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Change in the level of socio-economic development in Poland in the subregional dimension[2]

Introduction

An assessment of the level of the socio-economic development, including any changes, is a highly important research problem in terms of both economic theory and practice. The extent of EU fund allocation in the respective regions depends on the level of development, as well as the intensity of state aid made available in the respective regions (Spychała, 2017; Martin, 2020; Hall, 2012). A research program was initiated on the significance of the process of socio-economic development, its core, its causes and consequences, with the latter constituting the subject of many scientific compilations (Stiglitz, 2004; Grosse, 2004; Kozarova, 2013; Iyer, Kitson, Toh, 2005; Churski, 2008). A characteristic of regional development is its spatial variation. The increasing disparities in regional development constitute a sensitive problem for the contemporary economy, while the main purpose of the EU cohesion policy is convergence, i.e. activities geared towards decreasing the differences in the level of development throughout the EU (Sweet, 2012; Kološta, 2016; Krugman, 1991; Kehagia, 2013). The classification of EU regions is carried out solely on the basis of the GDP per capita of a particular NUTS-2 region and by means of comparing its value against the background of the EU average. The purpose of the compilation is to specify the regional level of development, yet by taking into account a larger number of indicators than GDP per capita. This study was carried out in NUTS-3 lower level subregional units for more details.

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In a compilation, the level of the socioeconomic development is presented based on 60 indicators categorized within the four constituents (factors) of regional development: material capital, human capital, natural environment, and both innovativeness and entrepreneurship (analysed together). The main assumption of the article is to present the variation in the level of socio-economic development in Poland in terms of the arrangement of subregions, that is, the third level of classification of territorial units for statistical purposes used by Eurostat ("NUTS-3"). The level of socio-economic development is presented based on a synthetic gap representing the taxonomic distance of each subregion from the established pattern of development.

In the article, a hypothesis was tested according to which the socioeconomic development of the subregions in Poland is highly varied, with its highest level registered in the largest regional cities: Warsaw, Cracow, Wrocław and Poznań, and its lowest in the subregions distant from these major cities constituting the centers of development. All NUTS-3 subregions in Poland were included in the research – 73 units in total. Statistical data on the level of subregion development have been retrieved from the Local Data Bank of the Statistics Poland.

The first part of the study discusses the four stages of the research procedure. The results from this were categorized in the form of charts and presented in the form of choropleth maps representing spatial differentiation of the level of socio-economic development of the NUTS-3 subregions. The final part of the study presents the initial conclusions based on the research work regarding the respective growth constituents, as well as the characterization of the general levels of socioeconomic development in the NUTS-3 subregions.

STAGES OF THE RESEARCH PROCEDURE

In order to specify the level of socio-economic development of the NUTS-3 units, a synthetic gap of the distance from the role model was used. Parallel examinations were carried out in the static dimension (based on the values of indicators from 2019) and the dynamic dimension (based on the changes in the gaps values in the years of 2010–2019). The research work consisted of four stages:

1. adjustment of variables – by constructing a geographical information matrix,
2. reduction of the free space,
3. indication of the level of socioeconomic development,
4. classification of the subregions based on the scale of socio-economic development.

A matrix of geographical information was first created, based on 60 indicators (Table 1), which defined the level of development of NUTS-3 units in 2019 as

well as changes in the years 2010–2019 in relation to material capital, human capital, natural environment, and both innovativeness and entrepreneurship (the latter two considered together). Based on a review of the literature comprising the concept of regional development, the most important subcomponents, i.e., the factors of regional development, were specified. A factor of development may be a component, a property of the region, or an occurrence which exerts an influence over the socio-economic development (Churski, 2008). In the subject literature, many reviews of theories and concepts of regional development have been compiled. Some of them undertook to systematize them from different perspectives (Grosse, 2004). A review of the concepts of regional development was made of the factors of development based on two main trends in economic thought: neoclassical (e.g. the concept of convergence as formulated by Jan Tinbergen, a new theory of growth, a new economic geography) and neokeynesian (e.g. the demand theories which have emerged related to the doctrine of John Maynard Keynes, theories of Austrian school). Consequently, Pearson's correlation coefficients were calculated separately between the baseline indicators for 2019 and for their change over the years 2010–2019. This is extremely important in order for the selected indicators used for the synthetic gap of distance from the pattern to be weakly correlated with each other. As a result, the information capacity of each of these variables differed (Dattorro, 2005).

Table 1. Indicators taken into account in the analysis specifying the constituents of regional development

Constituent of the development	Indicators
1	*2*
Material capital (18 variables)	Proportion of people using the gas network in the total number of inhabitants; proportion of people using a water sewage network in the total number of inhabitants; proportion of people using the sewage network in the total number of inhabitants; length of local roads and provincial roads per 100 km^2 ; length of bike routes per 10 000 inhabitants; length of bike routes per 100 km^2; road accidents per 100,000 inhabitants; fatalities per 100,000 inhabitants; number of people visiting per 10,000 inhabitants; book collection of state bookstores per 1000 inhabitants; number of doctors per 10,000 inhabitants; proportion of children under the age of three under the care of creches; proportion of children in kindergarten institutions; average usable area of 1 dwelling; average usable area of 1 dwelling or 1 person; number of dwellings per 1000 inhabitants; number of sports facilities per 10,000 inhabitants.

1	*2*
Human capital (17 variables)	Level of the registered unemployment rate; proportion of the unemployed with higher education to the number of the unemployed in total; proportion of the unemployed under the age of 25 to the number of the unemployed in total; balance sheet of migration per 1000 inhabitants; feminization coefficient in total; share of people of production age in the total number of people; proportion of people of post-production age in the total number of people; proportion of people of pre-production age in the total number of people; number of people of non-production age per 100 people of production age; number of people of post-production age per 100 people of pre-production age; number of students per 1000 inhabitants; passability of final exams in high schools in the general education profile; net scholarization coefficient for elementary schools; number of people regularly exercising per 1000 inhabitants; number of marriages entered into per 1000 inhabitants; number of divorces concluded per 1000 inhabitants.
Natural environment (10 variables)	Share of legally protected areas in the total area; share of people using the sewage systems in the total number of inhabitants; input directed towards the environmental protection per 1 inhabitant; input directed towards water management per 1 inhabitant; emission of particular pollutants per 1 km^2 of the area; water use per 1 inhabitant; electricity use per 1 inhabitant; share of parks, green spaces and residential estate green areas in the total space; number of tourists staying overnight per 1000 inhabitants; accommodation offered per 1000 inhabitants.
Innovativeness and entrepreneurship (15 variables)	Share of foreign entities in the total number of entities; share of private entities in the total number of entities; number of private individuals conducting an economic activity per 1,000 inhabitants; number of microentities per 1000 inhabitants; reports of inventions at the Polish Patent Office per 1 million inhabitants; patents accepted by the Polish Patent Office per 1 million inhabitants; share of entities conducting a service activity in the total number of economic entities; share of entities conducting educational activity in the total number of economic entities; share of entities conducting a financial activity in the total number of economic entities; share of newly registered entities of the creative sector in the number of newly registered entities in total; proportion of people working in the sales sector in the total number of the employed population; average monthly remuneration gross; average price per 1 m^2 of residential premises; GDP per 1 inhabitant; people injured in industrial accidents per 1000 inhabitants.

Source: own compilation based on the research conducted.

Pearson's correlation coefficients formed the basis for the reduction indeparture indicators using the Hellwig method, namely the seclusion of diagnostic features, that is, those variables that should be taken into account later in the procedure (Spychała, 2020b). In Hellwig's feature reduction method, the diagnostic feature is the indicator whose sum total of the absolute values of correlation coefficients with other variables is the highest. In the next step, those variables with the calculated correlation coefficients with the diagnostic feature higher than the critical value, established based on the formula below, were eliminated (Hellwig, 1990):

$$r^* = \sqrt{\frac{(t^*)^2}{n - 2 + (t^*)^2}}$$

where:
r^* – critical value of Pearson's linear correlation coefficient
t^*– value of the t-student statistic (at the relevance level of relevance of p=0.05)
n – number of departure indicators (variables)

As a result of the reduction conducted using the Hellwig method, any statistically relevant variables correlated with a diagnostic feature were eliminated. This reduction was repeated by obtaining new reduced correlation matrices, until a collection of indicators was exhausted or isolating features were secluded (Nowak, 1990). The reduction of variables procedure was conducted four times: separately for the level of development of each of the four capitals constituting the factors of the development.

In the next step, a pattern and an antipattern of regional development were indicated. Maximum standardized values of the respective diagnostic feature were considered to be the pattern (Hartigan, 1975). In the next stage, the taxonomic distance of each subregion based on the formula presented below was calculated (Spychała, 2020a):

$$d_{i0} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{0j})^2}$$

where:
d_{i0} – taxonomic distance of subregion i from the accepted pattern of development
z_{ij} – standardised value of the indicator (feature) j for subregion i
z_{0j} – standardised value of the indicator (feature) j for the development pattern

For the last stage in each NUTS-3 subregion, a synthetic gap was created, which was an indicator of the level of development of a particular subregion. The value of the synthetic gap was calculated for each of the four subcomponents of socioeconomic development, and the value of the gap for the general level of socioeconomic development was stated as the average of the value for each subcomponent. The synthetic gap was calculated based on the following pattern (Kordos, Paradysz, 1999):

$$v_i = 1 - \frac{d_{i0}}{d_0}$$

where:

v_i – synthetic gap of the level of development of a region

d_{i0} – taxonomic distance of the *i*-subregion from the accepted pattern of development

d_0 – taxonomic distance of the pattern and antipattern of development

The synthetic gap for the level of development assumed values from 0 to 1. The lower the value, the lower the level of development of the phenomenon under consideration. Based on the calculated indicators, a ranking of 73 NUTS-3 subregions in Poland was established, and subsequently divided into five groups: very high (20% of the subregions with the highest synthetic gap value – group 1 – placed 1–15 in the ranking), high (the next 20% of the subregions – group 2 – placed 16–30 in the ranking), average (group 3 – subregions placed 31–43 in the ranking), low (group 4 – subregions placed 44–58 in the ranking) and very low (20% of the subregions with the lowest value of synthetic gap – group 5 – placed 59–73 in the ranking). Taking into account the dynamic dimension, the subregions for which the indicator assumed the highest values (20% of the subregions) were classified as a group featuring a very large change in the level of development of the phenomenon, while the units for which the gap assumed the lowest values (20% of the subregions) were classified as a group featuring a relatively low change in the level of development of a particular phenomenon.

Table 2. Extreme values of the synthetic gap within the respective subcomponents of socio-economic development in 2019

Highest values of the synthetic indicator **(2019)**			Lowest values of the synthetic indicator **(2019)**		
No.	NUTS-3 subregion	v_i	No.	NUTS-3 subregion	v_i
Material capital					
1	Warsaw	0.563	73	Nowosądecki	0.261
2	Wrocław	0.499	72	Ełcki	0.263
3	Cracow	0.487	71	Radomski	0.270
4	Poznań	0.460	70	Ciechanowski	0.273
5	Katowicki	0.429	69	Nowotarski	0.274
Human capital					
1	Cracow	0.555	73	Łódź	0.224
2	Rzeszowski	0.552	72	Sosnowiecki	0.267
3	Wrocławski	0.552	71	Wałbrzyski	0.293
4	Krakowski	0.539	70	Szczecinecko-Pyrzycki	0.311
5	Warszawski Wschodni	0.526	69	Sandomiersko-Jędrzejowski	0.314
Natural environment					
1	Rybnicki	0.385	73	Radomski	0.143
2	Nowotarski	0.377	72	Sandomiersko-Jędrzejowski	0.163
3	Warsaw	0.371	71	Tarnowski	0.190
4	Koszaliński	0.357	70	Chełmsko-Zamojski	0.191
5	Gdański	0.342	69	Ostrołęcki	0.192
Innovativeness and entrepreneurship					
1	Warsaw	0.691	73	Świecki	0.159
2	Cracow	0.651	72	Chojnicki	0.163
3	Poznań	0.610	71	Krośnieński	0.172
4	Wrocław	0.578	70	Sandomiersko-Jędrzejowski	0.174
5	Trójmiejski	0.562	69	Nowosądecki	0.178
Level of socioeconomic development					
1	Warsaw	0.522	73	Sandomiersko-Jędrzejowski	0.237
2	Cracow	0.501	72	Szczecinecko-Pyrzycki	0.254
3	Wrocław	0.466	71	Chełmsko-Zamojski	0.259
4	Poznań	0.456	70	Radomski	0.261
5	Trójmiejski	0.435	69	Inowrocławski	0.265
6	Warszawski Zachodni	0.431	68	Puławski	0.270
7	Szczecin	0.395	67	Łomżyński	0.271
8	Rzeszowski	0.385	66	Świecki	0.271
9	Warszawski Wschodni	0.384	65	Grudziądzki	0.271
10	Bielski	0.378	64	Ełcki	0.273

Source: own compilation based on the research conducted.

Table 3. The highest and lowest values of the synthetic gap within the respective subcomponents of the socioeconomic level of development in the years 2010–2019

Highest values of the synthetic indicator (2010–2019 period)			Lowest values of the synthetic indicator (2010–2019 period)		
No.	NUTS-3 subregion	v_i	No.	NUTS-3 subregion	v_i
Material capital					
1	Warszawski Zachodni	0.460	73	Szczecin	0.271
2	Warszawski Wschodni	0.455	72	Nyski	0.292
3	Wrocławski	0.447	71	Inowrocławski	0.310
4	Lubelski	0.439	70	Szczecinecko-Pyrzycki	0.316
5	Krakowski	0.438	69	Szczeciński	0.316
Human capital					
1	Gdański	0.459	73	Szczecinecko-Pyrzycki	0.224
2	Krakowski	0.458	72	Koszaliński	0.265
3	Białostocki	0.443	71	Chełmsko-Zamojski	0.269
4	Warszawski Zachodni	0.443	70	Jeleniogórski	0.275
5	Trójmiejski	0.440	69	Bialski	0.281
Natural environment					
1	Warsaw	0.443	73	Wrocław	0.214
2	Nowotarski	0.438	72	Szczecin	0.265
3	Szczeciński	0.434	71	Kaliski	0.267
4	Cracow	0.423	70	Starogardzki	0.268
5	Gdański	0.421	69	Radomski	0.270
Innovativeness and entrepreneurship					
1	Warsaw	0.638	73	Wałbrzyski	0.221
2	Trójmiejski	0.560	72	Szczecinecko-Pyrzycki	0.278
3	Wrocław	0.559	71	Gorzowski	0.280
4	Warszawski Zachodni	0.537	70	Sosnowiecki	0.296
5	Cracow	0.528	69	Nyski	0.297
Level of socioeconomic development					
1	Warsaw	0.482	73	Szczecinecko-Pyrzycki	0.282
2	Cracow	0.455	72	Nyski (2006)	0.230
3	Trójmiejski	0.451	71	Wałbrzyski	0.310
4	Warszawski Zachodni	0.445	70	Inowrocławski	0.312
5	Krakowski	0.435	69	Chełmsko-Zamojski	0.316
6	Gdański	0.433	68	Sosnowiecki	0.322
7	Wrocławski	0.424	67	Krośnieński	0.324
8	Warszawski Wschodni	0.420	66	Jeleniogórski	0.326
9	Poznański	0.416	65	Świecki	0.327
10	Poznań	0.405	64	Gorzowski	0.328

Source: own compilation based on the research conducted.

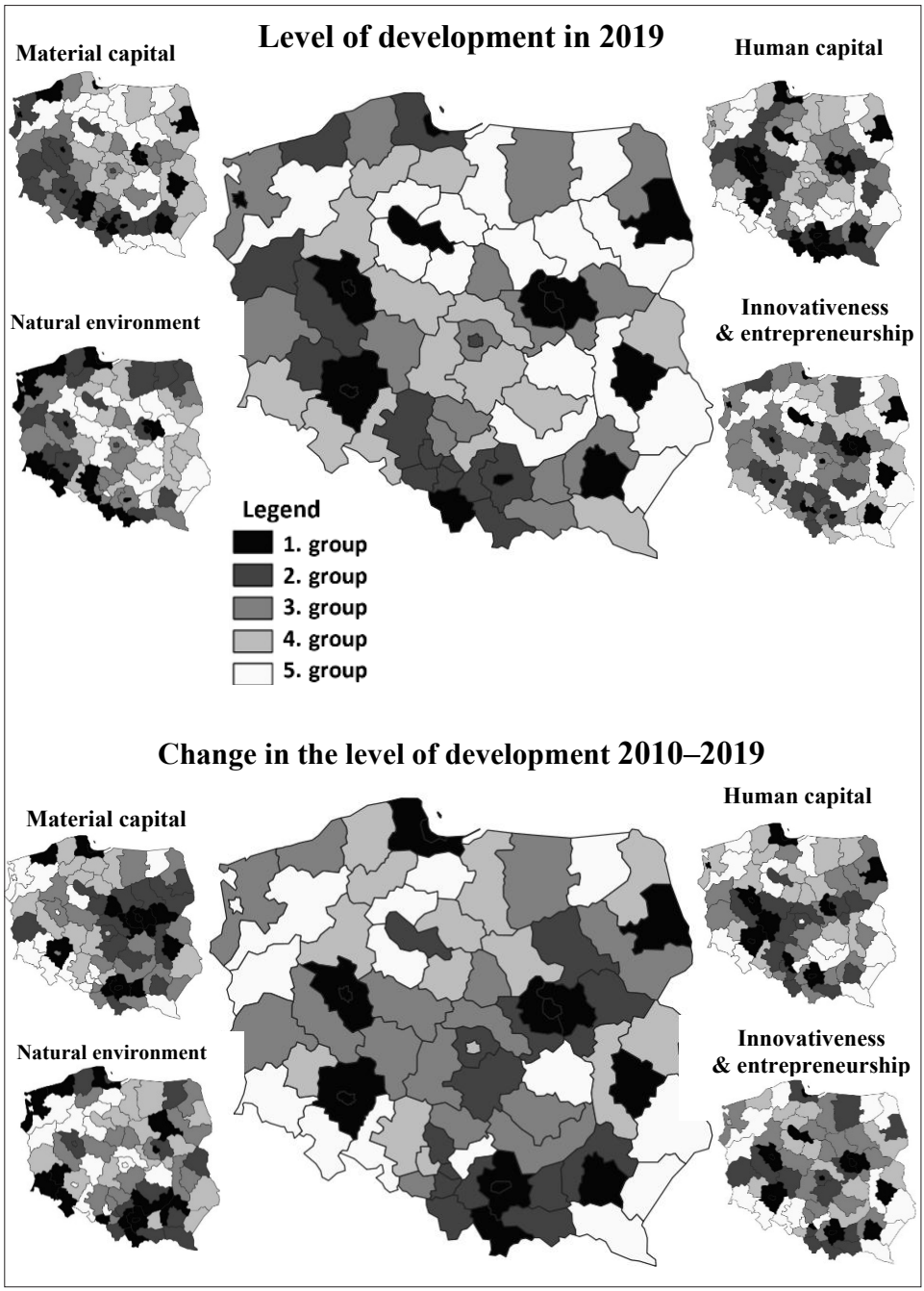

Figure 1. Variation in the level of socioeconomic development in the subregions of Poland

Source: own compilation based on the research conducted.

Figure 1 and Tables 2 and 3 present the results of the research work. Table 2 shows the NUTS-3 units with the highest and lowest synthetic gap values within the respective components of the socioeconomic development calculated separately for 2019. Table 3 shows the NUTS-3 subregions with extreme synthetic gap values calculated for changes in the years 2010–2019. Figure 1 contains choropleths exhibiting spatial differentiation in the level of socioeconomic development of NUTS-3 subregions in Poland for 2019, as well as changes in the level of development for the years 2010–2019.

Conclusions based on research conducted on the respective factors of development

Spatial differentiation of the 73 subregions of the NUTS-3 level in Poland has been presented, based on the level of socioeconomic development and the four major cities, as constituting the factors of development (Figure 1). The value of the synthetic gap representing the level of socioeconomic development in 2019 ranged from 0.24 to 0.52 (Table 2). The value of the gap that represents the change in the level of socioeconomic development of the subregions in the years 2010–2019 ranged from 0.28 to 0.48 (Table 3). A similar differentiation was observed in the case of material capital (0.26–0.56 for 2019 and 0.27–0.46 for the period 2010–2019), human capital (0.22–0.56 and 0.22–0.46, respectively), natural environment (0.14–0.39 and 0.21–0.44, respectively) and both innovativeness and entrepreneurship (0.16–0.69 and 0.22–0.64, respectively).

Based on the level of development of material capital, the highest value of the synthetic gap in 2019 occurred for the NUTS-3 units that comprise the major cities: Warsaw, Wrocław, Cracow and Poznań, and the lowest for the subregions: Nowosądecki, Ełcki, Radomski, and Ciechanowski. The decisive elements in shaping a high position for a NUTS-3 unit were the length of roads and bike routes per 100 km^2, very well-developed technical network infrastructure, average usable area of a dwelling per person, as well as the accessibility of creches and kindergartens. The decisive elements in shaping a low position were the following: low proportion of children under the age of three in the care of creches, inadequacies in the development of the technical network infrastructure, and low level of healthcare. From another angle, related to the analysis of the dynamic dimension, the greatest changes in the level of development of material capital in the years 2010–2019 were observed in the Warszawski Zachodni, Warszawski Wschodni and Wrocławski subregions, whereas the lowest in Szczecin and the Nyski and Inowrocławski subregions. The decisive factors in terms of the high positions in the ranking of the NUTS-3 units were: improvement in the state of the network and road infrastructures, decrease in the number of road accidents, and

child care by kindergartens and creches. The decisive factors in terms of the low positions in the ranking were the lack of improvement in access to doctors and the lack of development of the technical infrastructure.

Taking into account the level of human capital development, the highest synthetic gap value was observed in 2019 for Cracow as well as for the Rzeszowski and Wroclaw subregions, while the lowest was observed for Łódź and for the Sosnowiecki and Wałbrzyski subregions. The high position for the units was due to: proportion of students per 1000 inhabitants, low level of unemployment, and high level of the passability of final school exams. The low position for the units was due to very high share of people of post-production age in the total population (29% in Łódź, and 26% in the Sosnowiecki subregion) and a relatively high proportion of the unemployed with higher education in the total population. Taking into account the analysis in the dynamic dimension, the largest change in the level of human capital development in the years 2010–2019 was observed in the Gdański, Krakowski and Białostocki subregions, and the lowest in the Szczecinecko-Pyrzycki, Koszaliński and Chełmsko-Zamojski subregions. What played a decisive role in the establishment of a weaker position in the NUTS-3 units in terms of the change in the development of human capital were: increase in the share of the unemployed with higher education in the total number of the unemployed, decrease in the passability of final school exams and increase in the indicator of age dependency. A high position in the ranking of the subregions was shaped by: high positive balance of migration, high increase in the passability of final school exams, increase in the share of people doing physical activity, and relatively high decrease in the share of the unemployed under the age of 25 in the total number of the unemployed.

For the state of the natural environment, the highest value of the synthetic gap in 2019 was registered in the Rybnicki and Nowotarski subregions as well as in Warsaw, and the lowest in the Radomski, Sandomiersko-Jędrzejowski and Tarnowski subregions. The high position of the NUTS-3 units was due to: the high input directed towards water management per inhabitant (the highest registered in the Rybnicki subregion was over four times higher than in the second subregion, the Wałbrzyski subregion) as well as the input directed towards environmental protection per inhabitant. A low position in the ranking of the subregions was due to: significant emission of particular pollutants and high water use (the highest was registered in the Sandomiersko-Jędrzejowski subregion). Taking into account the analysis carried out in the dynamic dimension, the greatest improvement in the condition of the natural environment in the years 2010–2019 was observed in Warsaw, as well as in the Nowotarski anSzczeciński subregions, and the lowest in Wrocław, Szczecin and the Kaliski subregion. A weaker position of the units was due to the highest increase in water and electricity per capita, as well as an increase in the emission of pollution. A stronger position of the units in the ranking

was due to a relatively high increase in the share of the entities of water sewage, as well as the highest increase in the input directed towards environmental protection in the researched period.

For the level of the development of innovativeness and entrepreneurship, the highest synthetic gap value in 2019 was registered in Warsaw, Cracow and Poznań (these cities had the highest share of entities conducting a financial activity in the total number of economic entities, the highest share of microentities per 1000 inhabitants, as well as the highest share of newly registered entities in the creative sector in the number of newly registered entities in total), and the lowest in the Świecki, Chojnicki and Krośnieński subregions (with the lowest number of microentities per 1000 inhabitants, as well as the lowest share of private entities in the total number of enterprises). For the analysis conducted in the dynamic dimension, the greatest progress in the level of development in innovativeness and entrepreneurship in the years 2010–2019 was observed in Warsaw, Wrocław and Trójmiasto, and the lowest in the Wałbrzyski, Szczecinecko-Pyrzycki, and Gorzowski subregions. The factors that were decisive in the case of the position of the NUTS-3 units in the dynamic dimension were: proportion of economic entities conducting a financial or educational activity in the total number of economic entities, share of entities conducting a service activity in the total number of economic entities as well as GDP per capita (for all three indicators the highest growth was registered in Warsaw), as well as registration of inventions at the Polish Patent Office per million inhabitants (the highest growth in Wrocław) as well as changes in the structure of the size of enterprises.

Concluding remarks – General level of socioeconomic development of the NUTS-3 subregions in Poland

In summarizing the research results on the level of socioeconomic development of the 73 NUTS-3 subregions in Poland, one may draw the following conclusions. The level of general development of the subregions in 2019 was stated based on 60 indicators subcategorised within four factors of development: material capital, human capital, natural environment, and innovative entrepreneurship.

The highest value of the synthetic gap was registered in major provincial cities: Warsaw, Cracow, Wrocław and Poznań as well as in the Trójmiejski subregion (comprising Gdańsk, Gdynia and Sopot). The hypothesis stated at the beginning of the article has been positively verified. Furthermore, among the 6 subregions being single cities (Warsaw, Cracow, Wrocław, Poznań, Szczecin and Łódź), 5 were classified as a group of units with a very high level of socioeconomic development (10% of the most developed regions). Łódź was classified in the 26th position for the ranking of the best-developed NUTS-3 units in Poland. For

the analysis conducted in the dynamic dimension, the highest change in the level of socio-economic development in the years 2010–2019 was observed in Warsaw, Cracow and Trójmiasto. Poznań and Wrocław were also high in the ranking (10th and 13th positions, respectively). Łódź, in turn, was placed in 45th position among the 73 subregions with the highest change in socioeconomic development in the years 2010–2019, with Szczecin in the 61st position. It is worth noting that the subregions with a very high level of socioeconomic development were, in principle, those units where the greatest change was recorded in the level of this development in the years 2010–2019 (and vice versa). Apart from the major cities, the group also included the subregions surrounding the capitals of voivodeships, such as: Gdański, Poznański, Wrocławski, Warszawski Wschodni, Warszawski Zachodni, Krakowski, Rzeszowski, and Bydgosko-Toruński. On the other hand, the subregions with the weakest level of socio-economic development were the NUTS-3 units located on the periphery of as well as far away from the strongest regions, e.g. the Sandomiersko-Jędrzejowski, Szczecinecko-Pyrzycki, Chełmsko-Zamojski, Radomski, and Inowrocławski subregions. One may thus conclude that to a large extent the activities taken within the last ten years played a major role in shaping the current level of development of the respective subregions in Poland, the latter period representing one of full participation in the EU cohesion policy, while increasing developmental disparities at the level of NUTS-3 units were observed, to the largest extent, where the level of socioeconomic development increased in the strongest subregions in economic terms (in Warsaw and in the capitals of the provinces), and to the least extent in the relatively lower developed subregions (e.g. those located on the northern, north-eastern and south-western border of Poland). Substantial developmental disparities can also be observed at the region level. Within almost all of them, there are subregions at a very high level of socioeconomic development, as well as those categorised in the group of the 20% least developed NUTS-3 units in Poland.

The research procedure was unique, as in the subject literature it is not possible to find a different compilation in which the level of regional development of the Polish regions was determined using the synthetic development gap created based on Hellwig's reduction method. The conclusions of other authors researching regional development who use different methods are, however, similar. They also specify the highest level of development occurring in the regional capitals, and the level thereof usually decreasing with increasing distance from the central units. Similarly, the analyses conducted by Eurostat based on GDP per capita, the richest regions include the capital units. The comparison mentioned above therefore confirms the correctness of the results obtained, irrespective of the method selected, and that the classification of a particular region into the group of better or worse developed regions was appropriate.

In considering the above-mentioned, the research process as well as the results may thus constitute both an impulse towards conducting deeper analyses in this direction, as well as being potential inspiration for those Polish organs within the scope of the manner of specifying the richest and the poorest regions with the purpose of securing the effective management of the cohesion policy in terms of spatial concentration.

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Summary

The compilation involved an analysis of the level of socioeconomic development at the NUTS-3 subregion level in Poland, based on 60 indicators classified within 4 subcomponents (factors) of regional development: material capital, human capital, natural environment and both innovativeness and entrepreneurship. The purpose of the article is to present the varied nature of the socio-economic level of development in Poland based on the NUTS-3 subregion concept. The level of socio-economic development, as well as the level of its shaping factors, is presented based on a synthetic gap exhibiting the taxonomic distance of a particular subregion in terms of the established pattern of development. The examination was carried out in the static dimension (based on the values of the indicators in 2019) as well as in parallel with the dynamic dimension (based on changes in the values of the gaps in the years 2010–2019). In the compilation, a hypothesis which was tested according to which the socio-economic development of the subregions in Poland is highly varied, and its highest level is registered in the largest provincial cities: Warsaw, Cracow, Wrocław and Poznań, and the lowest in the subregions far away from these major cities, which constitute the centers of development.

Keywords: synthetic gap, provinces, distance from the role model, Hellwig reduction.

Zmiany poziomu rozwoju społeczno-gospodarczego w Polsce w ujęciu subregionalnym

Streszczenie

W opracowaniu dokonano analizy poziomu rozwoju społeczno-gospodarczego subregionów (NUTS-3) w Polsce na podstawie 60 wskaźników ujętych w ramach czterech składowych (czynników) rozwoju regionalnego: kapitału materialnego, kapitału ludzkiego, środowiska naturalnego oraz innowacyjności i przedsiębiorczości. Celem artykułu jest określenie zróżnicowania poziomu rozwoju społeczno-gospodarczego Polski w układzie jednostek NUTS-3. Poziom rozwoju społeczno-gospodarczego, a także poziom rozwoju jego czynników przedstawiono na podstawie syntetycznego miernika ukazującego odległość taksonomiczną danego subregionu od ustalonego wzorca rozwoju. Badanie równolegle przeprowadzono w ujęciu statycznym (na podstawie wartości wskaźników w 2019 roku) oraz w ujęciu dynamicznym (na podstawie zmian wartości wskaźników w latach 2010–2019).

W opracowaniu weryfikacji poddano hipotezę, według której rozwój społeczno-gospodarczy subregionów w Polsce jest mocno zróżnicowany, a najwyższy jego poziom odnotowuje się w naj-

większych miastach wojewódzkich: Warszawie, Krakowie, Wrocławiu, czy Poznaniu, natomiast najniższy – w subregionach oddalonych od wskazanych dużych miast stanowiących centra rozwoju. Na podstawie przeprowadzonych badań można stwierdzić, iż – z jednej strony – o bieżącym poziomie rozwoju poszczególnych subregionów w Polsce w znacznej mierze decydują działania podejmowane w ostatnim dziesięcioleciu, czyli w okresie pełnego uczestnictwa w polityce spójności Unii Europejskiej, a z drugiej strony – obserwuje się coraz większe dysproporcje rozwojowe na poziomie jednostek NUTS-3, gdyż w największym stopniu zwiększył się poziom rozwoju społeczno-gospodarczego w najsilniejszych gospodarczo subregionach, a w najmniejszym stopniu – w relatywnie słabiej rozwiniętych subregionach (np. w tych, które położone są przy północnej, północno-wschodniej i południowo-zachodniej granicy Polski).

Słowa kluczowe: miernik syntetyczny, powiaty, odległość od wzorca, redukcja Hellwiga.

JEL: O11, O20, O47.