The Features of Regional Human Capital Development

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Abstract

The article focuses on identifying the specifics of the relationship between human capital and the quality of economic development across regions and the world as a whole. The Human Capital Index (HCI) was used as an indicator of human capital development. GDP per capita as an objective indicator and the Happiness Rating as a subjective indicator were used to display the quality of economic development. The panel sample includes data for 140 countries for 2020. The study showed that there are significant regional differences both in the values of the analysed indicators and in their distribution among the groups. The research also revealed that the relationship between the indicators ranged from a strong positive in some cases to a negative or no correlation in others. It was concluded that there are inter-regional differences in human capital development.

Keywords

economic development; regional development; human capital; Human Capital Index; GDP per capita; Happiness Rating

Introduction

The primary objective of any state is to ensure sustainable economic development, often one associated with economic growth measured in GDP dynamics. However, although economic indicators are important, non-economic factors – social, cultural, technological, environmental – are also relevant to achieving development in a broader context. The availability of natural resources and transport routes, a convenient geographical location, and good climate were key factors for economic development in past centuries. However, alongside these, factors whose impact is relatively recent are also becoming important nowadays. These include the availability of modern communications, information resources, a high level of human capital, ease of doing business, optimum bureaucracy, etc. While geographical, climatic, and natural factors are virtually uninfluenced at the national level, information and communication as well as human resources are manageable at the state level.

Human capital is an important factor that contributes to economic growth and development. The formation of human capital entails certain costs for society as a whole, for individual companies, and for individuals themselves. Investments in human capital involve spending on medicine, education, research, culture, art, and other components. However, it is equally important to create an enabling environment for the realisation of human capabilities and knowledge, which significantly increases the return on investment in human capital. At the same time, a country can produce human capital itself through investment, but it can also attract human resources by creating favourable conditions for them.

Literature review

Human resources have a significant impact on economic development primarily because a highly skilled labour force is more in demand on the labour market and receives a higher rent on its human capital in the form of higher wage rates. A number of studies confirm this. Cuaresma et al. (2018) concluded by building an econometric model that human capital is a driver of income growth.

An important characteristic of human capital is its ability to generate GDP. Weckroth et al. (2015) studied the relationship between GDP and human and social capital components in European regions. The study showed that the social components have a positive link with regional GDP.

There are certain differences in the manifestation of the relationship between economic development and human capital across countries and regions. Weckroth and Kemppainen (2016) investigated the relationship between value-based human capital and economic development. The results showed the existence of inequality between Western and Eastern European regions in terms of cultural values. As it turns out, higher economic development is accompanied by wide-ranging cultural diversity.

It is important for any country that development takes place evenly in all regions, in which way it will be balanced. However, this is not always the case. Laskowska and Dańska-Borsiak (2016) determined that the amount of human capital in a region has a significant impact on the GDP per capita there. Researchers have found a relationship between the level of regional development, measured by GDP per capita, and the level of human capital in various EU regions. However, the analysis revealed inter-regional disparities in these variables.

Human capital also contributes to innovation and technological development by increasing the amount of innovation as the level of ability and knowledge grows. Diebolt and Hippe (2019) consider regional human capital as a factor of technological progress and economic development in the historical context. Using a range of data on literacy rates, the number of patents, etc. from 1850 to 1960, they identified human capital as an important determinant of economic and innovation differences between European regions. Cappelli et al. (2021) studied the impact of the crisis on unemployment since 1978 in 248 regions of the European Union. They investigated regional resilience from 2008 to 2016 to assess the impact of the 2008 crisis. As a result, it was determined that human capital is a factor in ensuring the region's technological progress in the post-crisis period. However, sustainability can be achieved through more than just human capital. Institutional variables also matter.

Human capital can increase labour productivity. This is because more skilled employees are better able to cope with complex production tasks and current problems. Carrion-i-Silvestre and Surdeanu (2016) determined that human capital, physical capital, as well as public capital influence labour productivity in Spain by estimating a panel data model of 17 Spanish regions over the period 1964–2011. Kijek and Kijek (2020) examined the impact of human capital and R&D on overall productivity in European regions from 2009 to 2014. The results show that investment in human capital increases returns to R&D and *vice versa*.

In addition, human capital helps to reduce inequalities in society. Suhendra et al. (2020) analysed the factors that influence inequality using data from 34 Indonesian provinces for 2013–2019. The results showed that human capital has a negative impact on income inequality. In contrast, inflation widens the income gap, thereby exacerbating inequalities in society.

Migration as a manifestation of the human factor also affects economic development. Migration can have both positive and negative impacts on regional development. With the outflow of human resources, migration is a significant problem. Human capital accumulated over many years by subsidising expenditure on education, health, etc. may be irretrievably lost in this case. In this aspect, migration affects the gap in wages, incomes, and living standards in a region. In turn, the influx of labour into a region contributes to a more efficient distribution of jobs, thereby creating competition in the labour market and stimulating aggregate demand in the region. It is, therefore, important to note that a state's ability to attract human capital will subsequently have a favourable impact on economic development. Better living and working conditions in a region attract more educated and skilled workers. Coniglio and Prota (2008) stress that the ability of a region to generate human capital is important. The high quality of life in the region is a factor that attracts skilled workforce.

Both economic well-being, measured in terms of per capita income, and subjective well-being – assessed in terms of life satisfaction and measured not only by economic indicators but also by cultural, environmental, and institutional ones – are important for the efficient allocation of human resources. Infrastructure, wages, the environment, climate, the availability of social and recreational facilities, and many other factors matter in the distribution of human resources across countries and regions. For example, the spread of digital technology improves the quality of life of people in the region. Therefore, scholars focus on the issues of spatial distribution of the labour force. For example, Koisova et al. carried out an assessment of the human resource potential of the V4 regions of the Czech Republic. The results show that the best conditions for realising the potential of human

resources are observed in megacities that attract a highly skilled workforce. However, it should be noted that there are also some disparities in the distribution of human resources within regional boundaries. Human capital is predominantly accumulated in cities. Sanromá and Ramos (2007) note that there is a positive relationship between human capital and productivity in Spanish regions. The externalities of human capital are more intense within cities. Rafaj (2020) points out that cities play an important role in regional economic development. In doing so, the analysis showed that human capital has the greatest impact on GDP in Slovak urban areas. Thus, there is a tendency for the accumulation of human capital in urban agglomerations.

A high level of human capital ultimately contributes to the region's competitiveness. Merło and Bogdański (2018), in analysing the competitiveness of European regions, determined that higher levels of human capital are usually accompanied by higher levels of competitiveness. The highest level of competitiveness is observed in regions with the highest quality of human capital and *vice versa*. Infrastructure is also important for ensuring the quality of human capital. Pavel and Jucu (2018) emphasise that human resources are an important element of regional development. Also, human resources can enhance the value of a country's national brand. A correlation was found between the Brand Strength Index and the Human Development Index (for the sample of the world as a whole), but the relationship is uneven and can range from negative to positive across country groups (Stryzhak et al., 2021).

Balanced economic development is an objective of public policy and implies ensuring security, prosperity, economic freedom, infrastructure, and a business-friendly environment in any country. The level of investment attractiveness also contributes to an effective distribution of jobs. The movement of labour between countries and regions is determined by both economic and non-economic factors. The labour market situation, and, in particular, the unemployment rate, affects the level of income and well-being of a country's citizens. In this context, the purpose of this article is to determine the features of the relationship between economic development, expressed by subjective and objective measures, and human capital by groups of countries regionally and globally.

The study uses methods of descriptive statistics, correlation analysis, cluster analysis, and the graphical method, applying the software package Statistica to achieve the goal.

Pearson correlation was used primarily for preliminary analysis, but also to graphically show the relationship between the analysed indicators and to determine the distribution of the indicators in space.

The Spearman and Kendall tau correlation coefficients were calculated for groups with a small number of analysed variables. In this case, the calculation of two coefficients was used to compare the results of the analysis.

Results

The article examines the features of the relationship between economic development and human capital across regions and the world as a whole. The Human Capital Index (HCI) is used to display the level of human capital in the paper.

The HCI quantifies the contribution of health and education to the productivity of the next generation of employees. The HCI combines indicators for aspects of human capital such as health and the quantity and quality of schooling. The HCI currently covers 98% of the world's population.

GDP per capita and the Happiness Rating (HR) were used as indicators of economic well-being. The World Happiness Ranking is based on data from the Gallup World Life Assessment Survey and has been published annually for the past 10 years in the World Happiness Report. The Happiness Rating is based on three measures of well-being: the quality of life assessment, positive emotions, and negative emotions.

The choice of these indicators is due to the fact that GDP per capita reflects the objective economic aspect of society development, while the Happiness Ranking reflects the subjective satisfaction of the country's residents with their lives. For example, Lepeley (2017) also notes the limitations of GDP as a universal measure of well-being, suggesting that it should be complemented by Gross National Happiness.

A feature of the approach implemented in the study is the use of such a subjective indicator of well-being as a happiness rating. Most previous research was based on the use of economic development indicators only.

However, the purely economic aspect of development, measured in per capita income indicators, does not reflect the real well-being of a country's citizens, as GDP can be allocated for different purposes, including militarisation. In the case of a highly militarised economy (such as in Russia at present), high GDP indicators do not guarantee an increase in the welfare of a country's citizens and cannot be an objective indicator of development.

The initial stage of the study is to analyse the dependence between variables by regions and the world. For the distribution of countries by regions, we used the World Bank's approach, according to which all countries of the world form seven geographical regions. The panel sample includes 140 countries for which comparable data is available for 2020 (i.e. all three analysed indicators are represented in the sample). Table 1 shows descriptive statistics by groups.

Table 1. Descriptive statistics

Variable	Mean	Standard Deviation	Min	Max
South Asia (6 cases)				
Afghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka				
RH	4.27	1.08	2.40	5.38
HCI	0.48	0.07	0.40	0.60
GDP per capita (current US$)	1820.20	1103.67	516.75	3694.04
Europe & Central Asia (48 cases)				
Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Luxembourg, Moldova, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, the Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, the United Kingdom, Uzbekistan				
RH	6.30	0.79	4.74	7.80
HCI	0.69	0.08	0.50	0.80
GDP per capita (current US$)	26475.57	26064.19	852.83	116356.20
Middle East & North Africa (16 cases)				
Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Malta, Morocco, Palestinian Territories, Saudi Arabia, Tunisia, the United Arab Emirates, Yemen				
RH	5.27	1.21	2.96	7.36
HCI	0.56	0.10	0.37	0.73
GDP per capita (current US$)	12978.30	14070.33	631.68	44177.57
East Asia & Pacific (16 cases)				
Australia, Cambodia, China, Hong Kong, Indonesia, Japan, South Korea, Lao PDR, Malaysia, Mongolia, Myanmar, New Zealand, Philippines, Singapore, Thailand, Vietnam				
RH	5.75	0.76	4.39	7.20
HCI	0.66	0.14	0.46	0.88
GDP per capita (current US$)	19998.05	21200.18	1450.66	60729.45
Sub-Saharan Africa (35 cases)				
Benin, Botswana, Burkina Faso, Cameroon, Chad, Comoros, Congo, Cote d'Ivoire, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia, Zimbabwe				
RH	4.48	0.67	3.00	6.07
HCI	0.40	0.06	0.30	0.62
GDP per capita (current US$)	1948.48	2004.14	448.84	8632.75

Table 1. – cont.

Variable	Mean	Standard Deviation	Min	Max
Latin America & Caribbean (17 cases)				
Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay				
RH	6.03	0.32	5.53	6.58
HCI	0.56	0.06	0.46	0.65
GDP per capita (current US$)	7285.24	3940.83	1900.04	15418.82
North America (2 cases)				
Canada, United States				
RH	7.00	0.03	6.98	7.03
HCI	0.75	0.07	0.70	0.80
GDP per capita (current US$)	53142.97	13979.09	43258.26	63027.68
Sample (140 cases)				
RH	5.55	1.11	2.40	7.80
HCI	0.58	0.14	0.30	0.90
GDP per capita (current US$)	15055.02	20765.64	448.84	116356.20

Source: Own elaboration.

An analysis of the data in the table shows that the GDP indicator in the Europe & Central Asia group has the greatest variation, which is due to the large size of this group of countries, as well as the significant uneven economic development of the countries in this group. At the same time, the gap between the other indicators is insignificant. The GDP gap is the smallest in Sub-Saharan Africa, but this group also has the lowest values for this indicator.

The HCI discrepancies are smallest in Sub-Saharan Africa and Latin America & Caribbean, but HCI values are also the lowest in these groups. At the same time, HCI discrepancies are the greatest in East Asia & Pacific, suggesting that human resource development in this geographic region of the world is uneven.

The Happiness Rating also varies by regions. The gap in the HR is the largest in Middle East & North Africa, which can be explained by significant differences in living standards and self-determination in this region. The gap in the HR is the smallest in North America, but this region is represented by only two countries that are close, both economically and socioculturally.

The next stage of the study focuses on a more detailed analysis of the relationships between the indicators by groups. Table 2 presents the results of the correlation analysis.

Table 2. The results of correlation analysis by the countries groups

Variable	HCI		
	Pearson Correlations	Spearman Rank Order Correlations	Kendall Tau Correlations
South Asia (6 cases)			
RH	-*	0.37	0.33
GDP per capita (current US$)	-*	0.60	0.47
Europe & Central Asia (48 cases)			
RH	0.73	0.73	0.54
GDP per capita (current US$)	0.65	0.85	0.65
Middle East & North Africa (16 cases)			
RH	-*	0.69	0.53
GDP per capita (current US$)	-*	0.62	0.47

Table 2. – cont.

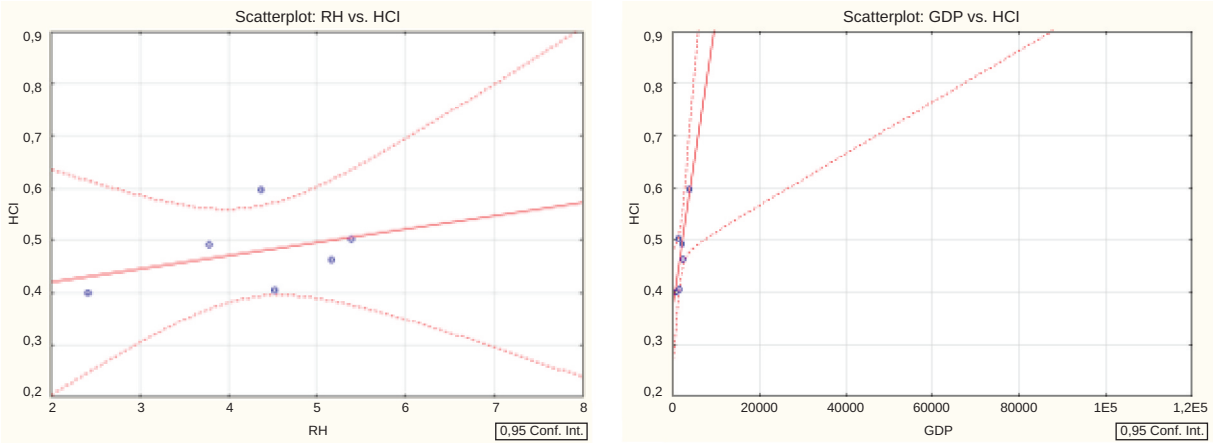
Variable	HCI		
	Pearson Correlations	**Spearman Rank Order Correlations**	**Kendall Tau Correlations**
East Asia & Pacific (16 cases)			
RH	-*	0.66	0.45
GDP per capita (current US$)	-*	0.89	0.73
Sub-Saharan Africa (35 cases)			
RH	0.20	0.07	0.04
GDP per capita (current US$)	0.61	0.54	0.38
Latin America & Caribbean (17 cases)			
RH	-*	0.04	0.03
GDP per capita (current US$)	-*	0.55	0.24
North America (2 cases)			
RH	-**	-**	-**
GDP per capita (current US$)	-**	-**	-**
Sample (140 cases)			
RH	0.78	0.80	0.59
GDP per capita(current US$)	0.72	0.89	0.71

Note: Significant correlations are highlighted in red. Marked correlations are significant at p < 0.05 (Casewise deletion of missing data)
* – this type of correlation is not used when the sample size is N<30
** – insufficient sample size for analysis
Source: Own elaboration.

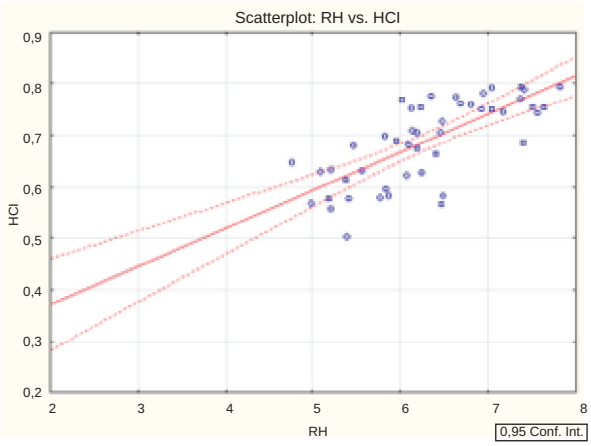
Table 2 shows that the relationship between the indicators is clear across the sample as a whole, but the link weakens across country groups. Based on this, it can be concluded that there are inter-regional differences in the analysed indicators. It should also be noted that there is no relationship between the level of human capital and happiness in South Asia, Sub-Saharan Africa, and Latin America & Caribbean (i.e. in regions represented by countries with a low level of all analysed indicators). This gives reason to conclude that people in countries, and therefore regions, with low level of economic development do not feel happy even when their level of knowledge and health status is improving. At the same time, in all regions, the relationship between the GDP and human capital development is stronger than the relationship between human capital development and happiness.

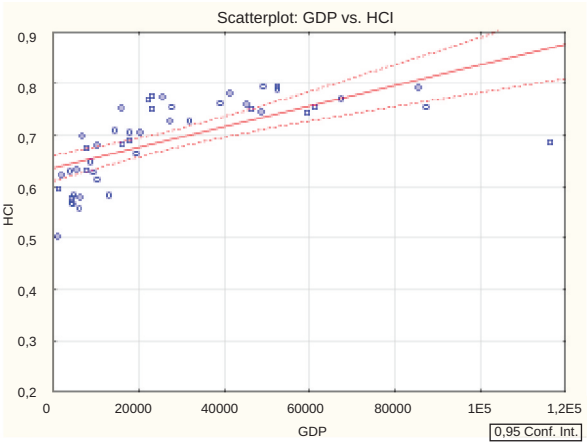
Figure 1 displays a visual representation of the distribution of the analysed indicators worldwide and by regions.

South Asia (6 cases)

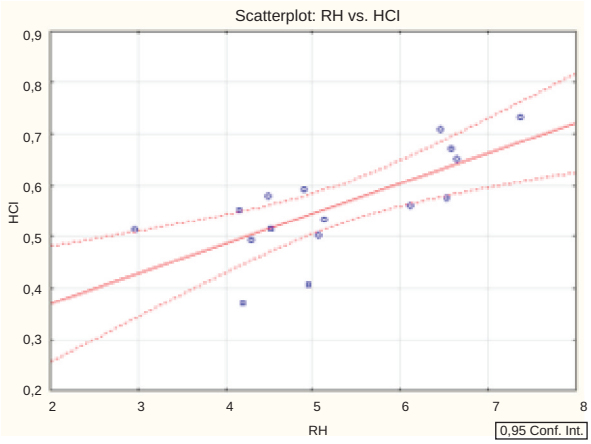


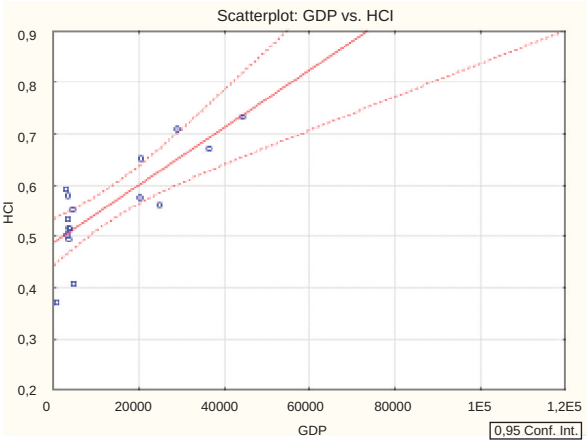
Europe & Central Asia (48 cases)



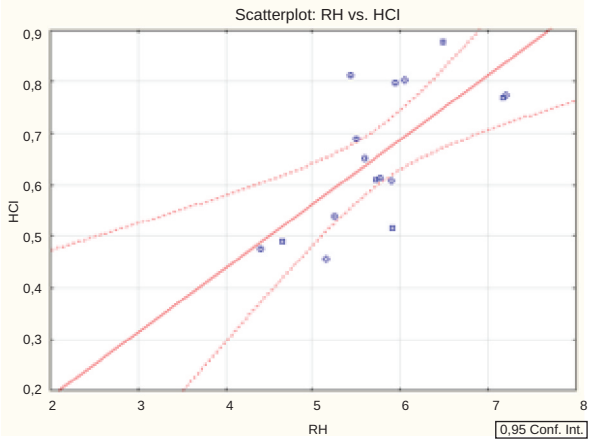


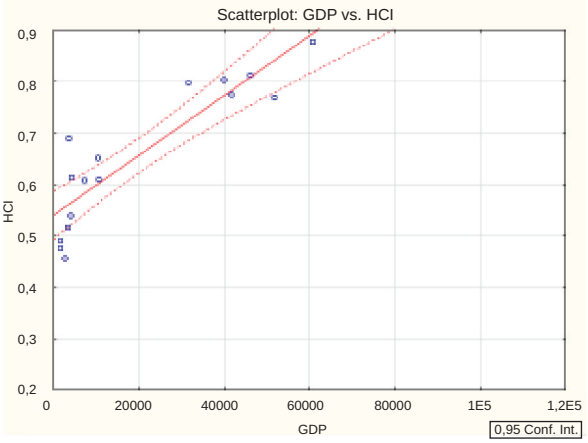
Middle East & North Africa (16 cases)



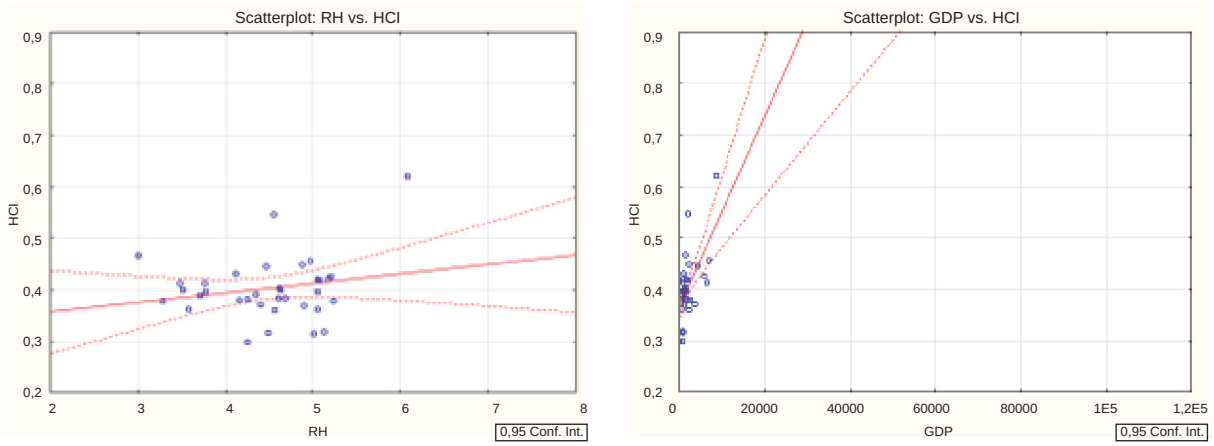


East Asia & Pacific (16 cases)

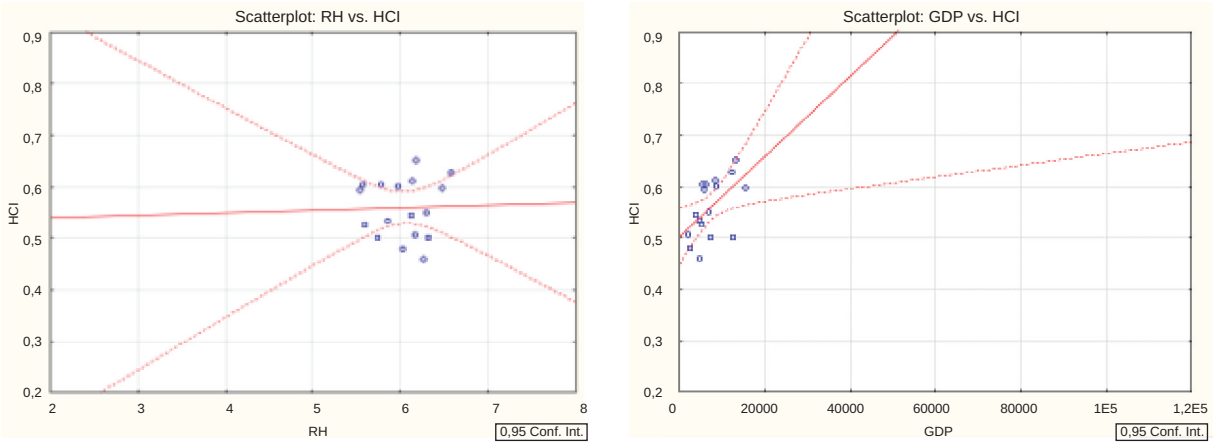




Sub-Saharan Africa (35 cases)



Latin America & Caribbean (17 cases)



North America (2 cases)

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Sample (140 cases)

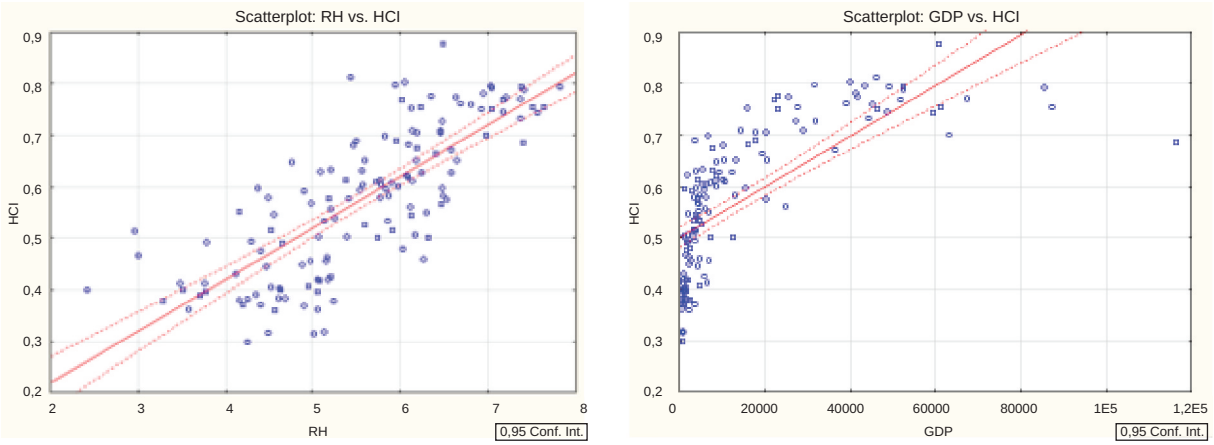


Figure 1. Spatial distribution diagrams of indicators by regions and the world as a whole

Note: GDP on the pics means GDP per capita (current US$)
Source: Own elaboration.

The visualisation of the relationship makes it possible to draw conclusions. A direct relationship between the HCI and the RH and an even distribution of these indicators in space is observed in the sample as a whole. Based on this fact, it can be concluded that investments in human capital,

which contribute to an increase in its level, ultimately lead to higher levels of happiness among a country's citizens. The graphs also point to uneven levels of human capital development and happiness across regions of the world.

The analysis of the distribution of GDP per capita and human capital development levels around the world as a whole shows that the level of the HCI, with almost the same level of GDP, is very different in many countries. That is, countries at the same income level invest differently in human resources. This gap is significant across countries and regions.

The next stage of the study consists of a more detailed analysis of the countries in the group with the highest values of the analysed indicators, in particular the countries of the European Union. The issue that needs to be addressed is whether the relationship between indicators is homogeneous or whether countries form separate groups. Cluster analysis was used to find a solution. The indicators had been standardised before the cluster analysis procedure.

Ward's method was used as a distribution method for the indicators, and Euclidean distance as a proximity measure. Figure 2 presents the results of the cluster analysis.

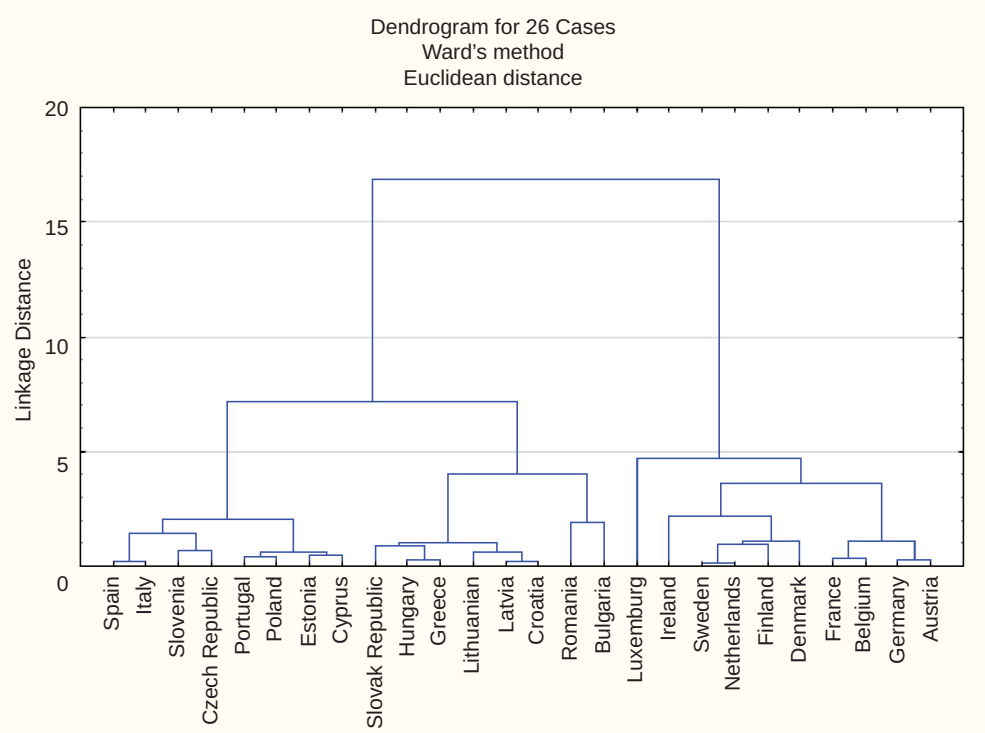


Figure 2. The distribution of countries by groups (standardised values)

Source: Own elaboration.

Figure 2 demonstrates that countries form three natural clusters. Table 3 displays descriptive statistics by clusters.

Table 3. Descriptive statistics

Variable	Mean	Standard Deviation	Min	Max
Cluster 1 (8 cases)				
Cyprus, the Czech Republic, Estonia, Italy, Poland, Portugal, Slovenia, Spain				
RH	6.40	0.29	6.02	6.92
HCI	0.75	0.02	0.73	0.78
GDP per capita (current US$)	24498.42	4750.82	15742.45	31834.97

Table 3. – cont.

Variable	Mean	Standard Deviation	Min	Max
Cluster 2 (8 cases)				
Bulgaria, Croatia, Greece, Hungary, Latvia, Lithuania, Romania, Slovakia				
RH	6.13	0.36	5.37	6.48
HCI	0.67	0.05	0.58	0.71
GDP per capita (current US$)	16011.78	3422.82	10079.20	20232.30
Cluster 3 (10 cases)				
Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, Sweden				
RH	7.24	0.36	6.69	7.80
HCI	0.76	0.03	0.69	0.80
GDP per capita (current US$)	59576.70	23650.85	39037.12	116356.20
Sample (26 cases)				
RH	6.64	0.59	5.37	7.80
HCI	0.73	0.05	0.58	0.80
GDP per capita (current US$)	35378.79	24557.98	10079.20	116356.20

Source: Own elaboration.

The information in Table 3 shows that the countries with the lowest values for all indicators form the second cluster, while the third cluster includes the countries with the highest indicators. At the same time, there is a relationship between the analysed indicators for the whole group, but there is no significant correlation in each cluster separately (Table 4). The lack of correlation between the indicators in each group can be explained by the small number of variables in each cluster. Therefore, several methods of calculating correlation coefficients (Spearman and Kendall), which are usually used for small sample sizes, were applied to verify the calculation results.

Table 4. Correlations between the HCI and RH and GDP per capita

Variable	HCI	
	Spearman Rank Order Correlations	**Kendall Tau Correlations**
Cluster 1 (8 cases)		
RH	-0.26	-0.14
GDP per capita (current US$)	-0.36	-0.29
Cluster 2 (8 cases)		
RH	-0.07	-0.07
GDP per capita (current US$)	0.43	0.29
Cluster 3 (10 cases)		
RH	0.21	0.11
GDP per capita (current US$)	-0.03	-0.11
Sample (26 cases)		
RH	0.48	0.35
GDP per capita (current US$)	0.60	0.43

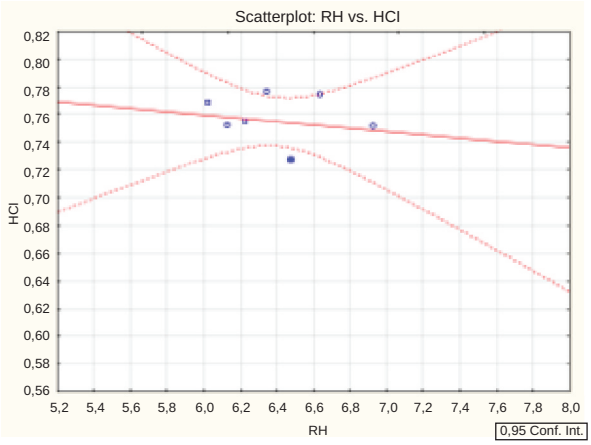
Note: Significant correlations are highlighted in red. Marked correlations are significant at $p < 0.05$ (Casewise deletion of missing data)
Source: Own elaboration.

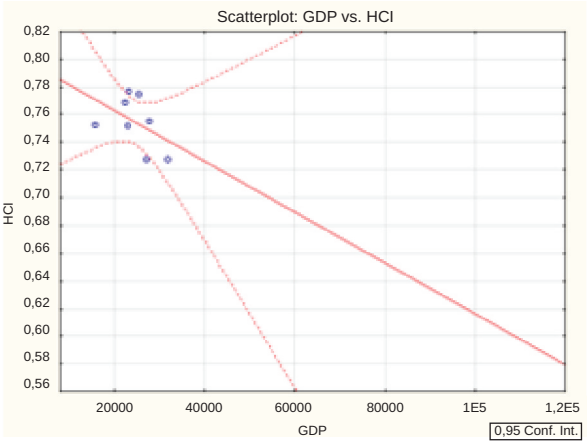
Figure 3 presents a graphical interpretation of the relationship between the analysed indicators.

The graphs in Figure 3 illustrate a large spread of values in space, indicating an uneven level of indicators across the European Union. However, it should be noted that with increasing GDP per capita, the level of human capital development grows only up to a certain point. The relationship

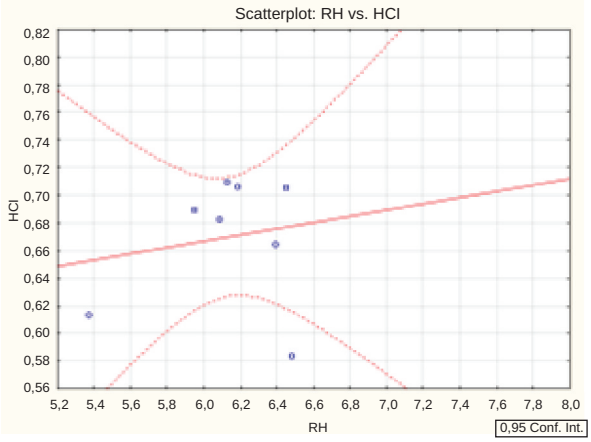
between GDP and human capital is negative in groups of countries with very high GDP per capita. Thus, GDP growth stimulates the development of human capital up to a certain level, while further growth in GDP is not accompanied by increase in human capital.

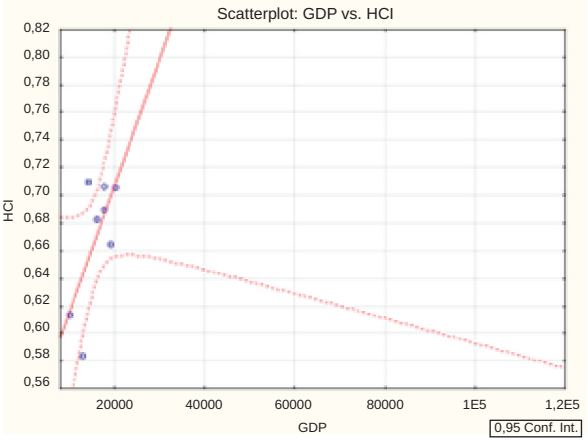
Cluster 1 (8 cases)



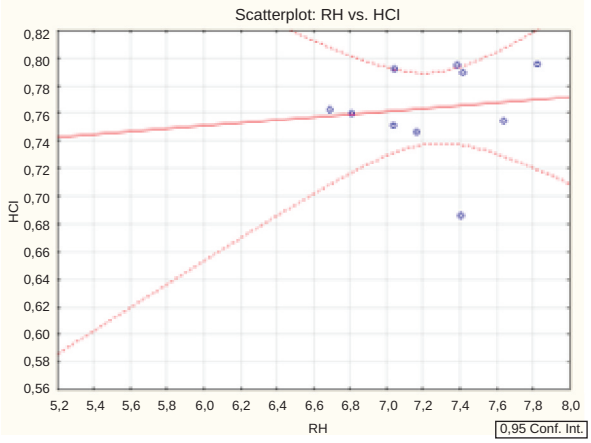


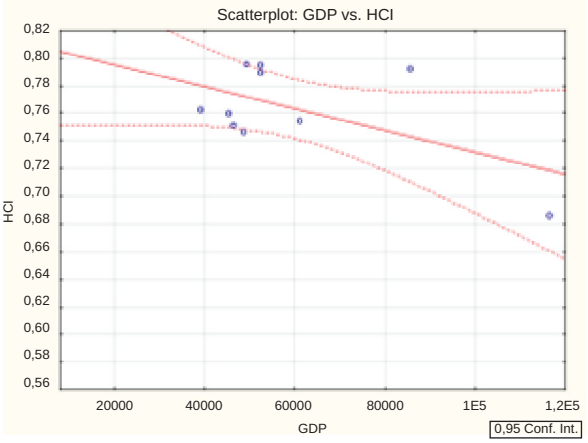
Cluster 2 (8 cases)





Cluster 3 (10 cases)





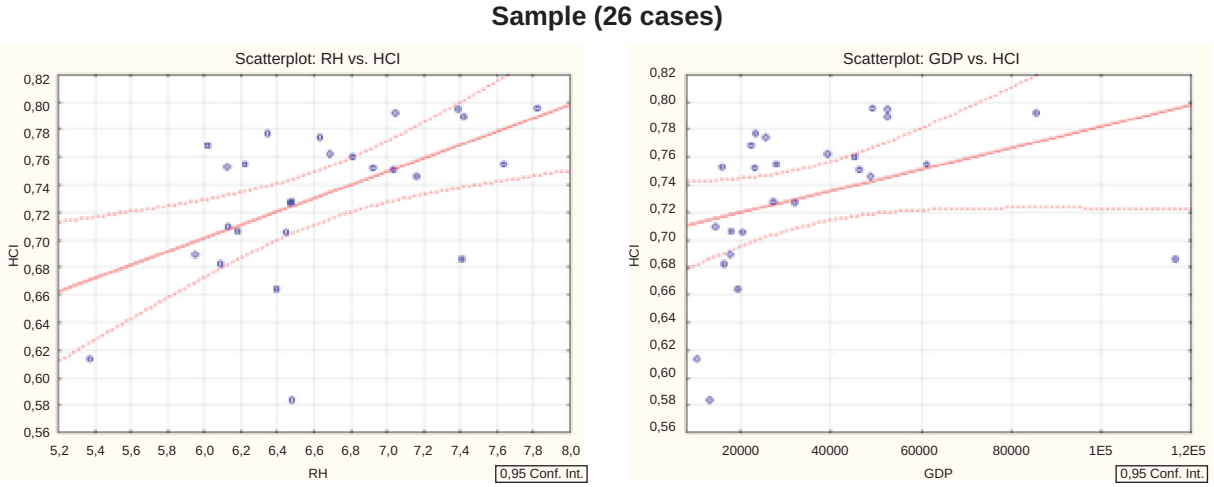


Figure 3. Spatial distribution diagrams of indicators for the European Union as a whole and the obtained clusters

Note: GDP on the pics means GDP per capita (current US$)
Source: Own elaboration.

Conclusions

Sustainable economic growth enables the country to invest in all areas. However, the directions of investment depend on government economic policy priorities. The volume and direction of such expenditures vary from country to country and from region to region. The analysis carried out in this paper showed that with the same level of income, the level of human capital development is different across countries and regions. Merło and Bogdański (2018) reached similar conclusions in their study. They found out that there are significant disparities in the spatial distribution of human capital in the regions of the European Union. Laskowska and Dańska-Borsiak (2016) determined that the amount of human capital has a positive impact on GDP per capita in the region. Moreover, this influence extends to neighbouring regions.

The results of our research also show that the level of human capital development is not always higher in countries with a higher level of GDP per capita. This means that investments in the human factor are determined not so much by income in the country as by the priorities of government economic policy. Consequently, a high level of human capital is achieved primarily by following a socially-oriented development vector. These findings are somewhat consistent with the conclusions of Diebolt and Hippe (2019), who accumulated that human capital is a factor explaining regional differences in economic development. Their research highlights the importance of human capital for economic development over the long term. A study in the historical context has shown that those regions that were better endowed with human capital in the past now have a higher level of GDP per capita. Positive externalities of human capital persist for a long time. Weckroth and Kemppainen (2016) also emphasise that value-based human capital has a positive and significant relationship with GDP in the region. Furthermore, social trust and subjective human capital positively and significantly correlate with regional GDP (Weckroth et al., 2015).

At the same time, the relationship between the HR and the HCI is directly positive, and this relationship is more even across regions. This suggests that a high level of human capital – represented by better education, health, and, correspondingly, higher standards of living – makes people happier.

The novelty of the study lies in the fact that it explores, by groups of countries in a geographical context, the relationship between the level of human capital development and the objective and subjective aspects of development, manifested respectively in GDP per capita and the happiness ranking.

Prospects for further research are to determine the direction of the causal relationship between human capital and GDP, which will enable the development of a theoretical basis for public economic policymaking. An important issue is to define which factors determine the spatial allocation

of human capital. It is also advisable to find out the prerequisites to the movement of skilled labour between countries and regions.

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