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SPATIAL DISPARITIES IN THE LEVEL OF HUMAN CAPITAL IN THE EUROPEAN UNION IN THE CONTEXT OF REGIONAL COMPETITIVENESS

Abstract: Competitiveness is a key factor determining the development of a region and hence the standard of living of its inhabitants, and human capital is one of the most important factors enabling improvement of regional competitiveness. The aim of the presented research is to analyse the spatial differentiation of the level of human capital in the regions of the European Union (EU) in relation to their level of competitiveness. The results show significant disproportions in this respect, especially between the so-called old and new EU. The higher levels of human capital in the old EU regions were also generally accompanied by a higher level of competitiveness. In the long run, this will lead to an increase in regional disparities in development.

Keywords: competitiveness, regional competitiveness, human capital, regional development

The key aim of research on the processes of economic growth in countries and regions is to indicate their conditions and determinants. Currently, the prevailing opinion is that the improvement of the economic situation of spatial units and increased affluence of the population are determined by complex correlations between many factors, phenomena and processes of both a measurable and non-measurable nature. Some of them form the level of economic competitiveness, and only once it has been improved over an extended period of time, it may, but does not necessarily have to, translate into accelerated economic growth. Furthermore, it should be remembered that the hierarchy of factors determining the competitiveness of national and regional economies varies, depending on the prevailing economic paradigm and the accomplished level of development.

The purpose of the research performed by the authors is to analyse the spatial differentiation of the level of human capital in the light of competitiveness in respect of regions of the European Union (EU) member states. The analysis of the available literature shows that such a relationship has a feedback nature. Therefore, the level of competitiveness, and hence the regional growth rate, is determined by the quality of human capital in the region. Additionally, the quality of human capital depends to a large extent on the achieved level of economic growth and competitiveness of the regional economy.

Thus, the performed analysis allows for indirectly addressing the issue whether the observed disparities in the economic growth rate of the European regions partially depend on the differences in the level of human capital. Efficient implementation of the Cohesion Policy, the aim of which, *inter alia*, is to decrease the existing development disparities within the Community, requires careful analysis and description of their determinants. Therefore, the results of the analysis may be used to define the current tools of the Cohesion Policy under the 2014–2020 financial perspective and may contribute to the discussion on the directions and tools of the Cohesion Policy after that period.

Human capital as a determinant of regional competitiveness

Regional competitiveness is a process which directly results from striving to improve the economic competitiveness. Assuming that the competitiveness of the economy is a “capacity to produce and offer goods and services with such technical and utility features, prices, quality and sales conditions that would attract purchasers on both domestic and international markets” (Markowski, 1999), the definition of regional competitiveness proposed by Stawasz (2004) seems valuable. The author claims that regional competitiveness is an “advantage over other regions, which is the resultant of the attractiveness of the service offer addressed to current and potential users in the region, such as inhabitants, companies, investors, guests.” Such competitiveness is the result of certain advantages, *i.e.* the most important strengths of the region, the source of which may be traced back to, among other things, the educational system, economic structure, as well as the physical, institutional and intellectual infrastructure of the region (Stawasz, 2004). The basis of regional competitiveness is a high efficiency of the regional economy, which “provides the society with a high and constantly improving standard of living, as well as a high employment rate [...] what is more, the level of economic activity should not disturb the balance in the economy or in any way encumber the economic well-being of the future generations” (European Competitiveness..., 2000).

Economic competitiveness, including regional competitiveness, as a complex and multidimensional term, is determined by multiple factors. Some of them are tangible and measurable, thanks to which their impact on the level of regional economic competitiveness and hence the economic growth rate may be assessed relatively easily. However, many of regional competitiveness determinants are qualitative factors that shape its level indirectly. In current regional competitiveness models, it is often stressed that all these factors make up a hierarchical system where the meaning of particular competitiveness determinants mainly depends on the already achieved level of competitiveness and the economic growth rate. Such models as, *inter alia*, the competitiveness pyramid (*cf.* Lengyel, 2004; Szakálné Kanó and Lengyel, 2012), the competitiveness hat (Martin, 2003) or the competitiveness tree (Ecorys-Nei, 2015, Bulu, 2011) are based on the aforesaid assumption.

Even though such models indicate various determinants as crucial for fostering regional competitiveness, human capital always plays the key role. An increase in its level translates into better work performance, greater efficiency of other production factors, increased absorption capacity, as well as creation of knowledge and innovation (Coe et al., 2008; Owsiak, 2002; Nazarczuk, 2013; Anderson et al., 2004; Abel and Deitz, 2011).

In general, as noted by Misala, the competitive capacity of economies (including regional economies) is determined by two main components: the actual component, which consists of the region's own and external resources in a broad sense, as well as economic infrastructure; and the institutional component, which is understood as the system required for the economy to operate. It is a group of institutions and a framework for governing the economic life. To increase the level of competitiveness, each of the aforementioned components is essential, so as the elements shaping them. However, the most important factor which holds together and integrates the functioning of the actual and institutional components is human capital, composed of three basic capacities (Misala, 2011):

- the capacity to save: it results from the fact that the capacity to accumulate physical capital as one of the production factors mainly depends on the growth rate of savings;
- the capacity to invent: its level determines the pace at which knowledge and innovation are generated, i.e. the prerequisite for technical progress; its changes, apart from modifications of the employment infrastructure, determine the production growth rate per capita;
- the capacity to self-organise: economic history shows that only those communities which had this capacity were able to shape the social and economic system in a way that contributed to the accumulation of physical capital and innovation; this is how the circle of economic competitiveness determinants is completed.

Research methodology

With the above in mind, while determining human capital in accordance with the OECD definition as the knowledge, skills and competencies of individuals which have a positive effect on the ability to create personal, social and economic well-being (Peters, 2012), the authors based the paper on the thesis that there exists a relationship of a feedback nature between the level of human capital and the economic competitiveness of EU regions. It means that an increase in the level and quality of human capital helps to improve the competitiveness level and thereby leads to the acceleration of economic growth. Higher levels of the latter mean greater opportunities for increasing the resources and the quality of human capital. This suggests that it is possible to identify the endogenous and exogenous variables. Such an approach is described in the literature as the most relevant for research into relationships between other macroeconomic variables. However, Maddala and Lahiri (2009) point at three reasons why grouping of variables into

endogenous and exogenous and causal model structures is highly controversial and raises many doubts:

- in many cases the determination of variables as endogenous or exogenous is arbitrary,
- identification of a variable's nature often results in ignoring other variables that are important for the relationship concerned (the so-called Liu critique);
- parameters of multiple models are often dependent on changes in exogenous variables (the Lucas critique).

From this point of view, it seems more reasonable to examine the spatial variations in the level of human capital in the light of regional economic competitiveness rather than the impact of changes in the former on the level of the latter. Such research will allow for the identification of regions with specific relationships between the analysed variables, and in effect for describing their detailed characteristics. This may also allow for a more efficient profiling of public spending aimed at stimulating regional economic development. The focus of this research should be considered as particularly relevant from the point of view of effectiveness of the EU Cohesion Policy. Already at this stage the question arises as to whether competition between regions makes sense in a global context. Should regions with low levels of human capital compete with high-level regions? Can aggregated competitiveness be considered through the prism of analysing many similar variables for regions with different profiles, can it be the basis for creating a convergent economic policy?

Literature offers numerous definitions of human capital which emphasise its attributes, but only some of them may be measured. Nonetheless, it seems that the essence of the analysed term is of a qualitative nature, which is difficult to quantify in an explicit and precise manner. Consequently, the choice of measurement methods and/or indices describing the level of human capital becomes increasingly important. Usually, they are divided into simple and complex indices. As to simple indices, the following are used to measure human capital: average or compulsory schooling period, Gross Enrolment Index (GEI) at various levels of education, average scores achieved by students in international competency tests, and the percentage of people who continue education. However, a significant deficiency of such indices is the fact that they reflect only some of the selected aspects impacting the level of human capital. Furthermore, taking into consideration the differences in the operation of educational institutions and labour markets in individual countries, the application of such indices for enabling international comparison is limited (Fleischer et al., 2010). Therefore, it seems more sensible to measure human capital by using synthetic measurements and indicators. Their indisputable advantage is that they not only allow capturing various aspects of the analysed term, but also facilitate comparative analyses and rankings of the examined areas in terms of the level of human capital development. At the same time, a significant barrier to their common use, especially for the purpose of international analyses, is the limited availability of comparable statistical data. In the presented analyses, the researchers decided to use the Human Capital Resources

Index (Waśniewska, 2007; Mossakowska, 2008; Merło et al., 2015), which relies on the measurement of four variables:

- professional activity rate: the share of the working population compared to the total population over 15 years old; this rate assesses the degree of employed human capital (it is assumed that professionally passive and unemployed people do not use their skills on the labour market);
- employment rate: the share of the working population compared to the total population over 15 years old; the rate is used to assess the mobilisation of the labour force;
- entrepreneurial activity rate: the number of non-financial enterprises per inhabitant over 15 years of age, engaged in professional activity in a region (it is assumed that a higher level of entrepreneurial activity results in a larger number of registered entities);
- education level: the percentage of the working population with higher education; it is assumed that the quality of human capital improves along with the increase of the level of educational attainment of individuals.

The aggregate index comprising the four above-mentioned variables is calculated according to the formula as follows (1) (Nowak, 1996):

$$H_j = 1 / 4 \sum_{i=1}^4 H_{ij} \quad (1)$$

where:

j – index of a given NUTS 2 region (values from 1 to 276),

i – number of a partial index used to calculate the Human Capital Resources Index (values from 1 to 4).

To ensure comparability of variables used to build the Human Capital Resources Index, the *z-score* is standardised by using the average and standard deviation by the weighted average number of the population in a given region, which allows bringing the data to one scale (Knoke et al. 2002) (2).

$$x_{std} = \frac{x - \bar{x}_w}{\sigma_w} \quad (2)$$

where:

\bar{x}_w – weighted arithmetic mean,

σ_w – weighted standard deviation.

The calculated values of the Human Capital Resources Index for particular EU regions were compared to the values of the Regional Competitiveness Index (RCI), whose main assumptions and methodology of calculation are based on the Global Competitiveness Index (GCI) developed by the World Economic Forum (Annoni and Dijkstra, 2013; Annoni and Kozovska, 2010). To assess the RCI, regional competitiveness was defined as the ability to ensure an attractive and stable working and living environment for companies and the population. The analysis of determinants was performed in three areas determined as (Annoni and Dijkstra, 2013; Annoni and Kozovska, 2010; Dijkstra et al., 2011):

- the group of basic factors;
- the group of efficiency enhancers;

– the group of innovation and sophistication factors.

In turn, each of the above-mentioned areas is described by the so-called competitiveness pillars: quality of institutions, macroeconomic stability, quality of infrastructure, health, basic education, higher education and professional development, efficiency of the labour market, market size, technological readiness, quality of business environment and innovation. To calculate the RCI values, 80 explanatory variables in the aforementioned 11 pillars were used (ibid.). The microdata were verified in terms of the asymmetry of distribution, using the classical skewness measure (Helsel and Hirsch, 2002) (3):

$$k = \frac{n}{(n-1)(n-2)} \sum_{i=1}^n \frac{(x_i - \bar{x})^3}{s^3} \quad (3)$$

where:

n – number of observations for the index,

\bar{x} – arithmetic mean,

s – standard deviation.

In the case of significant asymmetry, the data were transformed according to the Box & Cox algorithm (4–5):

$$\Phi_{\lambda}(x) = \frac{x^{\lambda} - 1}{\lambda} \quad \text{where } \lambda \neq 1 \quad (4)$$

$$\Phi_{\lambda}(x) = \log(x) \quad \text{where } \lambda = 1 \quad (5)$$

For left asymmetry $\lambda = 2$ was adopted, whereas for right asymmetry $\lambda = -0.5$. In the case of raw data with the value of zero, the data were converted by using the logarithm transformation (Longman et al., 1995) in accordance with the following formula (6):

$$\Phi_{\lambda}(x) = \log(x + 1) \quad (6)$$

Similarly, as in the case of the Human Capital Resources Index, to obtain the comparability indices used for the construction of the RCI, the *z-score* standardisation was applied (2). Therefore, both positive and negative values, depending on the deviation from the average for all the NUTS 2 EU regions, were calculated.

The study covers the period from 2009 to 2013 due to the limited availability of the comparable statistical data.

Research results

The performed analysis shows that the competitiveness of individual EU regions is clearly varied. The highest level of competitiveness characterises the most developed regions of the Netherlands (Utrecht – RCI = 1.358; Amsterdam agglomeration (Flevoland, Noord-Holland) – RCI = 1.078; Zuid-Holland – RCI = 1.006; Noord-Brabant – RCI = 1.003), United Kingdom (London agglomeration (Inner London, Outer London, Bedfordshire, Hertfordshire, Essex) – RCI = 1.192; Berkshire, Buckinghamshire and Oxfordshire – RCI = 1.174;

Surrey, East and West Sussex – RCI = 1.093), Sweden (Stockholm region – RCI = 1.149), Germany (Frankfurt agglomeration (Darmstadt) – RCI = 1.05), Denmark (Copenhagen agglomeration, Hovedstaden, – RCI = 1.04) and France (Paris agglomeration, Île de France, – RCI = 1.05). In all these regions, the value of the RCI is over 1 (Fig. 1).

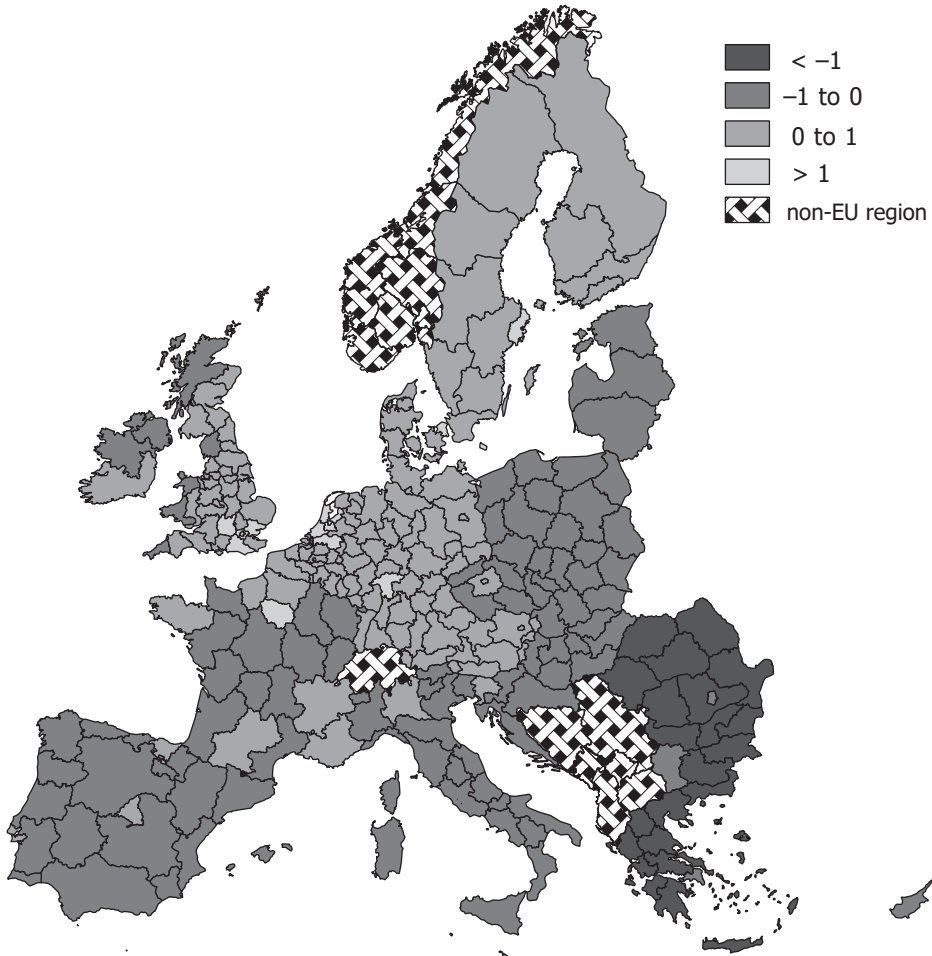


Fig. 1. Regional competitiveness in the European Union at the NUTS 2 level measured with the RCI index

Source: own calculations.

These are highly developed regions with a high degree of urbanisation which function as financial, academic and industrial centres. These regions are often referred to as “knowledge centres.” The social and economic potential of such regions is determined by the presence of large urbanised areas where research, financial and highly specialised production centres are located. Thanks to that, they attract highly qualified labour and offer opportunities for fast professional

development and high salaries. In effect, a large outlet market for consumer goods and services is created, which additionally accelerates their development (Martin, 2003; Merło and Michalak, 2015).

The regions in Romania, Bulgaria and Greece are characterised by the lowest level of competitiveness (RCI below -1). In these countries, only the capital areas positively stand out from other regions, but even in their case, the level of competitiveness is below the EU average. Furthermore, the low level of competitiveness is also a problem in peripheral regions of Spain (Ciudad Autónoma de Ceuta – RCI = -1.098) and France (Réunion – RCI = -1.162 ; Guyana – RCI = -1.102), where the RCIs are below -1 . However, these are overseas territories that may not actually compete with other regions.

In terms of national competitiveness (measured as the average regional competitiveness – CCI index), the economies of Luxembourg (CCI = 0.971), Netherlands (CCI = 0.945) and Belgium (CCI = 0.63) are characterised by the highest level of such competitiveness (Fig. 2).

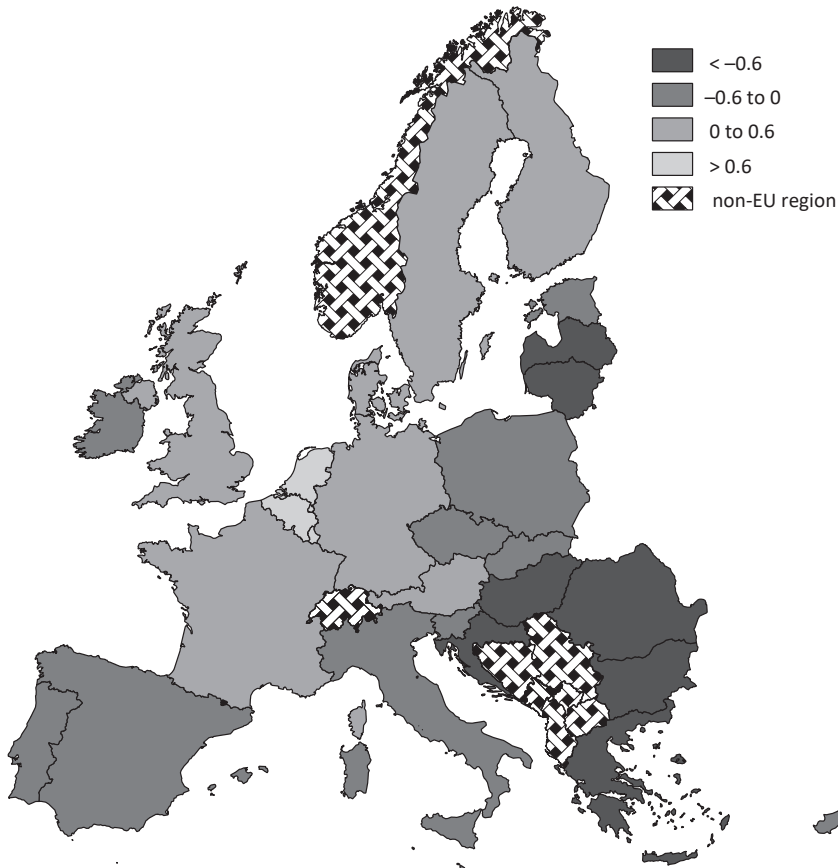


Fig. 2. National competitiveness in the EU measured with the CCI index

Source: own calculations.

The level of competitiveness is slightly lower in the Federal Republic of Germany (CCI = 0.6) and Sweden (CCI = 0.594). What is important is that all regions in these countries have higher levels of competitiveness than the EU average (RCI > 0). The competitiveness of the Polish economy at the regional level is relatively low when compared to other EU member states and lower than the average for all EU NUTS 2 regions (CCI = -0.56). The level of this index placed Poland 19th among 28 analysed countries (Fig. 2), next to Slovakia (-0.59) and Malta (-0.57). The low level of competitiveness of Poland is mainly driven by the country's low competitiveness in efficiency and innovation (Fig. 3).

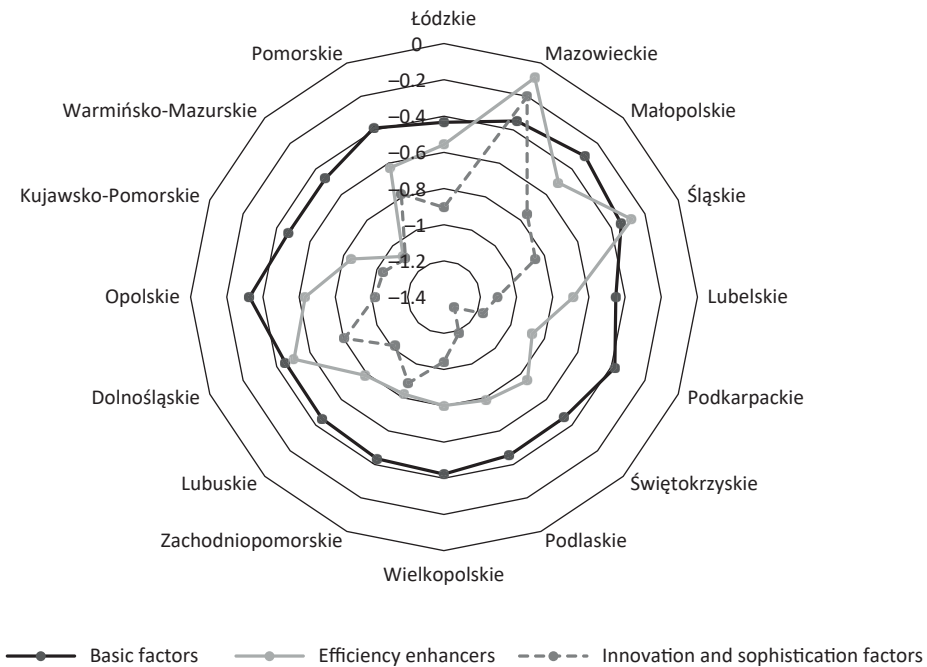


Fig. 3. Components of the RCI index in Poland in the area of basic factors, efficiency enhancers and innovation and sophistication factors

Source: Merło and Michalak, 2015, on the basis of: Annoni and Dijkstra 2013.

The competitiveness of the majority of Polish voivodeships relies on basic factors, but even in this aspect the values of most variables determining competitiveness are below the EU average. Basic competitiveness is described by five pillars: primary and secondary education, health, infrastructure, macroeconomic stability and quality of institutions. Four of the above-mentioned pillars form the greatest deficit in the case of Polish regions (Merło, Michalak 2015). According to the theoretical interpretation of regional competitiveness, in order to increase its level for such regions it is indispensable to take measures aimed at improving factors shaping competitiveness in the basic dimension and, subsequently, deal with efficiency and innovation.

Tab. 1. Descriptive statistics of the RCI index for individual countries

	\bar{x}_w	\bar{x}	σ	V	κ	<i>min</i>	<i>max</i>	R
Austria	0.237	0.161	0.150	0.929	0.617	0.044	0.393	0.349
Belgium	0.631	0.508	0.311	0.613	-0.052	0.048	0.969	0.922
Bulgaria	-1.171	-1.245	0.299	0.241	1.473	-1.481	-0.715	0.766
Cyprus	-0.285	-0.285	0.000	0.000	-	-0.285	-0.285	0.000
Czech Republic	-0.235	-0.293	0.260	0.887	1.604	-0.445	0.213	0.658
Germany	0.598	0.540	0.246	0.455	0.360	0.092	1.050	0.958
Denmark	0.579	0.510	0.317	0.622	1.724	0.295	1.040	0.745
Estonia	-0.182	-0.182	0.000	0.000	-	-0.182	-0.182	0.000
Spain	-0.281	-0.412	0.405	0.981	0.406	-1.098	0.479	1.577
Finland	0.575	0.451	0.602	1.334	0.091	0.278	0.790	0.512
France	0.154	-0.163	0.567	3.478	-0.073	-1.162	1.050	2.212
Greece	-0.938	-1.232	0.529	0.430	0.420	-1.417	-0.366	1.052
Croatia	-0.773	-0.788	0.045	0.057	-	-0.832	-0.743	0.089
Hungary	-0.678	-0.641	0.296	0.463	0.885	-0.877	-0.148	0.728
Ireland	-0.023	-0.104	0.175	1.691	-	-0.279	0.072	0.351
Italy	-0.389	-0.445	0.352	0.792	-0.270	-0.961	0.013	0.975
Lithuania	-0.820	-0.820	0.000	0.000	-	-0.820	-0.820	0.000
Luxembourg	0.971	0.971	0.000	0.000	-	0.971	0.971	0.000
Latvia	-0.840	-0.840	0.000	0.000	-	-0.840	-0.840	0.000
Malta	-0.569	-0.569	0.000	0.000	-	-0.569	-0.569	0.000
Netherlands	0.945	0.833	0.232	0.279	0.714	0.482	1.358	0.876
Poland	-0.558	-0.624	0.204	0.327	0.706	-0.871	-0.180	0.691
Portugal	-0.387	-0.542	0.298	0.549	1.215	-0.858	0.019	0.877
Romania	-1.228	-1.206	0.323	0.268	3.887	-1.479	-0.309	1.170
Sweden	0.594	0.440	0.389	0.882	0.853	0.076	1.149	1.073
Slovenia	-0.057	-0.047	0.165	3.541	-	-0.212	0.119	0.330
Slovakia	-0.592	-0.451	0.395	0.877	5.052	-0.871	0.378	1.250
United Kingdom	0.584	0.405	0.438	1.082	0.299	-0.079	1.192	1.271

Source: own calculations.

Competitiveness across the EU varies not only in terms of quality but also, as in the case of many economies, a significant diversity within each country can be observed. In France, such a difference is the most significant: the difference between the weakest and the strongest region reaches 2.12 (Tab. 1, Fig. 4).

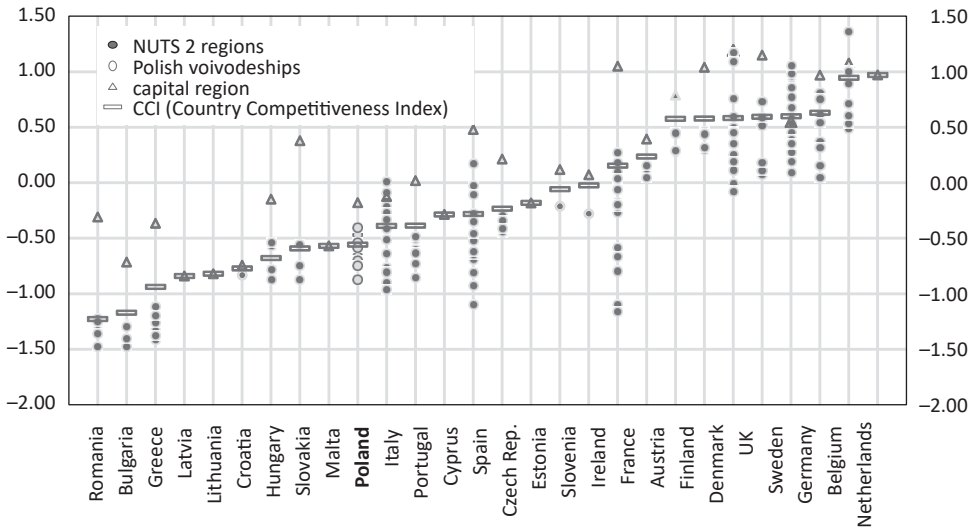


Fig. 4. Regional (RCI) and national (CCI) competitiveness in the European Union

Source: Merlo and Michalak, 2015, on the basis of: Annoni and Dijkstra 2013.

Wide differences between regions can also be observed in such countries as Spain (1.577), United Kingdom (1.271), Slovakia (1.25), Romania (1.17), Sweden (1.073) and Greece (1.052). Natural differences are more noticeable in larger countries with greater administrative fragmentation at the NUTS 2 level. In the majority of these economies, the capital region plays a leading role, which leads to a significant asymmetry in distribution within particular countries.

The countries with the greatest asymmetry were Slovakia ($\kappa = 5.052$) and Romania ($\kappa = 3.887$). In these countries, apart from the capital region, all other areas play a peripheral role, characterised by very low levels of regional competitiveness. It should also be noted that the disparities in such cases are so significant that further aggravation, rather than convergence, should be expected. The capital regions are not only able to attract investments more easily, but also extract high-potential labour force from peripheral regions. In the case of Poland, the diversification of regional competitiveness is rather insignificant when compared to other countries ($\kappa = 0.706$). Hence, the regions with a lower level of competitiveness have a chance to catch up with stronger voivodeships. To this end, it is essential to control investment policy, especially at the level of public funds, as it may help to even out the gaps and so improve the ability of the regions with lower competitiveness to attract private capital. It should be noted, however, that the gap between them and the most developed regions of the EU in this regard is so significant that it is difficult to expect any convergence in the near future.

Additionally, apart from investment policy, the potential of a region and possibilities of its use and development are of vital importance as far as levelling of disparities is concerned. In such cases human capital, understood as a factor

impacting the size of demand and production factors involved in production processes, plays an important role. Highly qualified labour force creates opportunities for a more efficient use of other production factors, and therefore allows for achieving higher profits and enables faster development of businesses.

An analysis of the value of the competitiveness index and the human capital resource index in the EU allowed to distinguish six groups of regions. (Fig. 5).

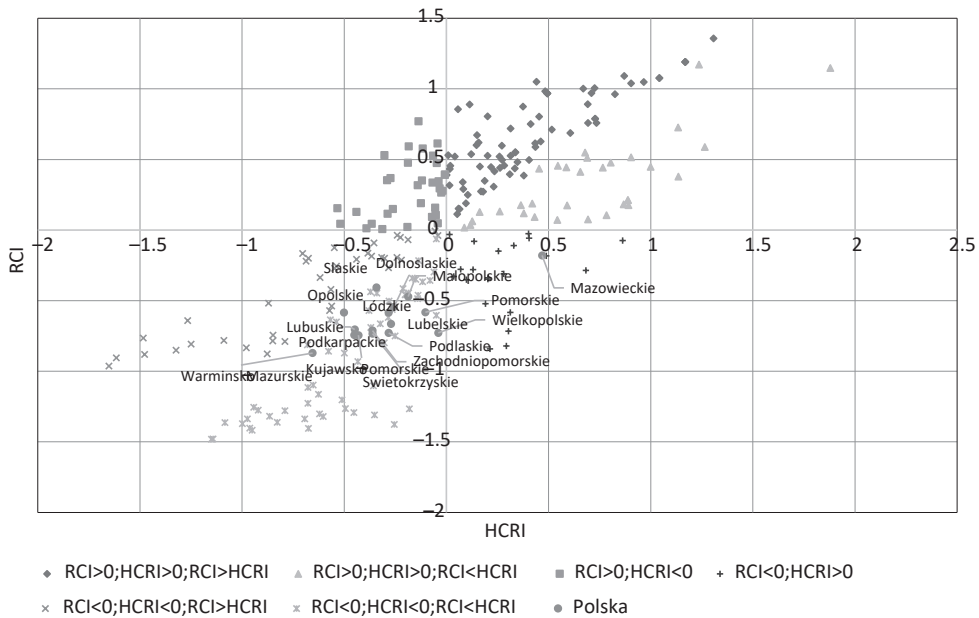


Fig. 5. Dispersion of the relationship between the RCI and the HCRI indices in NUTS 2 regions of the European Union

Source: own calculations.

In pursuit of an analogy between the distinguished groups of regions and the types of employees that can be found on labour markets, the following groups are defined for the analysed areas: established leaders, skilled pretenders, industrial professionals, talented followers, blue collar workers, promising outsiders (Fig. 6). These groups are:

- 1) Established leaders – a group of regions with both the RCI and the HCRI being positive values (regional competitiveness and human capital above the average level) and with the HCRI < the RCI – this is a relatively large group of 73 regions, a vast majority of which lies in the contractual macroregion of Europe known as the Blue Banana. It is a heavily urbanised area stretching from the metropolitan area of London, through the Netherlands, Belgium and France, western Germany to northern Italy. Due to its favourable location, high population density and high economic potential, this area has been a driver of development of the European economy, science and technology

for many centuries (Grodzka, 2017; Netrdova and Nosek, 2016). High level of economic development and high competitiveness enable them to attract highly qualified workforce due to higher wages and better professional development opportunities. On the other hand, large human capital resources positively influence the region's competitiveness and economic development. This group includes, among others, regions like: Inner London, Outer London, Surrey, East and West Sussex, Hampshire and Isle of Wight (the latter two belong to the London metropolitan area), Île de France (Paris agglomeration), Oberbayern, Niederbayern, Oberpfalz in Bayern, Helsinki agglomeration (Helsinki–Uusimaa);

- 2) Skilled pretenders – a group of regions with positive RCI and HCRI values, with the HCRI > the RCI – it consists of 32 regions mainly located in the member states of the so-called old European Union (the old EU). It includes a number of capital regions (Prague, the Comunidad de Madrid, Área Metropolitana de Lisboa, Stockholm, Bratislavský kraj, Eastern Scotland) and the highly developed areas of the regions of the first group. In addition, some of them are home to recognised universities (e.g. Turku – Länsi-Suomi, Jönköping – Småland med öarna, Reading – Berkshire, Buckinghamshire and Oxfordshire), making them attractive locations for high-tech businesses and centres for research and development (R&D). The high level of human capital translates into a high development potential, which can lead to their dynamic development in the future;
- 3) Industrial professionals – a group of regions with positive RCI values (beyond the average level) and negative values of the HCRI (human capital level below the average) – a group consisting of 32 regions located in countries which belonged to the EU before 2004. These are regions whose economy was based on the mining and metallurgical industries (e.g. Hainaut – Belgium, Saarland – Germany, Nord – Pas-de-Calais – France), machinery industries (Namur – Belgium, Braunschweig, Lüneburg – Germany) or textile industries (Merseyside – United Kingdom), relying mainly on unskilled labour force. Hence, they are characterised by a relatively lower level of human capital. However, due to a high level of economic development in the past, they are still lucrative markets, and therefore attractive for potential investors. The gradual decline or transformation of their industries is likely to reinforce the outflow of the most skilled workers, reducing their development potential in the future;
- 4) Talented followers – a relatively small group consisting of 22 regions and characterised by the above average values of the HCRI (relatively high quality of human capital) and a lower than average level of competitiveness (RCI < 0). On the one hand, it comprises the capital regions or whole countries (in the case of smaller economies) of the new EU member states (Mazowieckie, Lithuania, Latvia, Estonia, Cyprus, Budapest metropolitan area) and, on the other hand, relatively less affluent areas of the “old Union” with diversified structures of production (from the tourist regions such as the Balearic Islands, Corsica to the industrial areas like Navarre, Aragón, Northern Ireland). The

capital regions are among the fastest growing areas in the EU, transforming relatively quickly towards a modern and competitive production structure. Therefore, they can be expected to move to the group of regions with above-average economic competitiveness in a short period of time. This process will probably be strengthened by attracting the most skilled workforce from other less developed areas of these countries. With regard to other regions of this group, it should be noted that their future development dynamics will depend on a skilful use of their potential in the form of relatively highly qualified human capital. At the same time, these regions will face the problem of the outflow of qualified staff to regions with higher development potential, offering higher earnings and better career prospects;

- 5) Blue collar workers – a group of regions with lower than average regional competitiveness ($RCI < 0$) and less developed human capital ($HCRI < 0$), where, at the same time, the level of competitiveness exceeds the level of human capital development ($RCI > HCRI$) – this group, consisting of 32 regions, mostly comprises the French and Italian regions (a total of 24) with a relatively little competitive production structure, where agriculture, traditional industries (textile, food, electromechanical industry) and/or tourism still play an important role. These regions mainly supply basic and low processed goods to more competitive regions in their countries. Thus, the dynamics of their development is determined by the overall economic situation in France and Italy. The remaining part of this group is eight regions in Croatia and Hungary – new member states of the EU. It can, therefore, be assumed that the economic

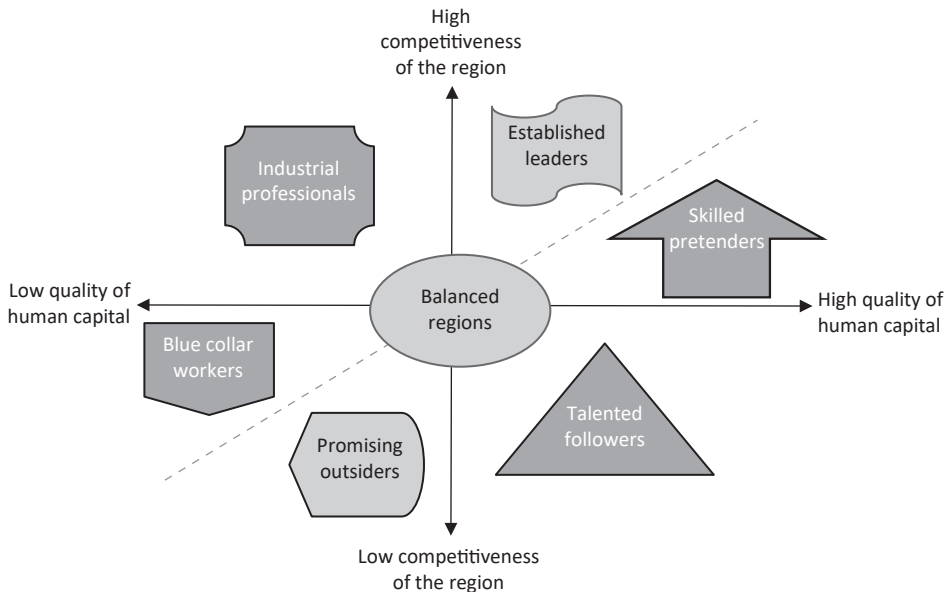


Fig. 6. Types of regions by level of competitiveness and human capital

Source: own elaboration.

potential of these regions is still determined by the processes of adapting their socio-economic systems to the European Community system. Relatively lower levels of human capital also indicate that they are experiencing an outflow of skilled labour to other regions of the EU;

- 6) Promising outsiders – a group of regions with lower than average levels of human capital and regional competitiveness ($HCRI < 0$, $RCI < 0$) but with relatively better labour resources ($HCRI > RCI$) – the largest group (73), where the regions of the new EU member states (Romania, Bulgaria, Czech Republic, Malta, all Polish voivodeships excluding Mazowieckie) are predominant. It also includes: peripheral regions of France, Spain and Portugal (Martinique, French Guiana, Canary Islands, Azores, Madeira) and the Greek regions. It is

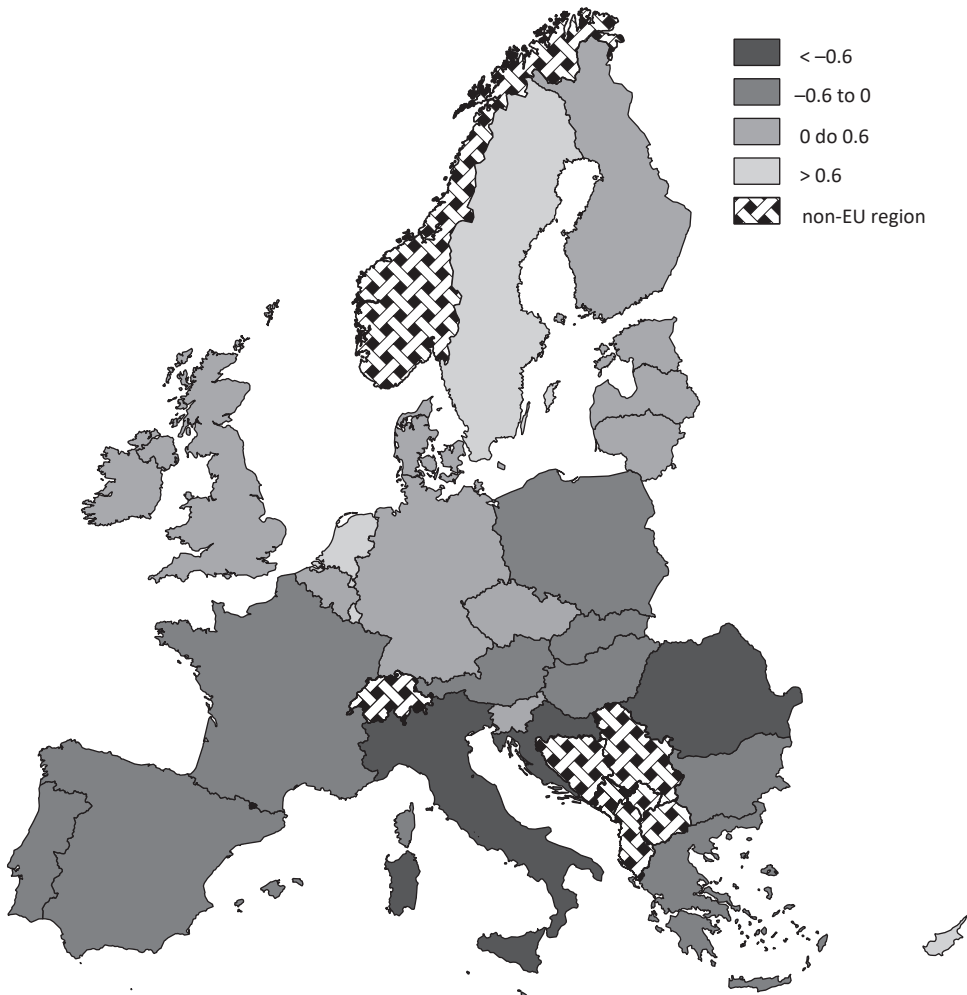


Fig. 7. Human capital resources at the national level in the EU measured with the Human Capital Resource Index

Source: own calculations.

a heterogeneous group dominated by areas with varied economic problems resulting from ongoing economic transformation processes (Poland, Bulgaria, Romania), their geographical location (Martinique, French Guiana, Azores) or general macroeconomic problems (Greece). However, they have some potential in the form of human capital resources, which, with properly implemented economic policies, can be factored into their socio-economic development.

Within the territory of the European Union, the country with the highest level of human capital resources is Sweden (Human Capital Resources = 1.2). The value of this index is much lower in other countries – in the case of Luxembourg, ranked second, it is 0.71, and in the Netherlands, ranked third: 0.7 (Fig. 7).

The lowest human capital resources were observed in Croatia (−0.892), Italy (−0.838) and Romania (−0.749). Unfortunately, Poland is also below the EU

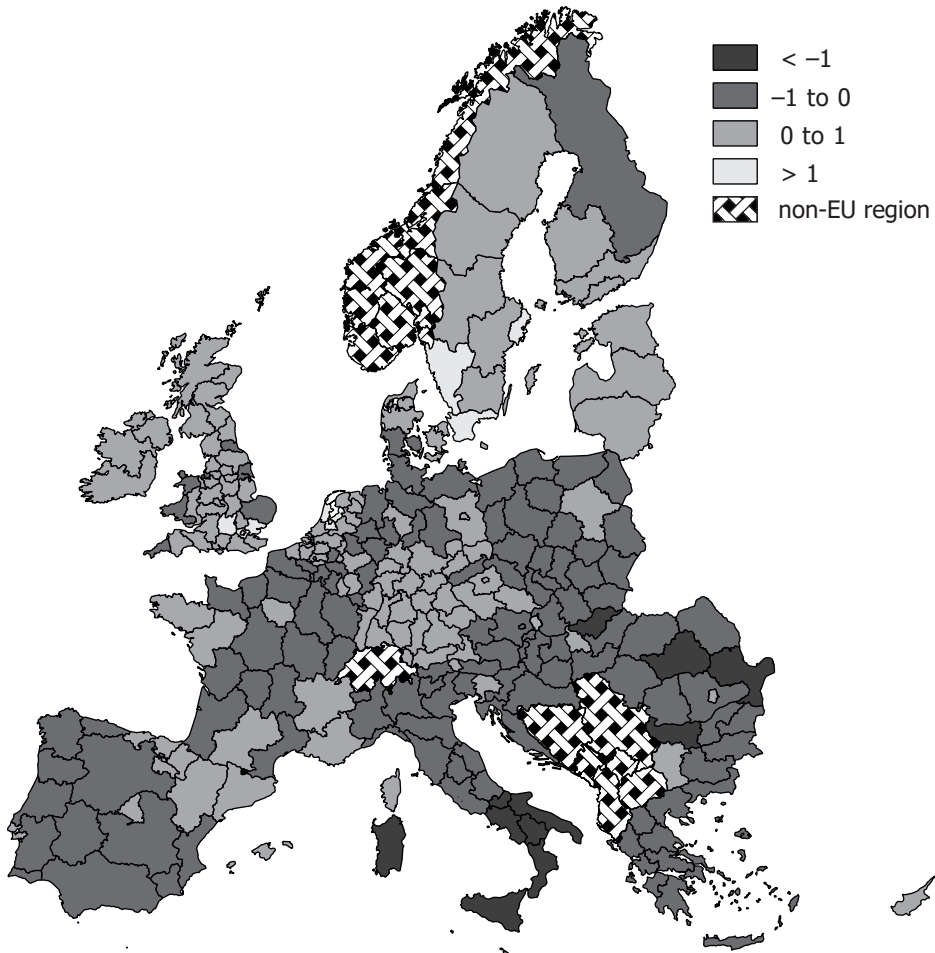


Fig. 8. Human capital resources at the NUTS 2 level in the EU measured with the Human Capital Resource Index

Source: own calculations.

average – the average value of this index in our country was -0.189 , alongside such countries as Slovakia (-0.173), Malta (-0.379) and Bulgaria (-0.375).

At the level of NUTS 2, the highest values of the Human Capital Resources Index were found in Swedish regions, i.e. Stockholm agglomeration (1.879), Gothenburg agglomeration (1.265), Malmö agglomeration (1.134), Netherlands – Utrecht (1.307), Amsterdam agglomeration (1.043), United Kingdom – Berkshire, Buckinghamshire and Oxfordshire (1.235), urbanised area of London (1.169) and Slovakia – Bratislavský rožok (1.135) (Fig. 8).

On the other hand, the lowest values in the Human Capital Resources Index were noted in Italy – Sicily (-1.652), Calabria (-1.615), Campania (-1.484), Puglia (-1.477), Basilicata (-1.324), Molise (-1.267), Sardegna (-1.25), Bulgaria – Severozapaden (-1.151), Romania – Sud-Est (-1.143), Centru (-1.085) and Hungary – Észak-Magyarország (-1.089). The potential of the Polish regions, except for the Mazowieckie Voivodeship, should be considered insufficient when compared to other EU regions. The value of the Human Capital Resources Index was above zero (0.469) only in the capital city voivodeship, which means that in all other voivodeships the quality of human capital resources is below the EU average (Fig. 9).

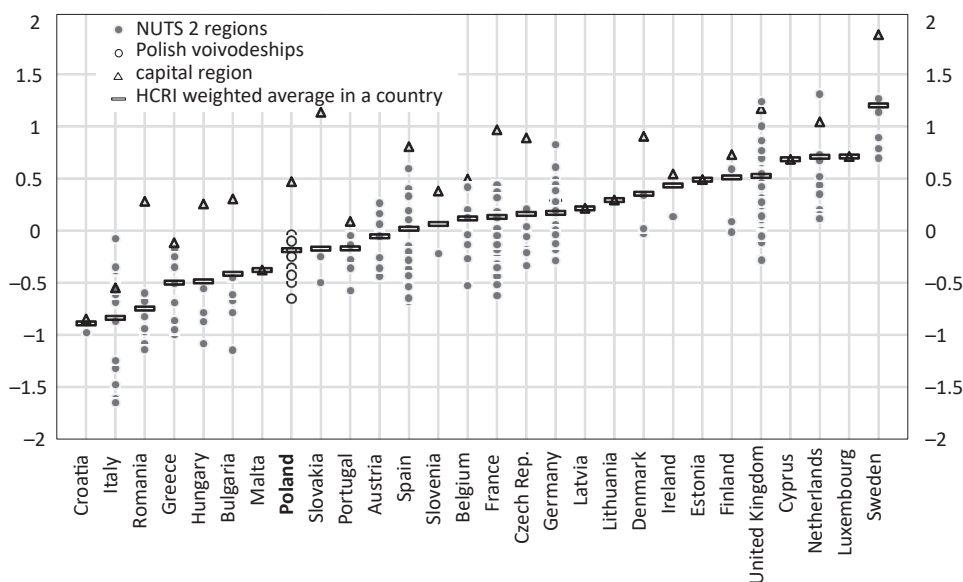


Fig. 9. Values of HCRI of the NUTS 2 regions

Source: own calculations.

A particularly unfavourable situation in this respect is observed in the Warmińsko-Mazurskie (-0.656), Opolskie (-0.502) and Lubuskie (-0.449) Voivodeships. In these regions, even the regional capitals have a low potential, which additionally lowers the chances of catching up with other voivodeships. Nonetheless, the fact that the disparities between various regions are rather

Tab. 2. Descriptive statistics of the HCRI index for individual countries

	\bar{x}_w	\bar{x}	σ	V	κ	min	max	R
Austria	-0.056	-0.081	0.173	2.149	-0.647	-0.440	0.261	0.701
Belgium	0.113	0.022	0.355	16.300	-0.109	-0.534	0.494	1.027
Bulgaria	-0.435	-0.565	0.511	0.905	0.991	-1.151	0.303	1.454
Cyprus	0.683	0.683	0.000	0.000	-	0.683	0.683	0.000
Czech Republic	0.152	0.047	0.451	9.634	1.304	-0.341	0.889	1.229
Germany	0.165	0.143	0.284	1.992	0.311	-0.303	0.825	1.127
Denmark	0.346	0.248	0.403	1.624	1.503	-0.032	0.903	0.936
Estonia	0.489	0.489	0.000	0.000	-	0.489	0.489	0.000
Spain	-0.464	-0.373	0.377	1.011	0.788	-0.999	0.590	1.589
Finland	0.217	0.098	0.604	6.150	0.713	-0.371	0.804	1.175
France	-0.239	-0.092	0.416	4.504	0.918	-0.681	0.966	1.647
Greece	-0.187	-0.120	0.256	2.135	1.108	-0.627	0.432	1.058
Croatia	-0.892	-0.914	0.066	0.072	-	-0.980	-0.848	0.132
Hungary	-0.594	-0.641	0.525	0.818	0.976	-1.089	0.255	1.344
Ireland	0.432	0.336	0.206	0.613	-	0.130	0.542	0.412
Italy	-0.753	-0.829	0.484	0.584	-0.477	-1.652	-0.081	1.571
Lithuania	0.293	0.293	0.000	0.000	-	0.293	0.293	0.000
Luxembourg	0.710	0.710	0.000	0.000	-	0.710	0.710	0.000
Latvia	0.213	0.213	0.000	0.000	-	0.213	0.213	0.000
Malta	-0.379	-0.379	0.000	0.000	-	-0.379	-0.379	0.000
Netherlands	0.704	0.563	0.341	0.605	0.943	0.114	1.307	1.193
Poland	-0.192	-0.281	0.309	1.099	0.943	-0.655	0.469	1.123
Portugal	-0.172	-0.270	0.220	0.813	0.054	-0.577	0.087	0.665
Romania	-0.758	-0.747	0.401	0.537	2.858	-1.143	0.280	1.423
Sweden	1.191	1.052	0.423	0.402	1.248	0.693	1.879	1.186
Slovenia	0.059	0.079	0.300	3.803	-	-0.221	0.378	0.599
Slovakia	-0.171	0.029	0.520	17.733	5.466	-0.500	1.135	1.634
United Kingdom	0.517	0.392	0.465	1.186	0.239	-0.287	1.235	1.523

Source: own calculations.

insignificant when compared with the disparities in the other EU member states may provide grounds for optimism (Tab. 2). In the case of Poland, the difference between the weakest Warmińsko-Mazurskie Voivodeship and the strongest Mazowieckie Voivodeship was 1.123, with an asymmetry index of 0.943. The distribution is significantly asymmetric in such countries as Slovakia ($\kappa = 5.466$) and Romania ($\kappa = 2.858$), where the capital city regions outperform other regions with their potential to a greater extent than in Poland.

Overall, it must be stated that Poland is characterised not only by a low level of regional competitiveness, but also by low human capital resources. The existing differences between the Polish regions in terms of the RCI and Human Capital Resources Index demonstrate the domination of the Mazowieckie Voivodeship, which, thanks to its potential, is able to develop more quickly and additionally drain the highly qualified personnel from other regions. Warsaw, as one of few urbanised areas, provides conditions similar to the EU's average ones in respect of innovation and development. A similar potential in this area was observed only in the urbanised areas of Śląskie (even though the voivodeship is still substantially lower than in the urbanised areas of Warsaw), which may facilitate the region's quicker development by benefiting from the absence of decreasing marginal productivity, whereas other regions with serious deficits in the basic fields will be forced to intensify investments in basic areas such as infrastructure, health and education. Investments in such areas are essential to provide the proper grounds for quicker development in other areas, including innovation.

Summary and conclusions

According to Gorzelak, the modern economy, its structure and transformation, is determined by three interdependent phenomena. The first one is the progressing economic globalisation whose main features include transnational corporations, world trade deregulation processes and increasing capital flows. The second one is the growing importance of new technologies and innovation, which not only improve efficiency and streamline social and economic processes, but also create a new demand for such technologies by establishing new outlet markets. Their effect (but also the cause thereof) is the intensification of competition and expansion of its subjective range (Gorzelak, 2003). Modern processes of economic competition no longer pertain to enterprises only. Nowadays, these are also cities, regions and even the whole countries that compete. The intensification of the process of economic competition is therefore the third element shaping the triad of the modern development model.

The condition for efficient competition in a more and more competitive environment, also at the mezzo- and macroeconomic levels, is high competitiveness. Its improvement constitutes an essential yet insufficient condition for attracting new capital, creating new and better jobs, and hence increasing the economic growth rate. Therefore, in the subsequent programming periods of the EU Cohesion Policy, more emphasis is put on improving the competitiveness of the regions, understood as a driving force for regional growth. Its importance seems to be especially significant in the areas of relatively low economic growth rates.

The level of economic competitiveness is determined by multiple factors, the importance of which changes depending on the prevailing economic paradigm and the accomplished level of growth. However, an analysis of the available literature shows that human capital is vital in this respect, whereas the correlations between it and the level of competitiveness have a feedback nature. Therefore, the objective of this study was to analyse the spatial differentiation of the level of

human capital in the context of competitiveness with respect to regions of the EU member states at the NUTS 2 level.

The conducted analysis shows significant disproportions in the level of human capital and regional competitiveness between EU regions. Taking into account the scale of these disparities, six groups of regions were identified – from regions with above-average levels of competitiveness and human capital to regions where these variables were at a low level. The highest level of competitiveness (measured by the RCI) was observed in those regions where the quality of human capital (measured by the Human Capital Resources Index) was the highest. These were mainly regions located around large urbanised areas and metropolises, of a continental and global importance, in the most developed EU member states – Netherlands, United Kingdom, Germany and Denmark. The lowest level of competitiveness due to low quality of human capital was observed in the regions of Romania, Bulgaria and Greece. Furthermore, these were regions with a relatively low economic growth rate due to their peripheral location and ongoing processes of economic transformation.

To effectively decrease the regional development disparities within the European Union, which is the main goal of the Cohesion Policy, activities are required which aim to improve the competitiveness of the regional economies of the poorest members of the Community. The analysis of the modern competitiveness models, as well as the presented data with respect to the Polish regions, show that the foundations for competitiveness in such areas are the basic factors. Above all, the level of economic, technical and transport infrastructure, as well as the quality of the institutions, health care and primary and secondary education, determine the competitiveness of such units. Investments in such areas should be a priority in terms of public funding so that they may increase, in a longer perspective, the competitiveness of the regional economy and, as a result, the economic growth rate of the voivodeship.

Additionally, the question arises as to the validity of the common understanding of the Cohesion Policy (which is, unsurprisingly, also popular among the greatest beneficiaries of such a policy) as a tool used for reducing regional development imbalances by a relatively simple redistribution of funds from the regions and the most developed countries to economically less developed areas. When considering the fact that the correlation between the quality of human capital and economic competitiveness, as well as competitiveness and the level of economic development and economic growth rate, is of a feedback nature, it is highly probable that the currently observed development imbalances will not drop, but will increase regardless of economic policy measures.

When taking into account the rationality of public fund spending and the need to enhance the competitiveness of the entire European Union due to the increasing competitive pressure from the United States and China, will it be more adequate to discuss finding a socially and economically accepted scale of the development imbalances? World economic history shows that striving after an artificial, top-down reduction of the development balances and income, both on micro- and macroeconomic scales, is subject to significant limitations and leads

to ineffective management of public funds. Therefore, should social and territorial cohesion in the EU be given top priority over economic cohesion? Due to the increasing political, social and economic challenges, Europe needs a new impetus to develop, which, according to the authors, implies the necessity to start work on a reform of the current policy of the European Union.

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