EVALUATION OF THE LEVEL OF SOCIO-ECONOMIC DEVELOPMENT IN THE COUNTIES OF WIELKOPOLSKA PROVINCE IN 2014

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INTRODUCTION

The processes of socio-economic development at the local level are determined primarily by the local governments, their main initiator. "Although local development depends to a large extent on macroeconomic conditions, it is accomplished mainly through stimulation applied by the local authorities; a number of steps are required to produce the desired process and phenomena" [Piasecki 2009, 323]. Therefore, the actions taken by the local government exert a significant influence on the standard of living, quality and capabilities to satisfy the needs of the inhabitants of the area, which was particularly influenced by the policy development put in place, as well as regulations concerning the entities functioning on the territory.

Local development is defined as "the complex of quality transformation of the local territorial structure in terms of the standard of living of its members and the conditions for the functioning of related business entities" [Sobczyk 2010, 127], it concerns changes occurring at the local level (community, county), while regional development is related to the transformations at the regional level. "An important element of the management of the local development is socio-economic and spatial planning. The methods and models are different, but generally this process precedes the assessment of the geographical situation of a territorial entity, economic structure, demographic situation, labour market, technical and social infrastructure, environment, resources and leading areas of development" [Piasecki 2009, 324].

The justification for undertaking research at LAU 1 was that it allows for the diagnosis of the socio-economic situation of a county of Wielkopolska Province in 2014, which in turn enables the development of the whole province to ve estimated, and each of the counties located there as well. The counties, though to a lesser extent than comminuties, influence local development, and even more so regional development.

AIMS AND METHOD

The main aim of the study was to assess the socio-economic development of the counties in Wielkopolska Province in 2014. The quantitative data were derived from the Local Data Bank of the Central Statistical Office [WWW 1], while qualitative data were taken from the subject literature. The specific aims concerned different aspects applied to assessing the level of the socio-economic development. The identification of the development in terms of environment, demographic, infrastructure, society, economic and finanances was carried out. Assessing the level of the socio-economic development required the use of a number of features to describe the counties under consideration.

Taxonomic methods comprise a set of methods for linear ordering of objects. They can be used to assess – among numerous other entities – the counties of Wielkopolska while taking into account a number of factors that influence them. To linearly sort the counties by socio-economic structure, a synthetic measure of the development was applied based on the method called TOPSIS, an acronym for Technique for Order of Preference by Similarity to Ideal Solution. TOPSIS is used to calculate the value of the synthetic measure and allows for the assessment of the socio-economic development of units (counties) described by certain criteria of assessment and metric and ordinal features. The construction of the synthetic feature was presented by prof. Zdzisław Hellwig, while the creators of TOPSIS are Lai Ching-Hwang and Yoon Kwangsu [Hwang and Yoon 1981].

Linear grouping methods are used to assess the objects described by a number of features, allowing for their arrangement them from "best" to "worst" on the basis of the adopted typological criterion. Due to a complex phenomenon, the objects tested can be assessed and ordered using a synthetic feature (synthetic measure of development), created as a function of actual directly measurable, but also ordinal simple features, defining the essential elements and linking the complex phenomenon [Wysocki 2010].

Simple features creating synthetic (aggregate) features, specifying the property directly immeasurable, can be defined as stimulants, destimulants and nominants. Stimulants are simple features, higher values of which are desirable and make it possible to qualify the entity as better from the point of view of the study being conducted. Stimulants are positively correlated with the synthetic feature. In the case of destimulants, lower values are more desirable and high values indicate the entity tested had a low position in the set. Destimulants are negatively correlated with the synthetic feature. Nominants are not significantly correlated with the synthetic feature. This feature takes the form of a stimulant to a certain point, called the nominal value, but subsequently has the character of a destimulant [Wysocki and Lira 2007, Wysocki 2010].

In the process of creating a synthetic measure of development based on TOPSIS involves the following stages [Wysocki 2010].

Stage 1. Creating a hierarchical structure of a multi-criteria problem for assessing the development level of units. This stage involves dividing the study problem into components, which is the main assessment and most important criterion (the level of socio-economic development), and the secondary criteria (aspects of development, natural, social, infrastructural or economic and financial conditions). By using the selected criteria, simple features are chosen to describe the analysed objects of the study [Łuczak and Wysocki 2005, Wysocki 2010]. Using substantive and statistical analysis, the features are selected. The values of simple features determined for each of the objects create a matrix of data:

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1K} \\ x_{21} & x_{22} & \cdots & x_{2K} \\ \cdots & \cdots & \cdots & \cdots \\ x_{N1} & x_{N2} & \cdots & x_{NK} \end{bmatrix}$$

where
x_{ik} – value of k-th feature (describing the level of socio-economic development) (k = 1, …, K) in i-th statistical unit (county) (i = 1, …, N).

Stage 2. Normalising the features' values. At this stage, the release of features from the titer and standardisation occur as numerical ranges. For this purpose, zero unitarisation, which is linear normalisation, can be applied. Destimulants and nominants are brought into the form of a stimulant, while at the same time their values are made comparable. This stage is as follows:

I.   For stimulants:

$$z_{ik} = \frac{x_{ik} - \min_{i} \{x_{ik}\}}{\max_{i} \{x_{ik}\} - \min_{i} \{x_{ik}\}}$$

II. For destimulants:

$$z_{ik} = \frac{\max_{i} \{x_{ik}\} - x_{ik}}{\max_{i} \{x_{ik}\} - \min_{i} \{x_{ik}\}}$$

III. For nominants:

$$z_{ik} = \frac{x_{ik} - \min_{i} \{x_{ik}\}}{\text{nom} \{x_{ik}\} - \min_{i} \{x_{ik}\}} \quad x_{ik} \le \text{nom}\{x_{ik}\}$$

$$z_{ik} = \frac{\max_{i} \{x_{ik}\} - x_{ik}}{\max_{i} \{x_{ik}\} - \text{nom} \{x_{ik}\}} \quad x_{ik} > \text{nom}\{x_{ik}\}$$

where:
x_{ik} is the value of k-th feature in i-th statistical unit, max $\{x_{ik}\}$, (min $\{x_{ik}\}$, nom $\{x_{ik}\}$) – maximal (minimal, nominal) value of the feature in the collectivity of units (rural counties) in Wielkopolska Province. The value of z_{ik} features transformed based on the above formulas are included in the interval of <0, 1>.

Stage 3. Calculating the feature of synthetic value (synthetic measure of development) using TOPSIS [Hwang and Yoon 1981]. TOPSIS method a standard method, and is associated with the creation of taxonomic measure of development, calculating the distance from the pattern, and on the basis of the construction of a synthetic measure [Binderman et al. 2009]. In Stage 3, the Euclidean distances of each assessed objects (counties) of pattern (z^{+}) are calculated:

$$z^+ = \left(\max_i (z_{i1}), \max_i (z_{i2}), \ldots, \max_i (z_{ik}) \right) = (z_1^+, z_2^+, \ldots, z_k^+)$$

and anti-pattern development (z^-):

$$z^- = \left(\min_i (z_{i1}), \min_i (z_{i2}), \ldots, \min_i (z_{ik}) \right) = (z_1^-, z_2^-, \ldots, z_k^-)$$

After determining the pattern and anti-pattern of the development, the euclidean distance of each entity undergoing assessment of pattern (z^+) and anti-pattern (z^-) is calculated:

$$d_i^+ = \sqrt{\sum_{k=1}^{k} (z_{ik} - z_k^+)^2} \ (i = 1, 2, \ldots, N) \quad d_i^- = \sqrt{\sum_{k=1}^{k} (z_{ik} - z_k^-)^2} \ (i = 1, 2, \ldots, N)$$

In the final part of the stage, the value of the synthetic measure of the socio-economic development is calculated on the basis of this formula:

$$S_i = \frac{d_i^-}{d_i^+ + d_i^-} \quad (i = 1, 2, \ldots, N).$$

The synthetic measure of the development calculated using TOPSIS can take the values $0 \leq S_i \leq 1$. The higher the value of synthetic feature S_i is, the higher the position i-th object will have in the hierarchy (here higher means more socio-economically developed).

Stage 4. Linear arrangement of objects and their typological classification according to the value of the synthetic feature. Linear arrangement and preparation of the classification from "best" to "worst" of the object can be carried out using statistical methods, including the arbitrary method, which involves the division of the studied objects according to the intervals of value measure S_i [Łuczak and Wysocki 2012]. From four to six class intervals are distinguished, corresponding to different levels of socio-economic development: very high, medium (medium-high, medium-low), low and very low [Wysocki 2010].

The assignment of the counties to the appropriate classes constitute numerical intervals of measure S_i, which are as follows:
– Class I (very high level): Si ∈ <0.80; 1.00>;
– Class II (high): Si ∈ <0.60; 0.80);
– Class III (medium-high): Si ∈ <0.50; 0.60);
– Class IV (medium-low): Si ∈ <0.40; 0.50);
– Class V (low): Si ∈ <0.20; 0.40);
– Class VI (very low): Si ∈ <0.00; 0.20).

PLACE OF THE COUNTY IN THE TERRITORIAL GOVERNMENT

The Territorial Government "is the entity of power and the local economy, implementing a wide range of tasks including current municipal and social services, and taking investment decisions shaping the future living conditions and directions of the local development" [Sierak 2009, 544]. The legal regulations make the territorial units responsible for all matters relating to the development of the area [Kudłacz 2007]. "In terms of administration, the territorial government is the most important. It is understood as a form of lo-

cal community organizations (community, county) or regional community organisations (province)" [Piasecki 2009, 30]. The whole population residing in the units of essential territorial division create, by the law, a self-governing community. The territorial government exercises public power, and is authorised to carry out public duties, which the local government carries out on behalf of itself and on its own responsibility (Constitution of the Republic of Poland of 2 April 1997, Art. 16.1 and 16.2).

On 1 January 1999, Poland introduced a three-tier territorial division of the country into communities, counties and provinces. The county was the second unit of administration and local government in Poland (the Act on the introduction of the three-tier division of the country on 24 July 1998, Art. 1). A county is a local self-government community, and a relevant territory, i.e. a unit of basic territorial division covering the area of a few to several communities, or the entire area of a city with county rights (that is, a community with the status of a city granted with county rights) (Law on the County Government of 5 June 1998, Art. 1 and 2). The laws form the names of counties, seats of their authorities, as well as the communities included in them (Regulation of the Council of Ministers on the creation of counties of 7 August 1998).

SOCIO-ECONOMIC DEVELOPMENT FACTORS

The concept of development is ambiguous, because it refers both to the biological sciences, and the process of evolution. It implies the transition of living organisms to a higher, more complex level. The economic sciences defines development as the "result of positive changes of the quantitative and qualitative growth in the economic, social and natural systems" [Strzelecki 2008, 13]. In Strzelecki's definition of development, the integration of the natural, social and economic must be integrated if full development is to occur. This form of development is called sustainable development, which seeks "to improve the quality of life while maintaining social equality, diversity and the richness of natural resources" [Gerwin 2008, 3]. Local development is considered as "the process occurring on the territory of communes, cities and counties" [Szewczuk et al. 2011, 14].

Socio-economic development tends to grow in terms of a particular country, a regional unit (province) or a local unit (commune, county) and can be expressed as "a complex of targeted changes occurring in different spheres of social reality: economic, political, institutional, cultural, biological, ecological and environmental protection" [Chojnacki and Czyż 2006, 24].

The main determinants of the socio-economic development include the resources at the disposal of a specified territorial area. These resources can include, among other things, the population inhabiting a specific territory, the environment and capital. Other categories influencing the course of creating "an innovative economy capable of permanent development" include: infrastructure (including the Internet), institutions (administration, judiciary), access to capital, trust and relations (between economic entities and public authorities and science), research and development activity, education and qualifications, and the process of transformation of knowledge into business networks" [Wyrwicka and Hadaś 2011, 39].

The foundation of the idea of local development is the perception of the specifics of local issues, including the disparities (for example natural, geographical, cultural,

economic or infrastructural) between different counties and solutions adjusted to the local conditions. The actions recommended to bolster development should show the preferences of the local communities [Łuczak and Wysocki 2005].

CONSTRUCTION OF THE SYNTHETIC MEASURE
OF THE DEVELOPMENT USING TOPSIS AND THE IDENTIFICATION
OF THE TYPOLOGICAL CLASS OF COUNTIES

To assess the level of socio-economic development of the counties, a synthetic measure of the development based on TOPSIS was developed. Simple diagnostic features were used in the synthetic measure of the secondary assessment criteria. The analysis was conducted for the 31 urban and rural counties located in the Wielkopolska Province.

To describe the level of the socio-economic development of the counties, 28 simple features were initially proposed. A correlation matrix between the selected simple features was used to calculate an inverse matrix correlation, which was used to exclude features strongly correlated with each other. It was important that the elements of the main diagonal of the inverse matrix to the correlation matrix between the selected features be as small as possible. The smaller the values of the elements on the main diagonal, the weaker the correlation is between the selected features. To measure the level of socio-economic development in the counties, the following 18 simple features were chosen:

– live births per 1,000 inhabitants (x_1);
– deaths per 1,000 inhabitants (x_2);
– not-working age population per 100 persons of working age (x_3);
– registered unemployment rate (%) (x_4);
– students per one computer with the Internet access for the use in primary schools and junior high schools (x_5);
– population per one public pharmacy (x_6);
– places of accommodation per 1000 inhabitants (x_7);
– length of communal roads with hard surface per 100 km² of the total area (km) (x_8);
– flats in use per 10,000 inhabitants (x_9);
– percentage of the population using the water supply system in % of total population (x_{10});
– percentage of the population using gas in % of total population (x_{11});
– percentage of the population using sewage treatment in % of total population (x_{12});
– business entities registered in REGON (National Register of Economic Units) per 1,000 inhabitants (x_{13});
– total sold industrial production per 1 inhabitant (PLN) (x_{14});
– persons working in industry and construction in total working population (%) (x_{15});
– gross average monthly wages (PLN) (x_{16});
– participation of own income in total income budgets of counties (PLN) (x_{17});
– participation of investment expenditures of the communities and counties in total expenditures (%) (x_{18}).

The threshold criterion of correlation was 15, but there were not more than 12 elements of the main diagonal of the inverse matrix to the correlation matrix between the selected features (Table 1).

TABLE 1a. Socio-economic development categories of the counties of Wielkopolska in 2014

Counties	Live births per 1 000 inhabitants	Deaths per 1 000 inhabitants	Not-working age population per 100 persons of working age	Unemployment rate (%)	Students per 1 computer with Internet access for use by students	Population per 1 public pharmacy	beds per 1 000 inhabitants	Length of communal roads with hard surface per 100 km² (km)	Flats put into use per 10 000 inhabitants
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9
Chodzieski	9.70	9.80	58.7	13.80	23.90	3 402	13.33	37.96	16.40
Czarnkowsko-trzcianecki	10.50	9.00	58.7	11.80	18.79	4 002	5.23	10.27	21.02
Gnieźnieński	10.90	8.90	58.5	12.30	22.77	2 591	22.48	51.43	33.03
Gostyński	11.30	9.40	57.1	10.50	20.21	3 175	3.65	45.75	23.75
Grodziski	11.70	7.70	56.1	7.50	26.20	2 845	10.27	30.14	30.18
Jarociński	11.20	9.00	58.4	10.60	12.83	3 988	12.22	46.76	22.46
Kaliski	11.20	9.30	58.6	6.80	16.37	6 901	5.06	60.16	26.49
Kępiński	11.00	8.80	57.5	3.40	19.15	3 323	2.27	39.75	28.16
Kolski	9.80	11.00	59.9	14.50	17.23	3 554	2.76	57.70	17.99
Koniński	9.80	8.40	55.5	17.00	18.05	4 161	28.53	75.22	32.31
Kościański	10.90	9.40	56.6	6.70	21.20	2 822	6.69	20.60	26.32
Krotoszyński	11.00	9.10	59.0	8.40	26.55	2 886	4.01	45.62	22.87
Leszczyński	11.80	7.50	57.6	6.30	16.43	4 186	55.20	21.58	50.77
Międzychodzki	10.60	8.10	58.0	8.40	24.32	2 652	57.39	11.26	26.41
Nowotomyski	12.40	8.60	58.7	4.60	18.51	3 241	13.97	16.93	37.85
Oborniki	11.30	8.40	57.1	8.80	25.61	3 952	5.71	20.03	28.39
Ostrowski	10.10	8.60	57.9	7.80	19.07	3 754	4.83	48.24	30.56
Ostrzeszowski	10.20	9.40	58.6	8.90	18.30	3 694	11.97	66.71	35.88
Pilski	9.30	9.20	56.5	10.00	24.48	2 997	7.21	24.90	21.52
Pleszewski	10.80	9.40	58.5	9.60	18.47	3 164	17.43	55.22	30.65
Poznański	12.00	6.90	56.4	3.40	22.14	2 639	10.39	58.12	93.24
Rawicki	10.10	8.90	60.7	9.20	21.82	3 359	2.78	46.95	21.52
Słupecki	10.30	8.30	57.9	14.70	18.92	2 596	30.83	48.40	24.66
Średzki	12.40	8.90	56.2	12.10	15.85	3 362	9.45	36.17	50.32
Śremski	11.50	8.90	56.9	7.00	22.52	3 200	10.01	23.69	48.75
Szamotulski	11.10	8.90	57.2	6.70	18.70	3 459	5.82	29.71	29.86
Turecki	10.40	9.20	58.4	9.00	18.06	3 518	2.13	46.43	22.28
Wągrowiecki	10.40	9.00	57.6	15.50	20.68	4 368	7.29	36.11	39.38
Wolsztyński	11.70	7.40	59.1	4.70	20.35	3 799	33.39	19.65	25.14
Wrzesiński	11.50	8.90	58.1	12.70	18.09	3 659	7.49	47.17	64.85
Złotowski	10.20	8.30	56.0	14.30	17.42	3 889	6.96	12.04	26.00
Wielkopolska Province	10.70	8.90	58.4	7.60	20.37	2 930	12.28	41.23	42.19
Poland	9.70	9.90	58.8	11.40	20.19	3 094	18.03	40.01	37.20
The values of the main diagonal of the matrix R-1	3.23	4.89	1.89	8.09	2.45	2.14	2.97	5.68	2.45

TABLE 1b. Socio-economic development categories of the counties of Wielkopolska in 2014

Counties	Percentage of the population using the			Business entities registered in REGON per 1 000 inhabit-ants	Total sold industrial production per 1 inhabitant (PLN)	Persons working in industry and construc-tion in total working population (%)	Gross average monthly wages (PLN)	Participation of own income in total income budgets of the counties (%)	Participation of investment expenditures of the com-munities and counties in total expenditures (%)
	water supply system	gas instal-lation	sewage treatment plant						
	(% of total population)								
	x_{10}	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}
Chodzieski	99.10	60.10	76.50	90	28 120	46.87	3303	35.42	14.30
Czarnkowsko-trzcianecki	94.40	16.20	57.20	81	27 796	38.84	3410	26.39	12.40
Gnieźnieński	97.20	49.30	73.90	106	18 854	29.51	3253	30.95	10.50
Gostyński	97.90	62.10	63.50	90	42 554	35.86	3283	39.43	15.00
Grodziski	94.90	60.40	54.00	95	42 414	35.58	2977	31.47	11.80
Jarociński	97.30	40.40	82.30	85	29 749	38.14	2804	26.97	14.90
Kaliski	94.60	8.60	29.60	76	25 320	16.13	3007	43.27	18.80
Kępiński	97.00	24.10	58.40	102	51 062	57.41	2544	38.35	17.60
Kolski	93.00	3.20	47.20	77	21 899	28.65	3624	27.87	12.50
Koniński	96.80	3.00	35.60	73	10 293	24.93	3328	37.26	16.30
Kościański	98.10	51.90	72.40	99	17 091	26.52	3257	38.77	16.60
Krotoszyński	97.30	48.20	60.40	83	30 902	35.83	2850	29.38	17.40
Leszczyński	94.50	20.50	49.00	102	48 103	36.01	3678	35.74	22.20
Międzychodzki	91.50	30.20	70.90	95	9 936	30.74	3173	35.95	16.50
Nowotomyski	92.60	55.40	53.20	108	38 821	47.10	3466	39.02	15.90
Obornicki	93.40	50.80	72.30	105	44 592	46.35	3596	29.03	13.60
Ostrowski	97.70	44.10	54.40	99	32 055	39.70	3212	34.33	18.10
Ostrzeszowski	96.70	26.50	50.30	99	28 389	33.66	3194	35.96	11.40
Pilski	94.90	56.20	84.20	93	46 896	33.28	3636	32.14	11.30
Pleszewski	95.20	8.30	52.70	90	20 412	24.49	3191	42.36	13.50
Poznański	95.60	71.40	67.20	153	57 461	41.13	3520	61.33	20.20
Rawicki	96.60	52.10	67.10	84	17 173	26.95	2921	35.70	11.80
Słupecki	95.80	1.10	55.60	86	14 714	22.56	3094	27.98	12.20
Średzki	96.30	50.50	65.90	99	25 800	39.27	3467	35.64	14.80
Śremski	97.80	58.20	79.00	105	18 730	33.83	3108	38.96	13.10
Szamotulski	96.90	23.00	71.90	95	73 938	43.07	3818	36.82	18.30
Turecki	98.40	5.10	49.20	71	30 699	39.69	3025	34.97	12.30
Wągrowiecki	96.50	30.60	63.20	87	15 309	29.81	3136	25.96	13.80
Wolsztyński	91.40	56.30	60.10	113	30 649	31.40	3014	27.23	21.10
Wrzesiński	98.10	21.60	61.70	108	42 572	42.42	3265	35.06	10.50
Złotowski	89.00	11.30	65.00	72	10 599	21.19	3019	20.52	13.90
Wielkopolska Province	96.20	47.40	69.40	116	38 035	32.35	3598	36.17	14.50
Poland	91.60	52.20	71.50	107	29 602	26.95	4004	31.30	18.00
The values of the main diagonal of the matrix R-1	4.92	4.52	7.13	11.08	6.02	3.26	4.71	4.32	2.43

Source: the author's own calculations, based on the Local Data Bank of the Central Statistical (2014) [accessed: 07.10.2016].

Simple features usually have different titers and ranges of variability, which prevents them from being directly compared. They must therefore be brought to a state where they can be compared with one another by normalising the values. To do that here, zero unitarisation was used. Based on that, the features' values were brought into the range of <0, 1>, while the features themselves were divided into stimulants and destimulants of socio-economic development.

Selected five diagnostic features recognised for the destimulants:
– deaths per 1,000 inhabitants (x_2);
– not-working age population per 100 persons of working age (x_3);
– registered unemployment rate (%) (x_4);
– students per one computer with Internet access for use by students in primary schools and junior high schools (x_5);
– population per one public pharmacy (x_6).

TABLE 2. Linear arrangement of counties in Wielkopolska by level of socio-economic development in 2014

Counties	Distance from:		Value of synthetic development indicator (S_i)	Typological class	The level of socio-economic development
	anti-pattern development (d_i^-)	pattern development (d_i^+)			
Poznański	3.490	1.350	0.721	I	high
Leszczyński	2.758	1.958	0.585	II	medium-high
Szamotulski	2.672	2.124	0.557		
Średzki	2.558	2.125	0.546		
Nowotomyski	2.519	2.194	0.534		
Kępiński	2.511	2.350	0.517		
Śremski	2.443	2.318	0.513		
Gostyński	2.388	2.294	0.510		
Wolsztyński	2.415	2.379	0.504		
Wrzesiński	2.313	2.312	0.500		
Ostrowski	2.250	2.316	0.493	III	medium-low
Kościański	2.374	2.457	0.491		
Grodziski	2.360	2.513	0.484		
Jarociński	2.319	2.482	0.483		
Obornicki	2.298	2.462	0.483		
Gnieźnieński	2.226	2.520	0.469		
Pilski	2.318	2.700	0.462		
Międzychodzki	2.242	2.643	0.459		
Chodzieski	2.225	2.666	0.455		
Ostrzeszowski	2.041	2.543	0.445		
Krotoszyński	2.109	2.685	0.440		
Koniński	2.222	2.849	0.438		
Pleszewski	1.962	2.621	0.428		
Turecki	1.974	2.814	0.412		
Słupecki	1.947	2.851	0.406		
Rawicki	1.920	2.902	0.398	IV	low
Kaliski	1.939	2.970	0.395		
Wągrowiecki	1.758	2.801	0.386		
Czarnkowsko-trzcianecki	1.690	2.929	0.370		
Złotowski	1.735	3.240	0.349		
Kolski	1.718	3.225	0.344		

Source: the author's own work, based on Table 1.

The 13 diagnostic features that occurred were the stimulants' level of the socio-economic development in the counties of the Wielkopolska Province in 2014.

After the division of diagnostic features for stimulants and destimulants and the normalization of their values, values of pattern and anti-pattern development were determined, and then Euclidean distances were calculated for all of the counties from the pattern and anti-pattern development. On this basis, the values of the synthetic measure of the development were calculated (Table 2). They are ordered linearly according to decreasing values, and four classes of typological analysed objects with the following levels of the development: high, medium-high, medium-low and low, were distinguished.
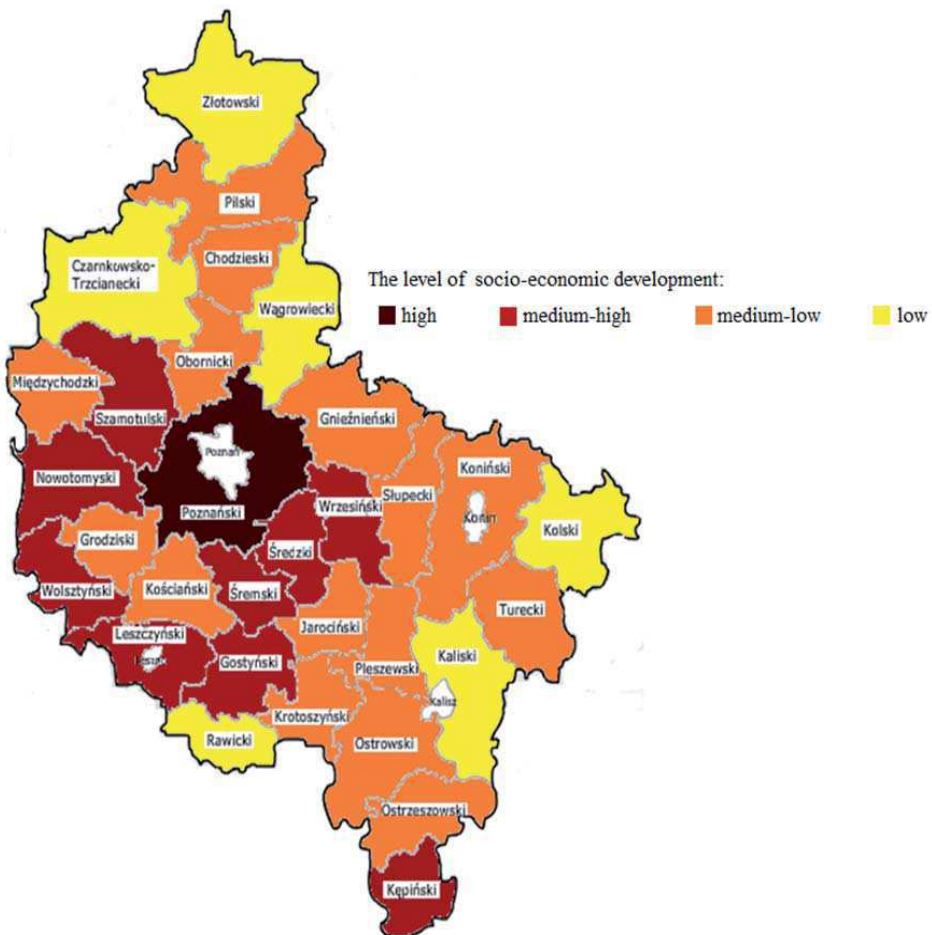

FIG. 1. Delimitation of spatial types of the level of socio-economic development in counties of Wielkopolska Province in 2014

Source: Own elaboration.

DESCRIPTION OF TYPOLOGICAL CLASSES

A synthetic measure of development was used to distinguish four typological classes with different levels of socio-economic development. For all diagnostic features in each class, the median was calculated (Table 3), which allowed each of the four separate classes to be compared with the average values of the features of Wielkopolska.

TABLE 3. The median values of individual diagnostic features characterising the counties of Wielkopolska Province in terms of the level of socio-economic development in 2014

Symbol	Specification	Class				Wielkopolska Province
		I	II	III	IV	
x_1	live births per 1 000 inhabitants	12.00	11.50	10.60	10.30	10.55
x_2	deaths per 1 000 inhabitants	6.90	8.90	9.00	9.00	9.00
x_3	not-working age population per 100 persons of working age	56.40	57.50	58.00	58.65	58.00
x_4	registered unemployment rate (%)	3.40	6.70	9.00	13.05	9.10
x_5	students per 1 computer with the Internet access for use by students in primary schools and junior high schools	22.14	18.70	21.20	18.11	19.88
x_6	population per 1 public pharmacy	2 639	3 362	3 164	3 945.50	3 382
x_7	beds per 1 000 inhabitants	10.39	9.45	11.97	5.15	8.37
x_8	length of communal roads with hard surface per 100 km² of the total area (km)	58.12	29.71	46.43	41.53	46.43
x_9	flats in use per 10 000 inhabitants	93.24	37.85	26.41	23.76	26.41
x_{10}	percentage of the population using the water supply system in % of total population	95.60	96.90	96.80	94.50	96.55
x_{11}	percentage of the population using gas of total population (%)	71.40	50.50	44.10	13.75	42.25
x_{12}	percentage of the population using sewage treatment of total population (%)	67.20	61.70	60.40	60.20	60.40
x_{13}	business entities registered in REGON per 1 000 inhabitants	153	102	93	79	90
x_{14}	total sold industry production per 1 inhabitant (PLN)	57 4610	42 5540	28 3890	19 5365	27 958
x_{15}	persons working in industry and construction in total working population (%)	41.13	39.27	33.66	27.80	33.47
x_{16}	gross average monthly wages (PLN)	3 520	3 283	3 194	3 077.5	3 194
x_{17}	participation of own income in total income budgets of the counties (%)	61.33	36.82	34.33	27.13	34.33
x_{18}	participation of investment expenditures of the communities and counties in total expenditures (%)	20.20	15.90	13.60	13.15	13.60

Source: the author's own work, based on Table 1.

Class I comprised Poznań County, with a high level of the socio-economic development, located in the central part of the province, near the city of Poznań. In 2014, Poznań County had a good demographic and social situation, the highest population density (189 people per km²), which was significantly higher than the average in Wielkopolska. The County was distinguished by the lowest unemployment rate (3.4%) in the province, and one of the lowest in Poland. In addition, the social and technical infrastructure was very well developed, particularly in terms of the high percentage of the population (more than 71%) using gas, while, the province average was just 42%. In 2014, there were 93 flats per 10,000 inhabitants completed, evidence of a well-developed housing economy. Poznań county also boasted a very large number of business entities, which, together with low levels of unemployment and a well-developed industry and construction sector, made the area of Poznań county attractive for enterprise, investors and developers.

Class II included nine counties characterised by medium-high socio-economic development, located near the urban agglomeration of Poznań. The nine include: Leszno, Szamotuły, Środa Wielkopolska, Nowy Tomyśl, Śrem, Gostyń, Wolsztyn and Września, which is located in the southern part of Wielkopolska (Kępno County). These counties had an unemployment rate 2.4 percentage points lower than the province average of 6.7%. The counties of the second class had great potential for future development of numerous areas, including the housing economy, the technical infrastructure [in 2014, gas was used by more than half of the inhabitants (50.5%)], the social infrastructure, the economy, and especially industrial and construction activity.

With a medium-low degree of socio-economic development, Class III comprised 15 counties scattered across Wielkopolska Province. They included Ostrów Wielkopolski, Kościan, Grodzisk, Jarocin, Oborniki, Gniezno, Piła, Międzychód, Chodzież, Ostrzeszów, Krotoszyn, Konin, Pleszew, Turek and Słupca Counties, all of which have a well-developed sphere of recreation, leisure and tourism, thanks to the numerous attractive landscape areas, lakes, forests, and guest beds (almost 13 accomodation places per 1,000 inhabitants, with an average lower than in the province by approx. 3.6 accommodation places). These counties' demographic, social, economic and infrastructure values were close to the average for Wielkopolska.

Class IV was made up of Rawicz, Kalisz, Wągrowiec, Czarnków-Trzcianka, Złotów and Koło Counties. These are the furthest from the city of Poznań and Poznań County and showed the lowest level of socio-economic development, including a high unemployment rate (13.05%), significantly exceeding the province average (by 3.95 percentage points). Relative to the rest of the province, these counties were characterized by poor infrastructural development (13.75% of the population used), and social and economic development. A large percentage of the inhabitants worked in agriculture.

CONCLUSIONS

The main aim of the study was to assess the level of socio-economic development of counties of the Wielkopolska Province in 2014. To this end, a synthetic development measure was constructed based on TOPSIS, which distinguished four typological classes of the counties with different levels of the socio-economic development. The studies show that

the most well-developed developed county was Poznań, where a number of business entities operate in a well-functioning social sphere, which accounts for the low unemployment rate. The city of Poznań radiates a high level of development throughout Poznań County, as it stands at the centre of economy, trade, science, academic and cultural life. Koło County was the worst developed in the province. Located in the east, its lack of development may be attributed to the peripheral location and distance from large urban agglomeration of Poznań.

Spacial delimitation of the socio-economic types of counties of Wielkopolska in 2014 showed that the counties comprising the first and second class were located around the city of Poznań (except for Kępno County), while the counties with a low level of development were located on the outskirts of the province. Moreover, the majority of the counties was characterised by a medium level of socio-economic development. Supporting development processes at the local level is important, as doing so will lead to growing competitiveness throughout the province. As Poland's other provinces develop, and together lift the country's economic competitiveness, it will be more competitive with the countries of Western Europe. Development activities carried out by the local authorities also increase the quality of life of the inhabitants and enable them to more effectively meet their needs. Supporting development at the local level is the responsibility of local governments; it takes place through the appropriate allocation of financial resources.

In the counties with a low level of socio-economic development, it is important to allocate financial resources primarily to support entrepreneurship, education and human capital (development of new qualifications of inhabitants, facilitating the possibility of retraining to broaden knowledge and skills), the protection of health, and to support the services sector, especially in counties where most residents are employed in the agricultural sector.

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Summary. The concept of socio-economic development refers to the qualitative and quantitative measure of progress. The main objective of the study was to assess the level of socio-economic development of thirty-one counties of Wielkopolska province in 2014. A synthetic indicator based on TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution), a multi-criteria decision analysis method, was used in the analysis. The statistical data were taken from the Local Data Bank of the Central Statistical Office. The counties were classified into four groups depending on their level of development. The study revealed that the most developed county of Wielkopolska province was Poznań county, while Koło county was the least developed. The socio-economic development in most counties of Wielkopolska province was at a medium level in 2014.

Key words: Wielkopolska province, socio-economic development, local development, TOPSIS, synthetic development indicator

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