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Socio-Economic Determinants of Regional Development in the EU-25[1]

INTRODUCTION

The article attempts to assess the level of development of regions of the EU-25[2], separated according to the FADN methodology, which gives a division of the 122 research objects. Assessment will be made synthetically and on two levels – economic and social. In the analysis of factors influencing the different levels of regional development was used method involving the reduction of space by analyzing multitrait principal components, based on separation of regions (made in earlier studies) connected with the concentration of objects (regions) the most similar to each of the analyzed characteristics of the total (Ward's cluster analysis[3]). To the economic factors, which have influence on development level of regions were assigned material capital and innovation and technology; to the social factors – human and social capital. Each of the factors is the result of several other variables that describe it. Scientific problem presented in the article is used in the assessment instruments to identify the most important determinants of growth in isolated clusters of regions, which were made in the last part of the study.

THE ECONOMIC LEVEL OF REGIONAL DEVELOPMENT [MATUSZCZAK, 2010B]

Evaluation of the regions to the economic criterion was, as mentioned above, divided due to two factors. To the material capital were included:

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[2] It was used available statistical data of the Eurostat till 2007 (http://epp.eurostat. ec.europa.eu/ portal/page?_pageid=1996,39140985&_dad=portal&_schema=PORTAL&screen=detailref&language=en&product=REF_TB_regional&root=REF_TB_ regional/t_reg/t_reg_eco/tgs00026) 20.08.2009 r.

[3] In Ward's cluster analyses there were considered regional features connected with land, employment and capital factor (for years 2007–2009, from FADN) in an average agricultural farm in region. On this base there was made separating of 122 regions of the EU-25 into classes according to the method of agglomeration classification [Stanisz, 2007, s. 161]. The studies objects are arranged hierarchically and divided into five classes [Matuszczak, 2010a].

- the disposable income of households (in purchasing power parity based on the final consumption – this is an important feature due to the fact that the level of final consumption is closely linked to the level of final demand, and the last is correlated positively with the production capacity of the economy, including regional and produced added value),
- GDP growth in the region,
- structure of gross fixed assets (divided due to his involvement in the sector: services, industry, agriculture),
- the employment structure of the population (which includes the following occupational groups: farmers and fishermen, operating machinery and mechanics, artisans and merchants, vendors of goods and services, officials, technicians, skilled workers/professionals, judicial staff, officials and senior managers, military officers, unskilled workers; may also be the image of the region's economy).

Material capital component ($K_{material}$) shows a substantial relationship to different variables depending on examined cluster. In the first class high values of component correspond to German regions, which are characterized by relatively high proportion of farmers and fishermen and craftsmen, tradesmen and merchants in the structure of employment. At the same time there is a relatively high proportion of gross fixed asset employed in services. But the lowest values of $K_{material}$ correspond to the British, Dutch and French (the only in the class – Ile de France – FRA) regions. They are characterized by a relatively high proportion of civil servants in the employment structure, and at the same time unskilled workers.

In the second class high values of the $K_{material}$ component have regions: Czech Republic (CZE) and Franche-Comté (FRA), where there are relatively high proportion of fixed assets involved in the industry and high employment of craftsmen, tradesmen and merchants. Low values of the material capital component were noted in French regions: Corse (FRA), Languedoc-Roussillon (FRA) and Provence-Alpes-Côte (FRA). In the third class, the highest values of the $K_{material}$ component adopt regions that are characterized by relatively low participation of farmers, fishermen and unskilled workers in the employment structure, and the relatively low gross assets involved in the services sector. These are primarily two Hungarian regions: Közép-Dunántúl (HUN) and Eszak-Magyarország (HUN). Low values of the $K_{material}$ component characterize Mazowsze and Podlasie (POL), Małopolska and Pogórze (POL).

$K_{material}$ component in the fourth class is strongly correlated with the variables: the share of workers with primary education, the involvement of fixed assets in various sectors of the economy and an indicator of regional economic growth. Regions characterized by a low value of the $K_{material}$ component and low employment of basically educated and relatively high share of fixed assets in industry and agriculture, with relatively high GDP growth rate in the region are:

Lithuania (LTU), Estonia (EST), Latvia (LVA) Navarra (ESP) and La Rioja (ESP). The reverse phenomena are observed in the regions of: Alentejo e do Algarve (POR), Açores (POR), Cyprus (CYP) and Murcia (ESP). However, in the fifth class, high values of the $K_{material}$ component were characterized by regions where there is a relatively low proportion of farmers and workers with only basic education in the employment structure, and at the same time high of craftsmen, traders and retailer or senior managers, with a relatively high involvement of fixed assets in industry and relatively high disposable income. These included: Trentino (ITA), Friuli-Venezia (ITA) and Valle d'Aoste (ITA). The reverse phenomena took place in: Basilicata (ITA), Calabria (ITA), Sicilia (ITA) and Campania (ITA).

To the innovation and technology feature, we can assign the following characteristics:

- expenditure on research and development (measured by share of the GDP),
- employment in the sectors of high technology (in high-tech manufacturing industries and high-tech services),
- HRST (human resources in science and technology, understood as the share of professionally active persons aged 15–74 years who have either higher education – completed the third phase of training – or are employed in the position where such qualification is required; these people are perceived as creators of innovation and progress),
- number of people having access to the Internet at home (no doubt reflecting technological development of the region),
- the number of people who have never used a computer.

$I_{nnovations\ and\ technology}$ in the first class showed the highest association with the variables on the commonness of access to and use of computers and the Internet. The higher its value is in the Danish, Dutch, British and Finnish regions, the higher the commonness of access and use computers, which in this class of clusters is the case in the region of Danish and Dutch, and British and Finnish regions. The lowest value were recorded by regions: Slattbygdslan (SVE), Baden-Württemberg (DEU) and Île de France (FRA). In the second class of clusters stronger relationships $I_{nnovations\ and\ technology}$ component, we can find with the variables associated with the expenditure on research and development and with employment requiring appropriate qualifications in the sector of advanced technology. Low values of the variable, indicating a high level of innovation and technological advancement is observed in the regions of: Midi-Pyrénées (FRA) and Rhônes-Alpes (FRA). The highest ones in: Champagne-Ardenne (FRA), Corse (FRA), Nord-Pas-de-Calais (FRA) and Poitou-Charentes (FRA).

In the third class, $I_{nnovations\ and\ technology}$ component correlated most strongly with the variables: employment in the sectors of high technology and number of persons who never used a computer. The highest values of the component, describing low employment level and a relatively large number of people not using a computer concern primarily on the two Polish regions: Mazowsze and Podlasie (POL) and also Małopolska and Pogórze (POL). The opposite situation occurs in: Közép-Dunántúl (HUN) and Nyugat-Dunántúl (HUN). $I_{\text{nnovations and technology}}$ component of the fourth class builds primarily variables: HRST and commonness in the use of computers and the Internet. In regions where the indicators describing these phenomena are relatively high, the component take low values, which applies to regions: Pais Vasco (ESP), Navarra (ESP), Castilla-La Mancha (ESP), Luxembourg (LUX) and Estonia (EST). Low quality of innovational and technological development is manifested in Portuguese regions.

$I_{\text{nnovations and technology}}$ component in the fifth class of clusters strongly was correlated with all variables in question. Regions characterized by high development of technology and innovation primarily are: Lazio (ITA), Trentino (ITA) and Veneto (ITA). The low development is observed in the regions of: Calabria (ITA), Basilicata (ITA) and Sicilia (ITA).

SOCIAL DIVERSITY OF THE EU REGIONS

According to modern concepts of regional development to the most important determinants of socio-economic development include the quality of human resources. The factors that shape human capital we can include many features, but for the purposes of this study it was enumerated as follows:

- education (the higher educated residents, the greater their wealth and opportunities for growth and development of the country or region),
- number of students (measured in a population of people aged 20–24, may be regarded as a measure of regional potential, which will be the driving force for the economy for several years),
- number of primary care physicians (per correct number of residents),
- number of hospital beds (thing is very similar to the amount of primary care physicians),
- the number of road traffic victims,
- mortality rate (properly remeasured, it can be assumed that the higher the ratio, human capital subject to the higher drainage).

K_{human} component in first class form primarily two variables which are highly correlated with it: basic education and mortality rate. And so, when the low ratio of mortality is accompanied by a high share of only basically educated, it can be concluded that in the region we are dealing with a weak human capital. In the examined class this observation concerns mainly two regions: Cataluna (ESP) and Île de France (FRA). High values of the component apply to the following regions: Mecklenburg-Vorpommern (DEU), Austria (OST), Közép-Magyarország (HUN) and Sachsen-Anhalt (DEU).

In the second class K_{human} component consists of primarily two variables: the number of students in the young population and the share of higher educated, that high percentage gives high value of the component, which takes place in the regions of: Midi-Pyrénées (FRA), Rhônes-Alpes (FRA) and Provence-Alpes-Côte (FRA). Relatively the weakest human capital is characterized in regions of: the Czech Republic (CZE) and Picardie (FRA). In third class K_{human} component was correlated most strongly with three variables: number of students among young people and education (basic and higher). The highest quality of human capital, as reflected in the relatively high proportion of students in the population 20–24 years, or high proportion of higher-educated and low proportion with only primary education, takes place in the regions of Mazowsze and Podlasie (POL) and Małopolska and Pogórze (POL). The reverse phenomena take place in Hungarian regions: Közép-Dunántúl (HUN) and Nyugat-Dunántúl (HUN).

The value of K_{human} component in the fourth class consists primarily of variables concerning education and health issues. The highest quality of human capital was noted in regions where there is a relatively small percentage of people with only primary education, but high with a higher education, with simultaneously low mortality of inhabitants of the region and high availability of primary care physicians. This occurs in the regions of: Navarra (ESP), Aragón (ESP), Pais Vasco (ESP), Lithuania (LTU) and Estonia (EST). Low quality of human capital is characterized by Portuguese region and Malta (MLT).

In fifth class of the clusters K_{human} component has got the highest value in regions where relatively large proportion of young people studying, and simultaneously many people have a university degree, while a small percentage of have only basic education, what is taking place in: Lazio (ITA) and Emilia-Romagna (ITA). Low quality of human capital relates to the regions: Campania (ITA), Puglia (ITA), Calabria (ITA) and Sicilia (ITA).

The social factor is a relatively young category having an impact on regional development. In the literature it is assumed that it includes the norms, values, social activity and creates conditions for development of entrepreneurship (Churski, Perdał 2008/4, p. 21–32). Therefore, in its operationalization social capital is considered as a professional and social activity of people living in a region. Meanwhile, to this analysis it was assumed that creates it:

- employment (in the age group 15–64 years, and separately in the group 55–64 years);
- the level of unemployment and the chronically unemployed;
- the average number of inhabitants in a region and population density K_{social} component of the first class showed a significant association with unemployment and employment. It is clear, however, that the higher the level of unemployment, including chronic one, and simultaneously lower employment, social capital has a lower value, which relates to the following regions in Germany:

Thueringen (DEU), Sachsen-Anhalt (DEU), Brandenburg (DEU), Sachsen (DEU) and Mecklenburg-Vorpommern (DEU). Relatively the highest level of social capital is observed in the following regions: England-East (UKI), Scotland (UKI), Denmark (DAN), The Netherlands (NED) and England-West (UKI).

In third class K_{social} component is strongly correlated with four variables: unemployment, including chronic and the number and density of population in the region. The regions with high value of social capital, which means a relatively low unemployment rate, density and relatively low number of inhabitants, are mainly Hungarian regions. Low quality of social capital was noted in the region: Małopolska and Pogórze (POL) and Slovakia (SVK). Fourth-class social capital is, similarly to the first and second clusters, the strongest correlation with the rates of unemployment and employment. In this case low values of the K_{social} component means relatively low value of the total unemployment rate, as well as chronic unemployment, and simultaneously high employment. This applies to regions of Entre Douro e Minho/Beira litoral + Tras-os-Montes/Beira interior (POR), Alto Adige-(ITA), Cyprus (CYP) and Navarra (ESP). In fifth class of clusters, the highest quality of social capital can be found in the regions of: Trentino (ITA), Friuli-Venezia (ITA), Liguria (ITA) and Veneto (ITA). The lowest quality of social capital is characterized by: Basilicata (ITA), Campania (ITA), Sicilia (ITA) and Puglia (ITA).

In summary, we can conclude that under these clusters, we find regions where separate socio-economic factors have a strong high or low quality. Most often low quality of the economic features also goes hand in hand with poor quality of social features and vice versa. Nevertheless, we can find the regions (eg Polish ones), in which, despite the low level of economic development, a relatively large potential lies in human capital, which properly capitalized, could arouse the multiplier effects, favoring the general economic development of these regions. One can also observe regions (eg southern Italy) remaining on the edge of town development, where it is difficult to find any factor that might encourage them to grow.

CONCLUSIONS

At the end of reflection on the diversity of regions development in the EU-25, there should be made reference to the level of income available by residents of the region, which is a major hallmark of its wealth and opportunities. Hence, in assessing development diversification of agricultural regions, the level of the GDP per capita was dependent on the four highlighted above factors (main components)[4].

[4] The method of principal components analysis gives the possibility to create new variables (components), which can then be treated as independent variables explaining the variation in the

Table 1. Regression equations describing the impact of factors of socio-economic level of development of agricultural regions of the EU-25 ($p \leq 0,05$)

class	Equation	coefficient of determination R^2
1	$PKB_{\text{per capita}} = 24\,906,3 - 3277,5 \cdot K_{\text{ludzki}}$	$R^2 = 36\%$
2	$PKB_{\text{per capita}} = 20\,893 + 959 \cdot K_{\text{ludzki}}$	$R^2 = 30\%$
3	$PKB_{\text{per capita}} = 10\,852 - 1875 \cdot K_{\text{materialny}} - 2864,4 \cdot I_{\text{nnowacje i technologie}} + 1286 \cdot K_{\text{ludzki}}$	$R^2 = 94\%$
4	$PKB_{\text{per capita}} = 20\,832 + 3476 \cdot K_{\text{materialny}} - 5370 \cdot I_{\text{nnowacje i technologie}}$	$R^2 = 35\%$
5	$PKB_{\text{per capita}} = 22\,102 - 2722 \cdot I_{\text{nnowacje i technologie}} + 2997 \cdot K_{\text{społeczny}}$	$R^2 = 93\%$

Source: own work based on.FADN and OECD statistics.

In searching of factors having the greatest impact were estimated multiple regression models (stepwise regression) for each class of regions (see tab.1).

As might be supposed, the most important factor enhancing GDP growth in most regions of "the old" EU (French, German, British, Swedish, Finnish and Belgian, Danish, Austrian, Dutch, Irish regions) is human capital. This corresponds with the latest theories, where the most important factor of economic growth is just the human capital. Its high quality coupled with financial capital determines innovation of the economy, and is conducive to increasing wealth of the inhabitants.

A model referring to the regions: Polish, Hungarian, Slovak and Czech, describing almost perfectly dependence of the level of development on the level of human capital, material capital and economic innovation is also very interesting. Similar, high measure of goodness of fit of the model is characterized by the Italian regions, where the degree of regional development depends primarily on the level of innovation and social capital. This may be due to the fact that the values of variables included in these two traits may show the greatest differentiation in the examined cluster.

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dependent variable. This is useful when independent variables taken into the analysis are highly correlated with each other, or the number of these variables is equal to or exceeds the number of test cases and calls for their reduction [Stanisz, 2007, p. 204–205]. A similar analysis conducted P. Churski, R. Perdał examining the impact of the extracted principal components on the level of GDP per capita in the region [Churski, Perdał, 2008, p. 28].

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Summary

This article attempts to assess the level of development of 122 regions of the EU-25, separated in accordance with the methodology FADN. There was made an assessment on the economic and social progress and using the regression model influencing the level of development, measured in terms of income per capita in the region. In the analysis of factors influencing the different levels of regional development method was used based on the reduction of space by analyzing multitrait principal components.

Społeczno-ekonomiczne determinanty rozwoju regionów UE-25

Streszczenie

W artykule podjęto próbę oceny poziomu rozwoju 122 regionów UE-25, wydzielonych zgodnie z metodologią FADN. Dokonano oceny na płaszczyźnie ekonomicznej i społecznej oraz posługując się modelem regresji wskazano na czynniki mające wpływ na poziom rozwoju, mierzony wielkością dochodu przypadającego na mieszkańca regionu. W analizie czynników wpływających na zróżnicowany poziom rozwoju regionalnego posłużono się metodą opartą na redukcji przestrzeni wielocechowej poprzez analizę głównych składowych. Wszystko to posłużyło rozwiązaniu problemu naukowego polegającego na wykorzystaniu zawartych w nim instrumentów oceny do wskazania najważniejszych determinant rozwoju w wyodrębnionych skupieniach regionów.