest financing level). In the era of knowledge based economy, education constitutes the simplest way to increase the intellectual capital possessed in the system. Therefore, in order to increase the potential of this capital, differences need to be leveled out in financing of higher education in the individual states. This has become one of the priority actions of the EU Board, which included it in the Europe 2020 Strategy.

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