

DIFFERENTIATION OF THE LEVEL OF SOCIO-ECONOMIC DEVELOPMENT OF RURAL AND SEMI-URBAN MUNICIPALITIES OF THE WIELKOPOLSKIE VOIVODESHIP IN 2004–2020

Iwona Pomianek✉

Warsaw University of Life Sciences – SGGW, Poland

ABSTRACT

Aim: The study aims to identify the spatial diversity and possible concentrations of the 207 rural and semi-urban municipalities of the Wielkopolskie voivodeship (Poland) regarding their level of socio-economic development. **Methodology:** Measuring the local development requires the use of several variables due to its multidimensional character. The Hellwig development measure was used, which is one of methods of multidimensional analysis. The LAU-2 administrative units were ranked according to the level of socio-economic development. The research period covers the years 2004–2020, i.e. from the year of Poland's accession to the European Union until the end of the previous financial perspective. The variables used in the study concerned the main spheres of local development: demography, social activity, labour market, infrastructure, entrepreneurship, and local finance. **Results:** Rankings constructed for 3 periods – 2004, 2012 and 2020 – made it possible to observe the improvement in the level of development of municipalities surrounding the main city of the Wielkopolskie voivodeship, Poznań, whereas municipalities located peripherally in the eastern part of the voivodeship were characterised by a low or very low socio-economic development level. **Conclusions:** A positive impact of the city on the surrounding rural area can be noticed, complementing its functions by locating enterprises in areas with lower rents and taxes as well as settling people commuting to the city every day to work. On the other hand, peripheral municipalities were characterised by some undiscovered or unexploited development potential, including tourist attractions.

Key words: socio-economic local development, spatial differentiation, LAU-2, Wielkopolskie, Poland

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INTRODUCTION

The broad context of understanding local development makes it impossible to formulate a single definition that is always true. One of general definitions describes development as a process of transition from a given state or form to a more complex and advanced one [Parysek 2018]. Local development is a complicated phenomenon and therefore it is based on many factors influencing it [Bramanti and Ratti 1997, Szajnowska-Wysocka 2009, Rakowska 2011, Hruška et al.

2015, Stanny and Strzelczyk 2015, Pomianek 2018b, Konecka-Szydłowska et al. 2019]. The study covered rural areas, which are usually characterised by greater diversity in terms of the level and rate of development than in the case of urban areas. However, according to Kłodziński [2006], small towns are still functionally and spatially connected with the surrounding rural areas. Therefore, adopting the administrative division, rural and semi-urban (urban-rural) municipalities of the Wielkopolskie voivodeship were selected for the study.

Iwona Pomianek <https://orcid.org/0000-0002-2858-2714>

✉iwona_pomianek@sggw.edu.pl

AIM AND METHODS

The study aims to identify the spatial diversity and possible concentrations of the 207 rural and semi-urban municipalities (also called ‘gminas’ or ‘communes’, LAU-2 local government units) of the Wielkopolskie voivodeship (Poland) regarding their level of socio-economic development in the period of 2004–2020. Measuring local development requires the use of several variables due to its multidimensional character. In the first stage, the content-related selection of the characteristics corresponding to the issue of socio-economic development was carried out. The

characteristics were selected based on a literature review [Kłodziński 2006, Pławgo 2007, Czapiewski 2010, Wong 2010, Będzik and Brelik 2015, Pomianek 2018a, Rakowska 2019, Józefowicz and Michniewicz-Ankiersztajn 2020, Bożek et al. 2021]. They concerned the main spheres of local development: demography, social activity, labour market, entrepreneurship, local finance, and infrastructure (Table 1). Taking into account the formal criteria for the selection of the variables, measurable and complete characteristics were qualified for the construction of the municipal development index. Some potential characteristics (for example bicycle paths, unemployment rate, and educa-

Table 1. Diagnostic variables applied in the research

Symbol	Diagnostic variable
Demography	
X_1	Population density (population per 1 square kilometre)
X_2	Change of number of inhabitants per 1,000 population
X_3	Feminisation rate (number of females per 100 males) *
Social activity	
X_4	Proportion of councillors with university degrees **
X_5	Proportion of councillors with high professional qualifications
X_6	Foundations, associations, and social organisations per 1,000 population
Labour market	
X_7	Proportion of registered unemployed in the working-age population
X_8	Demographic dependency ratio (population of post-working age per 100 population of working age)
Entrepreneurship	
X_9	National economy entities registered in Polish REGON database per 10,000 population
X_{10}	Number of natural persons running a business per 100 persons of working age **
Local finance	
X_{11}	Municipal own-source revenues per capita
X_{12}	Municipal property investment expenditures per capita
Infrastructure	
X_{13}	Proportion of population with a water supply connection *
X_{14}	Proportion of population with a sewerage connection
X_{15}	Proportion of children aged 3–5 participating in preschool education

* quasi-constant variables eliminated from the analysis

** variables eliminated from the analysis due to high correlation with other variables

tion level of the population), significant in terms of content, could not be included in the group of analysed variables because the Local Data Bank (Statistics Poland) does not collect certain data at the level of municipalities (LAU 2).

The characteristics presented in Table 1 were statistically tested to exclude quasi-constant variables. The coefficient of variation adopted a critical value of $V^* = 0.10$. Due to their low variation ($|V_i| \leq V^*$), characteristics X_3 and X_{13} were eliminated. Next, the strength of the relationship between the remaining variables was examined. For this purpose, Pearson's linear correlation coefficient was used. A correlation matrix was constructed for all variables. The critical value of the correlation coefficient was assumed as $r^* = |0.75|$. Due to the high degree of correlation with other variables, variables X_4 and X_{10} were eliminated.

Finally, 11 variables were accepted for the further analysis.

The research period covers the years 2004–2020, i.e. from the year of Poland's accession to the European Union until the end of the previous financial perspective. The upper limit of the research period was also forced by the access to data at the Local Data Bank (Statistics Poland). As data for 2004 were not collected for the X_6 variable, the data for 2005 were used in the analysis.

Based on the method of Hellwig's measure [Hellwig 1968, Nowak 1990, Pomianek 2010], a synthetic measure was constructed, enabling ranking the municipalities according to the level of socio-economic development. Hellwig's measure (d_i) usually takes values in the range [0; 1]. The closer the object (a municipality) is to the standard (model municipality), the higher the measure value. Two parameters of the taxonomic measure were used to classify municipalities according to the level of socio-economic development, i.e. the arithmetic mean (\bar{d}_i) and the standard deviation (S_{d_i}). The examined objects (municipalities) were divided into five groups, differing in terms of the degree of socio-economic development. The following classes were defined:

– Class A (very high level of socio-economic development): $d_i > \bar{d}_i + S_{d_i}$ (municipalities at a distance from the standard exceeding $\bar{d}_i + S_{d_i}$),

– Class B (high level of socio-economic development): $\bar{d}_i + \frac{1}{2} S_{d_i} < d_i \leq \bar{d}_i + S_{d_i}$ (municipalities at a distance from the standard ranging $(\bar{d}_i + \frac{1}{2} S_{d_i}, \bar{d}_i + S_{d_i})$),

– Class C (medium level of socio-economic development): $\bar{d}_i - \frac{1}{2} S_{d_i} < d_i \leq \bar{d}_i + \frac{1}{2} S_{d_i}$ (municipalities at a distance from the standard ranging $(\bar{d}_i - \frac{1}{2} S_{d_i}, \bar{d}_i + \frac{1}{2} S_{d_i})$),

– Class D (low level of socio-economic development): $\bar{d}_i - S_{d_i} < d_i \leq \bar{d}_i - \frac{1}{2} S_{d_i}$ (municipalities at a distance from the standard ranging $(\bar{d}_i - \frac{1}{2} S_{d_i}, \bar{d}_i - S_{d_i})$),

– Class E (very low level of socio-economic development): $d_i \leq \bar{d}_i - S_{d_i}$ (municipalities at a distance from the standard not exceeding $\bar{d}_i - S_{d_i}$),

where:

d_i – value of synthetic measure calculated by Hellwig's method,

\bar{d}_i – arithmetic mean of d_i ,

S_{d_i} – standard deviation of d_i .

In the period 2004–2020, three representative years were distinguished: 2004 – at the beginning of the period, 2012 – in the middle, and 2020 as the last year of the period. With the aim to show the diversity of municipalities in a dynamic approach, three rankings were constructed for the 2004, 2012 and 2020 data. The aim of the rankings was to distinguish clusters of municipalities with a similar level of development and similar development trends.

RESULTS

In Poland, the territorial division at the LAU1 level distinguishes poviats (consisting of several municipalities – LAU2 level) and large cities with poviat rights. Groups of poviats are combined into subregions for statistics purposes. Voivodeships (NUTS 3) usually consist of several subregions. Voivodeships are governed by regional government authorities, while poviats and municipalities are governed by local governments.

The top 5 positions in the ranking for 2004 were taken by semi-urban municipalities: Kępno (Kępiński powiat, Kaliski subregion), Szamotuły (Szamotulski powiat, Poznański subregion), Śrem (Śremski powiat, Poznański subregion), Nowy Tomyśl (Nowotomski powiat, Leszczyński subregion) and Ostrzeszów (Ostrzeszowski powiat, Kaliski subregion). These were municipalities where a town was a municipal centre – being the seat of the municipal authorities and at the same time the seat of the powiat authorities. Kępno, with a Hellwig’s measure score of 0.708, was the closest to the theoretical model of 1.000 (a hypothetical commune with the most desirable variable values among the results achieved by the surveyed units: the highest for stimulants and the lowest for destimulants). The ranking was closed by three rural municipalities from the Koniński subregion: Chodów, Olszówka and Przykona.

In 2004, municipalities from A and B classes (with a very high and high level of development) were located mainly in the central-western and south-western parts of the voivodeship. On the other hand, the concentration of the weakest municipalities can be seen in the eastern part of the voivodeship (Figure 1).

The top 5 municipalities in 2012 were more diversified than in the previous ranking. Three of them were rural and two were semi-urban. The rural municipality of Czerwonak (Poznański powiat and subregion) was ranked first with a Hellwig’s measure score of 0.515. The second was Nekla (semi-urban municipality from the Wrzesiński powiat/Koniński subregion). The next two places were taken by rural municipalities: Baranów (Kępiński powiat/Kaliski subregion) and Włoszakowice (Leszczyński powiat and subregion). The fifth place went to the semi-urban municipality of Mosina (Poznański powiat and subregion). Apart from Baranów, which was promoted from class C, the other municipalities mentioned in 2004 also belonged to class A. The Szamotuły and Ostrzeszów municipalities from class A in 2004 were relegated to class C in 2012. Again, municipalities in classes A and B were located mainly in the central-western and south-western parts of the voivodeship. The three bottom municipalities in the ranking of 2012 (Przedecz, Dąbie and Chodów) were located in the Kolski powiat (Koniński subregion) in the eastern

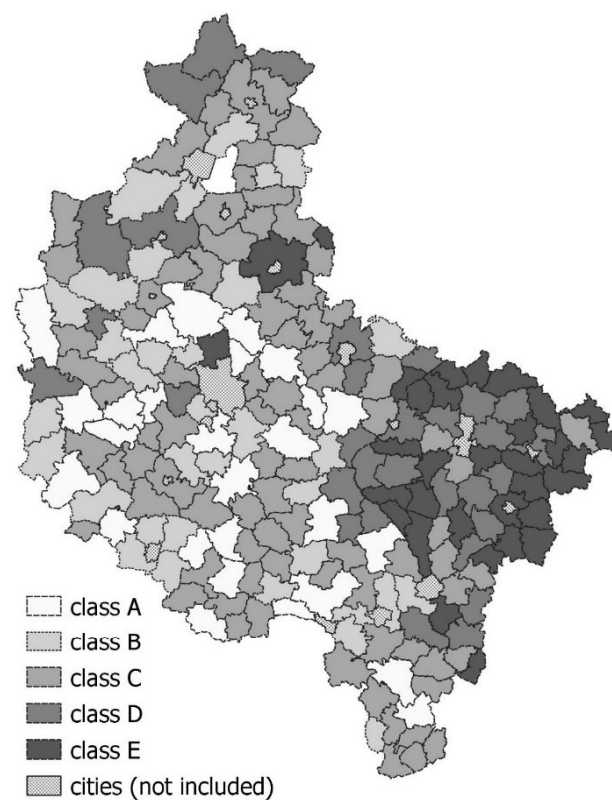


Fig. 1. Spatial differentiation of rural and urban-rural municipalities of Wielkopolskie voivodeship in terms of the level of socio-economic development in 2004

Source: the author’s calculation.

part of the voivodeship (Figure 2). The indicated municipalities that closed the ranking in 2004 and those that closed the ranking in 2012 belonged to class E in both analysed years.

The 2020 ranking was opened by three municipalities located in the Poznański powiat and subregion: Pobiedziska (semi-urban), Czerwonak (rural) and Mosina (semi-urban). The semi-urban municipality of Grodzisk Wielkopolski (Grodziski powiat, Leszczyński subregion) was ranked fourth, and the rural municipality of Ostrów Wielkopolski (Ostrowski powiat, Kaliski subregion) was ranked fifth. The first four communes also belonged to class A in the previous rankings. Ostrów Wielkopolski belonged to class B in 2004 and 2012, and in 2022 it was promoted by 31 places to class A. The three municipalities closing the ranking were located in the Konin subregion: Prze-

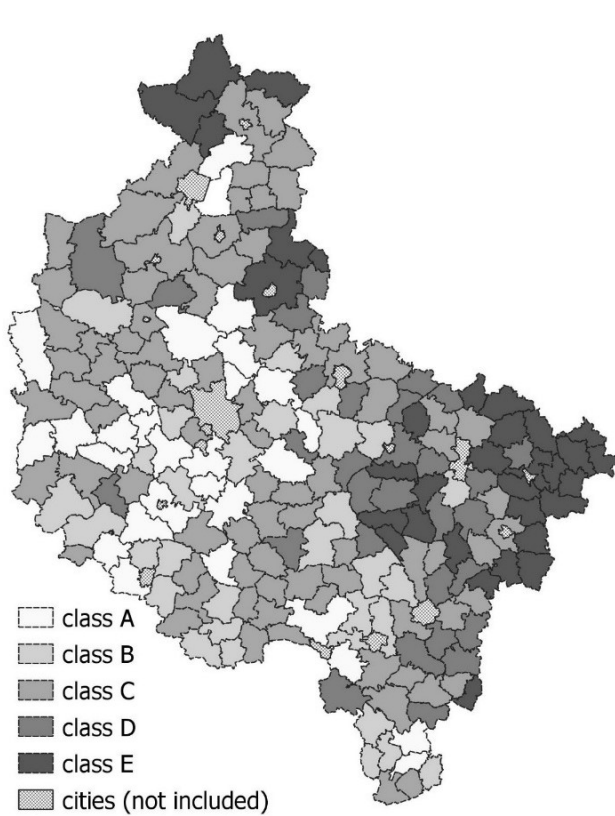


Fig. 2. Spatial differentiation of rural and urban-rural municipalities of Wielkopolskie voivodeship in terms of the level of socio-economic development in 2012
Source: the author's calculation

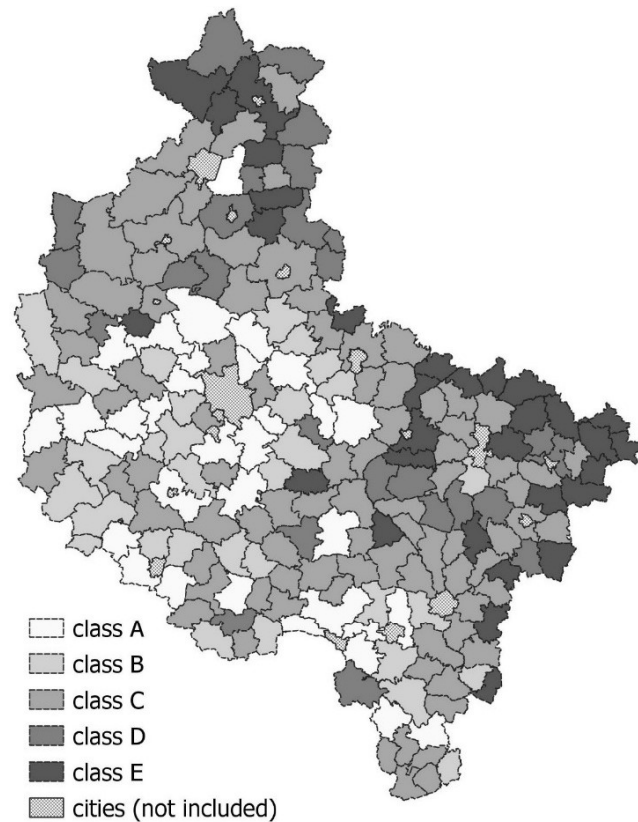


Fig. 3. Spatial differentiation of rural and urban-rural municipalities of Wielkopolskie voivodeship in terms of the level of socio-economic development in 2020
Source: the author's calculation

decz (semi-urban in Kolski powiat), Chodów (rural in Kolski powiat) and the last one, Wierzbiniek (rural in Koniński powiat). And this time, the largest number of municipalities from the class with a very poor level of socio-economic development were located in the easternmost part of the Wielkopolskie voivodeship (Fig. 3). However, comparing the spatial distribution from 2020 with 2012 and 2004, an improvement in the level of development of the municipalities surrounding Konin, which is the main city in the Koniński sub-region, can be observed.

The largest increase was observed in the rural municipality of Dopiewo – by 128 positions (from class D in 2004 to class B in 2020). A change in the position by more than 100 was also recorded in the municipalities of Przykona, Kleczew and Tarnowo Podgórne. They were followed by three municipalities where the

change exceeded 80 positions (Table 2). On the other hand, in the rural municipality of Komorniki, the largest decrease was observed from position 32 (class B) to position 150 (class C). A drop by over 100 places was also recorded in two semi-urban municipalities: Kłodawa and Ujście. The next five municipalities indicated in Table 3 were characterised by an equally significant decrease – by over 80 positions.

Many municipalities changed their positions, although not always in such a spectacular way as indicated in Tables 2 and 3. The change did not always involve a shift from class to class (Table 4).

As many as 14 municipalities from class A remained in this best group in all three rankings. They constituted about half of this class. Unfortunately, 13 municipalities remained in the class with a very low level of development throughout the analysed period,

Table 2. Largest increases (top 7)

No.	Municipality	Powiat	Subregion	Position in 2004	Position in 2020	Change
1	Dopiewo (r)	Poznański	Poznański	174	46	+128
2	Przykona (r)	Turecki	Koniński	207	96	+111
3	Kleczew (s)	Koniński	Koniński	187	78	+109
4	Tarnowo Podgórne (r)	Poznański	Poznański	133	29	+104
5	Łubowo (r)	Gnieźnieński	Koniński	132	38	+94
6	Stare Miasto (r)	Koniński	Koniński	125	33	+92
7	Godziesze Wielkie (r)	Kaliski	Kaliski	180	92	+88

* r – rural municipality, s – semi-urban municipality

Source: the author's calculation

Table 3. Largest decreases (top 8)

No.	Municipality*	Powiat	Subregion	Position in 2004	Position in 2020	Change
1	Komorniki (r)	Poznański	Poznański	32	150	–118
2	Kłodawa (s)	Kolski	Koniński	79	195	–116
3	Ujście (s)	Pilski	Pilski	33	134	–101
4	Wyrzysk (s)	Pilski	Pilski	61	157	–96
5	Szamocin (s)	Chodzieski	Pilski	90	185	–95
6	Krzykosy (r)	Średzki	Poznański	111	199	–88
7	Kobylin (s)	Krotoszyński	Kaliski	42	128	–86
8	Krzyż Wielkopolski (s)	Czarnkowsko-Trzcianecki	Pilski	82	168	–86

* r – rural municipality, s – semi-urban municipality

Source: the author's calculation

Table 4. Municipalities that did not change their development class in the three rankings: 2004, 2012 and 2020

Development class	Municipalities*
A	Buk (s), Czerwonak (r), Grodzisk Wielkopolski (s), Kępno (s), Krotoszyn (s), Mosina (s), Murowana Goślina (s), Nekla (s), Nowy Tomyśl (s), Oborniki (s), Opalenica (s), Pobiedziska (s), Śrem (s), Włoszakowice (r)
B	Czempiń (s), Lipno (r), Osieczna (s), Przemęt (r)
C	Bojanowo (s), Borek Wielkopolski (s), Budzyń (r), Dobrzyca (r), Dolsk (s), Grabów nad Prosną (s), Kamieniec (r), Kłecko (s), Koźminek (r), Krzywiń (s), Książ Wielkopolski (s), Kuślin (r), Kwilcz (r), Mikstat (s), Obrzycko (r), Opatówek (r), Pępowo (r), Pogorzela (s), Poniec (s), Rozdrażew (r), Rychtal (r), Stawiszyn (s), Swarzędz (s), Szydłowo (r), Trzcianica (r), Witkowo (s), Zakrzewo (r)
D	Pyzdry (s), Rychwał (s), Tuliszków (s), Zagórów (s)
E	Babiał (r), Brudzew (r), Chodów (r), Czajków (r), Dąbie (s), Dobra (s), Łądek (r), Lisków (r), Mycielin (r), Olszówka (r), Przedecz (s), Skulsk (r), Wierzbinek (r)

* r – rural municipality, s – semi-urban municipality

Source: the author's calculation

which was approx. every third municipality in class E. Greater fluctuation of positions and assignments to classes was observed in the remaining classes.

CONCLUSIONS

The aim of the study was to identify the spatial diversity and possible concentrations of the 207 rural and semi-urban municipalities of the Wielkopolskie voivodeship (Poland) regarding their level of socio-economic development. Rankings constructed for 3 periods – 2004, 2012 and 2020 – made it possible to observe the improvement in the level of development of the municipalities surrounding the main city of the Wielkopolskie voivodeship – Poznań. Consequently, a positive impact of the city on the surrounding rural area can be noticed, fulfilling functions that complement the functions performed by Poznań, including locating enterprises in areas with lower rents and taxes, as well as settling people commuting to the city every day to work. There was also a cluster of the weakest municipalities in the easternmost part of the voivodeship. These were peripheral municipalities, with undiscovered or unexploited development potential – for example, in the Przedecz municipality, there is a castle that could become a tourist attraction.

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ZRÓŻNICOWANIE POZIOMU ROZWOJU SPOŁECZNO-GOSPODARCZEGO GMIN WIEJSKICH I MIEJSKO-WIEJSKICH WOJEWÓDZTWA WIELKOPOLSKIEGO W LATACH 2004–2020

STRESZCZENIE

Cel: Badanie miało na celu określenie zróżnicowania przestrzennego i możliwych skupisk 207 gmin wiejskich i miejsko-wiejskich województwa wielkopolskiego pod względem poziomu rozwoju społeczno-gospodarczego. **Metody:** Pomiar rozwoju lokalnego ze względu na swój wielowymiarowy charakter wymaga użycia wielu zmiennych. Wykorzystano miarę rozwoju Hellwiga, która jest jedną z metod analizy wielowymiarowej. Jednostki administracyjne LAU-2 uszeregowano według poziomu rozwoju społeczno-gospodarczego. Okres badawczy obejmuje lata 2004–2020, tj. od roku przystąpienia Polski do Unii Europejskiej do końca poprzedniej perspektywy finansowej. Wykorzystane w badaniu zmienne dotyczyły głównych sfer rozwoju lokalnego: demografii, aktywności społecznej, rynku pracy, infrastruktury, przedsiębiorczości oraz finansów lokalnych. **Wyniki:** Rankingi skonstruowane dla 3 okresów: 2004, 2012 oraz 2020 pozwoliły zaobserwować poprawę poziomu rozwoju gmin otaczających stolicę województwa wielkopolskiego – Poznań, a gminy położone peryferyjnie we wschodniej części województwa charakteryzowały się niskim lub bardzo niskim poziomem rozwoju społeczno-gospodarczego. **Wnioski:** Z jednej strony zauważalny jest pozytywny wpływ miasta na otaczającą go przestrzeń wiejską, w tym uzupełnianie jego funkcji poprzez lokowanie przedsiębiorstw na terenach o niższych czynszach i podatkach oraz osiedlanie się osób dojeżdżających codziennie do pracy w Poznaniu. Z drugiej strony gminy peryferyjne charakteryzują się pewnym nieodkrytym lub niewykorzystanym potencjałem rozwojowym, w tym atrakcjami turystycznymi.

Słowa kluczowe: lokalny rozwój społeczno-gospodarczy, zróżnicowanie przestrzenne, LAU-2, Wielkopolskie, Polska

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