

**ECONOMIC AND SOCIAL ACTIVENESS
AS DETERMINANTS OF LOCAL DEVELOPMENT
IN MAZOVIECKIE VOIVODESHIP (POLAND)**

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Abstract

The aim of the research was to recognise the correlation between economic and social activeness and the local development level of semi-urban and rural gminas in Mazowieckie Voivodeship. The analysis shows that demography and the condition of infrastructure are strongly correlated to economic activeness, the number of businesses and the unemployment rate. On the other hand, social determinants (the number of NGOs, electoral turnout or the local government's predispositions) also play a role. About 70% of both semi-urban and rural gminas remained in the 1st Classes of the G-ranking and in the SA-ranking at the same time. For the 1st Classes of the G-ranking and EA-ranking this participation was even higher – from 80% for rural units to almost 90% for semi-urban gminas. Being located in close proximity to a city is an important growth stimulant for suburban gminas. More than 80% of highly developed units in the G-ranking were located in the Warsaw Metropolitan Area. Furthermore, there were no suburban gminas near the capital in the lowest development group. A low level of both economic and social activeness characterised only rural peripheral gminas.

**AKTYWNOŚĆ SPOŁECZNA I EKONOMICZNA JAKO DETERMINANTY ROZWOJU
LOKALNEGO W WOJEWÓDZTWIE MAZOWIECKIM**

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Abstrakt

Celem pracy była ocena zależności między aktywnością gospodarczą i społeczną a poziomem rozwoju lokalnego gmin miejsko-wiejskich i wiejskich województwa mazowieckiego. Przeprowadzona analiza pokazuje, że sytuacja demograficzna oraz stan infrastruktury technicznej są silnie skorelowane z aktywnością ekonomiczną, liczbą firm i stopą bezrobocia. Czynniki społeczne również odgrywają tu istotną rolę (liczba organizacji pozarządowych, frekwencja wyborcza lub predyspozycje samorządu terytorialnego). Około 70% gmin obu typów pozostało jednocześnie w 1 klasie rankingu generalnego i rankingu aktywności społecznej. Dla 1 klasy rankingu generalnego i rankingu aktywności ekonomicznej ten udział był jeszcze większy - od 80% dla jednostek wiejskich do prawie 90% w przypadku gmin miejsko-wiejskich. Położenie w bliskiej odległości od miasta stanowi ważny czynnik pobudzający wzrost gmin podmiejskich. Ponad 80% wysoko rozwiniętych jednostek z rankingu generalnego było zlokalizowanych w Warszawskim Obszarze Metropolitarnym. Ponadto do najniższej grupy rozwojowej nie zaliczono gmin ze strefy podmiejskiej Warszawy. Niski poziom aktywności gospodarczej i społecznej charakteryzował jedynie wiejskie gminy peryferyjne.

Introduction

Neither local development nor smart management of self-government can work without the involvement of residents and considering the fact that the municipality joins residents of different social spheres (SUNINA, RIVZA 2016). Local authorities (originating from the local community) and local social initiatives play a special role in community development (PYTLAK 2011, POMIANEK, BIERNAT-JARKA 2011, POMIANEK, KOWALCZYK 2016). They can influence not only the society's quality of life, but also the attractiveness of the community as a potential business location (DREJERSKA et al. 2014). According to endogenous development factors, local development is best measured at the LAU-2 level, which is at the communal level in Poland (referred to in the literature variously as gminas, communes, communities, municipalities). These factors are calculated more accurately and better reflect the local reality. Unfortunately, data availability is a big problem, because the Central Statistical Office of Poland (GUS) does not collect some potentially significant data on the local level. These are available only at the LAU-1 level (in the literature: at the level of poviats, districts or counties) or the NUTS-3 level (in the literature: Voivodships, provinces, regions), so it would be difficult or impossible to adapt them to differentiate the level of a particular phenomenon in gminas (POMIANEK, CHRZANOWSKA 2016). The aim of the research was to recognise the correlation between economic and social activeness and the local development level of semi-urban and rural gminas in Mazowieckie Voivodeship.

Material and Methods

The study included all rural (228) and semi-urban (51) gminas in Mazowieckie Voivodeship, according to their administrative state on 31.12.2015 (279 gminas in total). Urban gminas (35 large cities) were excluded from the analysis. Data from 2014 used to construct development indexes were taken from the Local Data Bank of the Central Statistical Office in Poland (GUS), while data on electoral turnout for the lower house of the Polish parliament (the Sejm) for the 2015 election came from the National Election Commission in Poland (PKW). Hellwig's method was used to provide 3 rankings of rural and semi-urban gminas in Mazowieckie Voivodeship. Regarding data availability at the LAU-2 level, a set of eight variables was prepared for the general ranking (Tab. 1).

The next two variables were selected for the ranking of economic activeness (Tab. 2).

Finally, four variables were used to construct the ranking of social activeness (Tab. 3).

Table 1

Diagnostic variables applied in the research – general ranking

Symbol	Diagnostic variables
Demographic variables	
X_1	Population density (population per 1 square kilometre)
X_2	Birth rate (balance of births and deaths per 1,000 inhabitants)
X_3	Balance of net migration per 1,000 inhabitants
X_4	Demographic dependency ratio (percent of post-working age population per 100 inhabitants of working age)
Infrastructural and investment variables	
X_5	Gmina property investment expenditures per capita
X_6	Proportion of population with a connection to a water supply
X_7	Proportion of population with a connection to waste water disposal
X_8	Proportion of children aged 3-5 participating in preschool education

Source: the Author's calculations.

Table 2

Diagnostic variables applied in the research – ranking of economic activeness

Symbol	Diagnostic variable
Economic activeness	
X_9	National economy entities registered in REGON per 10,000 population
X_{10}	Proportion of individuals in the working age population registered as unemployed

Source: the Author's calculations.

Table 3

Diagnostic variables applied in the research – ranking of social activeness

Symbol	Diagnostic variable
Social activeness	
X_{12}	Foundations, associations and social organisations per 10,000 inhabitants
X_{15}	Electoral turnout for the lower house of the Polish parliament for the 2015 election
X_{13}	Proportion of councillors with university degrees
X_{14}	Proportion of councillors with high professional qualifications

Source: the Author's calculations.

The multidimensionality of rural development justifies the use of multivariate analysis methods, including taxonomic ones. Hellwig's synthetic measure of development (SM_i) groups information from a set of diagnostic features and assigns a single (aggregate) measure to an analysed objects using values from 0 to 1 under the assumption that in doing so, a lower value SM_i determines a higher level of the occurrence under analysis (see: HELLWIG 1968). The formula for determining this measure is as follows:

- normalisation of diagnostic variables (x_{ij});
- making all variables homogenous by turning them into stimulants;
- constructing the object with the best (highest) values of the diagnostic variables (pattern):

$$z_{0j} = \max_i \{z_{ij}\} \quad (1)$$

where:

- z_{ij} – the normalised values which have been observed in the (whole) data set;
- calculating the Euclidean distance (d_i) of each object from the constructed pattern:

$$d_i = \sqrt{\frac{1}{m} \sum_{j=1}^m (z_{ij} - z_{0j})^2} \quad (2)$$

where:

- $i = 1, \dots, n$ – the number of objects,
- $j = 1, \dots, m$ – the number of variables,
- z_{ij} – the normalised value of the variable j for the object i ,
- z_{0j} – the normalized value of the pattern's variable j ;

– the Hellwig measure is normalised by the following formula:

$$z_i = 1 - \frac{d_i}{d_0} \quad (3)$$

where:

d_0 – the value determined by the formula,

$$d_0 = \max_i \{d_i\} \quad (4)$$

Two parameters: arithmetic mean and standard deviation, were used in the classification of gminas by their level of development. Following classes were defined:

– class 1 (high level of development) $d_i > \bar{d}_i + s_{d_i}$ (gminas at a distance from the pattern exceeding $\bar{d}_i + s_{d_i}$);

– class 2 (medium level of development) $\bar{d}_i - s_{d_i} < d_i \leq \bar{d}_i + s_{d_i}$ (gminas at a distance from the pattern ranging $(\bar{d}_i - s_{d_i}, \bar{d}_i + s_{d_i})$);

– class 3 (low level of development) $d_i \leq \bar{d}_i - s_{d_i}$ (gminas at a distance from the pattern not exceeding $\bar{d}_i - s_{d_i}$),

where:

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

\bar{d}_i – the arithmetic mean of d_i ,

s_{d_i} – the standard deviation of d_i .

Results and Discussion

Table 4 presents the structure of development classes in three rankings: The general ranking (G-ranking), the economic activeness ranking (EA-ranking) and the social activeness ranking (SA-ranking).

The rankings included 279 gminas. The first, the G-ranking, was based on demographic and infrastructure variables. The 1st Class (of high level of development) comprised 13.6% of the analysed units (35.3% of semi-urban gminas and 8.8% of rural gminas). The 2nd Class included 75.3% of gminas: 78.5% of rural units and 60.8% of semi-urban ones. Other gminas (11.1%) were classified as 3rd Class. The lowest level of development characterised 12.7% of rural gminas and 3.9% of semi-urban ones only.

The EA-ranking's 1st Class included 12.9% of the analysed units, with 8.2% of rural and 33.3% of semi-urban ones. The medium-development class was comprised of 80% (83.8% of rural gminas and 66.7% of semi-urban units). The 3rd Class included 7.9% rural gminas (6.6% of the total number of analysed units).

Table 4

Structure of development classes determined by Hellwig's method

Groups of gminas	Development classes						Total number of gminas
	1 st Class		2 nd Class		3 rd Class		
	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	
General ranking							
Rural	20	8.8	179	78.5	29	12.7	228
Semi-urban	18	35.3	31	60.8	2	3.9	51
Total	38	13.6	210	75.3	31	11.1	279
Economic activeness' ranking							
Rural	19	8.3	191	83.8	18	7.9	228
Semi-urban	17	33.3	34	66.7	0	0.0	51
Total	36	12.9	225	80.6	18	6.5	279
Social activeness' ranking							
Rural	22	9.6	170	74.6	36	15.8	228
Semi-urban	16	31.4	35	68.6	0	0.0	51
Total	38	13.6	205	73.5	36	12.9	279

Source: the Author's calculations.

The 1st Class in the last ranking (related to social activeness) included 20.4% of the analysed units (9.6% of rural gminas and 68.6% of semi-urban ones). A medium level of development in social activeness characterised 73.5% of gminas, i.e. 74.6% of rural and 68.6% of semi-urban units. Finally, the 3rd Class had the highest percentage in comparison to the same classes in the two previous rankings. Again, there were no semi-urban gminas in the group from the lowest level. The rural communes amounted to about 15.8% of the entire rural group, and a 12.9% share of all analysed gminas.

Due to the growth of cities and their expansion beyond urban borders, suburban areas are exposed to particularly strong investment pressure. Such gminas face the challenge of imposing spatial order in areas experiencing intensive development. On the other hand, being located in near proximity to a city is an important growth stimulant for suburban gminas (WOLNY et al., 2014). Analysis of the G-ranking results show that among highly-developed gminas as many as 31 out of 38 (81.6% of the 1st Class units) were surrounding Warsaw (the capital). There were no Warsaw Metropolitan Area gminas in the 3rd Class of the ranking (Tab. 5).

Table 5

G-ranking: top and bottom 15 gminas

1 st Class – top 15				3 rd Class – bottom 15			
Position	LAU-1	LAU-2 (gminas)	d_i	position	LAU-1	LAU-2 (gminas)	d_i
1	piaseczyński	Piaseczno ^s	0.626	265	makowski	Rzewnie ^r	0.075
2	pruszkowski	Michałowice ^r	0.582	266	przysuski	Kłwów ^r	0.075
3	piaseczyński	Lesznowola ^r	0.573	267	żuromiński	Siemiątkowo ^r	0.072
4	pruszkowski	Raszyn ^r	0.522	268	ostrowski	Szulborze Wielkie ^r	0.056
5	grodziski	Grodzisk Mazowiecki ^s	0.495	269	lipski	Chotcza ^r	0.047
6	wołomiński	Wołomin ^s	0.493	270	żuromiński	Lutocin ^r	0.044
7	warszawski	Ożarów Mazowiecki ^s	0.471	271	sokołowski	Sabnie ^r	0.042
8	pruszkowski	Nadarzyn ^r	0.470	272	sokołowski	Sterdyń ^r	0.036
9	warszawski	Łomianki ^s	0.452	273	sokołowski	Ceranów ^r	0.032
10	grodziski	Jaktorów ^r	0.444	274	węgrowski	Wierzbno ^r	0.022
11	pruszkowski	Brwinów ^s	0.432	275	siedlecki	Korczew ^r	0.016
12	warszawski	Stare Babice ^r	0.425	276	lipski	Solec nad Wisłą ^r	0.016
13	miński	Halinów ^s	0.412	277	ostrowski	Nur ^r	0.008
14	warszawski	Błonie ^s	0.406	278	mławski	Dzierzgowo ^r	0.001
15	legionowski	Nieporęt ^r	0.395	279	siedlecki	Przesmyki ^r	0.000

Note: ^r – rural gminas, ^s – semi-urban gminas

Source: the Author's calculations.

Table 6 presents results of the analysis of economic activeness variables: The number of national economy entities registered in REGON per 10,000 inhabitants (stimulant) and the proportion of individuals registered as unemployed in the working-age population (destimulant). As CHRZANOWSKA, DREJERSKA and POMIANEK found in 2013, the majority (91.7%) of 1st Class gminas were situated in the Warsaw Metropolitan Area. Nevertheless, the rest of the gminas were located in suburban areas of large cities (rural units: Słupno, Siedlce) or played an administrative role in the region (Białobrzegi, semi-urban gmina, as a seat of the LAU-1 unit). A low level of economic activeness development characterised only rural peripheral gminas.

The same situation can be observed in the social activeness ranking: Only peripheral rural communes in the 3rd Class and the Warsaw Metropolitan Area's gminas dominate among the highly-developed units. However, at 68.4%, it was less pronounced than in previous rankings. The top and bottom gminas are presented in Table 7.

Table 6

EA-ranking: top and bottom 15 gminas

1 st Class – top 15				3 rd Class – bottom 15			
Position	LAU-1	LAU-2 (gminas)	d_i	position	LAU-1	LAU-2 (gminas)	d_i
1	piaseczyński	Lesznowola ^r	0.964	265	zwoleński	Przyłęk ^r	0.114
2	warszawski	Łomianki ^s	0.806	266	lipski	Chotcza ^r	0.113
3	pruszkowski	Michałowice ^r	0.768	267	szydłowiecki	Orońsko ^r	0.110
4	pruszkowski	Raszyn ^r	0.736	268	gostyniński	Szczawin Kościelny ^r	0.109
5	pruszkowski	Nadarzyn ^r	0.684	269	przysuski	Rusinów ^r	0.109
6	warszawski	Izabelin ^r	0.650	270	radomski	Gózd ^r	0.107
7	warszawski	Stare Babice ^r	0.643	271	żuromiński	Siemiątkowo ^r	0.105
8	piaseczyński	Piaseczno ^s	0.642	272	szydłowiecki	Jastrząb ^r	0.099
9	pruszkowski	Brwinów ^s	0.604	273	radomski	Pionki ^r	0.090
10	piaseczyński	Konstancin-Jeziorna ^s	0.599	274	przysuski	Wieniawa ^r	0.088
11	legionowski	Jabłonna ^r	0.591	275	radomski	Przytyk ^r	0.086
12	legionowski	Nieporęt ^r	0.564	276	szydłowiecki	Mirów ^r	0.073
13	warszawski	Ożarów Mazowiecki ^s	0.535	277	przysuski	Gielniów ^r	0.048
14	otwocki	Wiązowna ^r	0.522	278	przysuski	Borkowice ^r	0.040
15	legionowski	Wieliszew ^r	0.522	279	szydłowiecki	Chlewiska ^r	0.039

Note: ^r – rural gminas, ^s – semi-urban gminas

Source: the Author's calculations.

Table 7

SA-ranking: top and bottom 15 gminas

1 st Class – top 15				3 rd Class – bottom 15			
Position	LAU-1	LAU-2 (gminas)	d_i	position	LAU-1	LAU-2 (gminas)	d_i
1	2	3	4	5	6	7	8
1	warszawski	Izabelin ^r	0.776	265	wołomiński	Poświętne ^r	0.088
2	piaseczyński	Lesznowola ^r	0.696	266	gostyniński	Pacyna ^r	0.085
3	warszawski	Łomianki ^s	0.679	267	płocki	Staroźreby ^r	0.080
4	piaseczyński	Piaseczno ^s	0.655	268	żuromiński	lubowidz ^r	0.079
5	pruszkowski	Brwinów ^s	0.640	269	płoński	Nowe Miasto ^r	0.079
6	piaseczyński	Konstancin-Jeziorna ^s	0.632	270	płoński	Raciąż ^r	0.078

cont. Table 7

1	2	3	4	5	6	7	8
7	grodziski	Grodzisk Mazowiecki ^s	0.615	271	ostrołęcki	Baranowo ^r	0.065
8	otwocki	Wiązowna ^r	0.563	272	ciechanowski	Ojrzeń ^r	0.055
9	legionowski	Nieporęt ^r	0.550	273	mławski	Dzierzgowo ^r	0.042
10	legionowski	Wieliszew ^r	0.536	274	lipski	Ciepielów ^r	0.040
11	kozienicki	Kozienice ^s	0.522	275	zwoleński	Tczów ^r	0.033
12	grójecki	Grójec ^s	0.519	276	płoński	Czerwińsk nad Wisłą ^r	0.030
13	sztydlowiecki	Szydłowiec ^s	0.515	277	żuromiński	Lutocin ^r	0.028
14	pułtuski	Pułtusk ^s	0.508	278	garwoliński	Maciejowice ^r	0.014
15	warszawski	Błonie ^s	0.499	279	żuromiński	Kuczborc-Osada ^r	0.007

Note: ^r – rural gminas, ^s – semi-urban gminas

Source: the Author's calculations.

Analysis shows that 25 gminas remained in the 1st Classes of the three above rankings. Most (23) were situated in the Warsaw Metropolitan Area, where the strong impact of the capital on surrounding rural and semi-urban areas is visible (see also: DREJERSKA et al. 2014, ŚLESZYŃSKI 2013, RAKOWSKA 2014). The other two gminas from the group – Słupno and Siedlce - bordered large cities of great economic importance (Płock and Siedlce). Furthermore, there was only one unit classified in the 3rd Class of development three times – Chotcza, which is rural and situated on the southern border of Mazowieckie and Lubelskie Voivodeships, in the peripheral area.

Table 8

Gminas remaining in the extreme classes in the three rankings

Gminas occurring in the 1 st Class of the three rankings	Gminas occurring in 3 rd Class of the three rankings
Piaseczno ^s , Michałowice ^r , Lesznowola ^r , Grodzisk Mazowiecki ^s , Ożarów Mazowiecki ^s , Nadarzyn ^r , Łomianki ^s , Jaktorów ^r , Brwinów ^s , Stare Babice ^r , Halinów ^s , Błonie ^s , Nieporęt ^r , Konstancin-Jeziorna ^s , Wieliszew ^r , Jabłonna ^r , Izabelin ^r , Serock ^s , Wyszaków ^s , Grójec ^s , Słupno ^r , Wiązowna ^r , Czosnów ^r , Teresin ^r , Siedlce ^r	Chotcza ^r

Note: ^r – rural gminas, ^s – semi-urban gminas

Source: the Author's calculations.

As Table 9 shows, 22 units from the 3rd Class of the G-ranking were found in the 2nd Classes in the other rankings. These were only peripheral areas of Mazowieckie Voivodeship, located at a distance from Warsaw (the capital) and other large cities of the region. However, if economic and social activeness continue this way, these units may be upgraded to the 2nd or even 1st Class of the G-ranking.

Table 9

Units found in the 3rd Class of the G-ranking and remaining in the 2nd Class of the EA- and SA-rankings

Position in the G-ranking	LAU-1	LAU-2 (gminas)	d_i	Position in the G-ranking	LAU-1	LAU-2 (gminas)	d_i
251	mławski	Stupsk ^r	0.098	264	węgrowski	Grębków ^r	0.078
252	siedlecki	Mordy ^s	0.096	265	makowski	Rzewnie ^r	0.075
253	sierpecki	Zawidz ^r	0.094	266	przysuski	Klwów ^r	0.075
254	sokołowski	Jabłonna Lacka ^r	0.094	271	sokołowski	Sabnie ^r	0.042
255	garwoliński	Trojanów ^r	0.092	272	sokołowski	Sterdyń ^r	0.036
256	białobrzeski	Radzanów ^r	0.089	273	sokołowski	Ceranów ^r	0.032
257	białobrzeski	Promna ^r	0.089	274	węgrowski	Wierzbno ^r	0.022
258	płoński	Joniec ^r	0.087	275	siedlecki	Korczew ^r	0.016
260	sokołowski	Repki ^r	0.085	276	lipski	Solec nad Wisłą ^r	0.016
261	ostrołęcki	Czarnia ^r	0.084	277	ostrowski	Nur ^r	0.008
263	sokołowski	Kosów Lacki ^s	0.081	279	siedlecki	Przesmyki ^r	0.000

Note: ^r – rural gminas, ^s – semi-urban gminas

Source: the Author's calculations.

Two semi-urban gminas (Pilawa and Tłuszcz) as well as three rural units (Rzekuń, Mińsk Mazowiecki and Jedlnia-Letnisko), were classified as 1st Class in the G-ranking and were included in the medium development class in the EA- and SA-rankings. Therefore, there is concern that if the situation remains unchanged, these municipalities may be downgraded in the coming years.

Statistical analysis (using Pearson's correlation coefficient) showed a high correlation between the results¹ of the G-ranking and EA-ranking (amounting to 0.79) as well as a moderate correlation between the results of the G-ranking and the SA-ranking (0.63). Moreover, the examined correlation between the EA-ranking and SA-ranking amounted to 0.68, statistically confirming the above groupings of gminas.

¹ 100 gminas, d_i for each gmina.

Conclusions

Determinants of local development have been a combination of several factors. These include demographic, historical and natural conditions; the local government's predispositions, activeness and policy; social initiatives; economic activeness. The analysis presented shows that demographic and infrastructural conditions, including the number of enterprises and unemployed, have been strongly correlated to economic activeness. On the other hand, social determinants (the number of NGOs, electoral turnout or the local government's predispositions) also play an important role. About 70% of both semi-urban and rural gminas remained in the 1st Classes of the G-ranking and in the SA-ranking at the same time. For the 1st Classes of the G-ranking and EA-ranking, the participation was even higher – from 80% for rural units to almost 90% for semi-urban gminas. Lying in the proximity of a city is an important growth stimulant for suburban gminas. More than 80% of highly developed units in the G-ranking were located in the Warsaw Metropolitan Area. Furthermore, there were no capital suburban gminas in the lowest development group. Low levels of both economic and social activeness characterised only rural peripheral gminas.

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