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SPATIAL VARIATIONS IN THE SOCIOECONOMIC DEVELOPMENT OF RURAL MUNICIPALITIES IN PODKARPACKIE VOIVODESHIP

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ABSTRACT

The main goal of all territorial administration units, including municipalities, is to promote socioeconomic development. The implemented actions address a broad range of economic, social, spatial and environmental issues. Therefore, socioeconomic development is a complex and multi-dimensional concept that is difficult to evaluate in an unambiguous and objective manner. Statistical methods in object-based multidimensional modeling support such evaluations by considering numerous attributes/variables, which increases the efficiency of the analytical process. In this article, Hellwig's development pattern method was applied to classify rural municipalities in Podkarpackie Voivodeship based on their socioeconomic development. Twenty-seven indicators were designed for the needs of the analysis with the use of Statistics Poland data for 2018. Based on the results, the municipalities were grouped into four classes with different levels of socioeconomic development. Class III was the largest group, and it was composed of 39 municipalities with a medium-low level of socioeconomic development. Class II was composed of a similar number of municipalities (38) with a medium-high level of socioeconomic development. The smallest groups were Class I containing 18 municipalities with a high level of socioeconomic development, and class IV containing 14 municipalities with a low level of development.

Keywords: socioeconomic development, indicators of socioeconomic development, Hellwig's method, Podkarpackie Voivodeship

INTRODUCTION

Rural areas cover 93.2% of Poland's territory and are inhabited by nearly 40% of the Polish population [www.stat.gov.pl]. Therefore, rural areas play a very important role in the social, economic and environmental development of the country. Socioeconomic development induces dynamic changes in rural areas [Pawlewicz, 2017, Kryk, 2019]. For this reason, social and economic measures implemented at the local level should aim to improve the inhabitants' welfare, living standards and quality of life [Janusz, 2020]. These goals are achieved primarily by promoting housing construction, protecting the natural environment, improving the availability of technical and social infrastructure, designing policy frameworks that support investment, and promoting social and economic mobilization of local communities. Measures and strategies that are implemented in a rational and conscientious manner contribute to the socioeconomic

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advancement of local inhabitants and territorial units [Bański & Czapiewski, 2008, Stanny, 2013].

Socioeconomic development is a multi-faceted concept that cannot be measured or expressed by a single indicator. Therefore, complex phenomena are characterized with the use of synthetic (composite) variables that replace a high number of individual indicators [Holgado Molina et al., 2015, Kuropka, 2001, Pérez et al., 2015]. The search of effective metrics for monitoring local development indicates that official statistics are still the most reliable sources of data for designing development indicators, despite their numerous flaws. The attributes used in comparisons of territorial units are most suitable for monitoring changes, and they can constitute input data. These include benchmark values for gauging changes in successive periods of the analysis, and they provide basic information about the socioeconomic status of a given area [Brodziński, 2011].

The aim of this study was to classify rural municipalities in Podkarpackie Voivodeship based on their socioeconomic development. The analysis relied on 34 indicators that were selected based on Statistics Poland data for 2018. A total of 109 rural municipalities were analyzed. Local development is an inseparable element of the socioeconomic development of both regions and entire countries. Local resources and factors influence local communities as well as entire societies on a macroeconomic scale. Local development should be monitored to assess the effectiveness of social and economic policies at different levels of territorial administration. The proposed composite measure of socioeconomic development could be an effective tool for diagnosing local problems, adjusting regional policies, minimizing inequalities and promoting regional growth.

MATERIALS AND METHODS

Study Area

Podkarpackie Voivodeship is the south-easternmost Polish region. It neighbors Lublin, Świętokrzyskie and Małopolska Voivodeships in the north and west. Podkarpackie borders Ukraine (Lviv District and, along a small section of the border, Zakarppatia District) in the east, and Slovakia (Prešov District) in the south [Development strategy of Podkarpackie Voivodeship 2030. Draft, 2019] (Fig. 1).

Rural areas span 16,646 km^2 in Podkarpackie and occupy more than 93% of the voivodeship's territory. Rural municipalities cover 73% of that territory and are inhabited by 912,982 people, i.e. around 43% of the voivodeship's total population [www.stat.gov.pl, date: 20.11.2020]. Podkarpackie is characterized by significant variations in natural conditions, socioeconomic development, infrastructure availability, ecological factors and history, which is why local land management strategies differ considerably from those implemented in other Polish voivodeships. The physiographic features of Podkarpackie include mountains, hills, valleys and lowlands. Natural resources and favorable soil and climate conditions play an important role in the region's economic growth. In a synthetic approach, Podkarpackie is characterized by a low level of development, low economic performance, low infrastructure availability and a low standard of living. The three main sectors of the local economy are industry, agriculture, and tourism and recreation. The accompanying areas of economic activity include transport, construction, community and cultural services, national parks and nature reserves that protect valuable ecosystems. Industry plays an important role in the development of Podkarpackie [Development strategy of Podkarpackie Voivodeship for 2007–2020, 2006].

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Fig. 1. Location of Poland and Podkarpackie Voivodeship
Source: own elaboration.

Methods

The socioeconomic development of rural municipalities in Podkarpackie Voivodeship was determined with the use of Hellwig's development pattern model, which is one of the oldest [Wysocki, 2010] and the most popular pattern methods [Panek & Zwierzchowski, 2013]. Data for analysis were acquired from Statistics Poland. The study was conducted according to the following procedure:

1. The literature was analyzed [Bański & Czapiewski, 2008, Brodziński, 2011, Dziekański, 2015, Heffner & Stanny, 2007, Kamińska & Janulewicz, 2009, Knapik & Kowalska, 2014, Ossowska, 2016, Pawlewicz et al., 2015, Ziemiańczyk, 2010] to select variables corresponding to different components (social, economic, infrastructural, environmental) of socioeconomic development in rural municipalities. The variables were chosen based on their availability and completeness. A total of 34 indicators were selected for the study.

2. Diagnostic attributes (indicators) were eliminated in a statistical analysis. A set of diagnostic attributes should be selected by analyzing the variation and correlation between potential attributes. The selected attributes (indicators) should be characterized by high variation in the set of the evaluated objects, and they should be weakly correlated with one another [Wysocki, 2010]. The variability of diagnostic attributes (indicators) was determined by calculating their coefficients of variation [Panek & Zwierzchowski, 2013]:

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$$V_j = \frac{s_{s\,j}}{\bar{x}_j}, \quad j = 1, 2, \ldots, n, \tag{1}$$

where: $\bar{x}_j$ is the arithmetic mean, and s_{s_j} is the standard deviation of the jth attribute (indicator).

Attributes characterized by low values of the coefficient of variation weakly discriminate the analyzed objects, and, therefore, have low information value. Indicators for which the coefficient of variation does not exceed a low and arbitrarily determined threshold value of V^*, where $Vj \leq V^*$, are eliminated from the set of diagnostic attributes. In most cases, $V^* = 0.1$ [Panek & Zwierzchowski, 2013].

Highly correlated attributes were eliminated by analyzing the diagonal elements of the inverse correlation matrix. The variables whose value on the main diagonal exceeded 10 were not considered in the study [Malina & Zeliaś, 1997]. The indicators were arranged in a decision matrix $X_{mxn,}$ where rows correspond to the analyzed objects (municipalities) and columns represent diagnostic attributes (indicators of socioeconomic development). In the decision matrix, x_{ij} is value of the j^{th} attribute ($j = 1, \ldots, n$) of the i^{th} object ($i = 1, \ldots, m$). The list of the variables (indicators) selected for the study is presented in Table 1.

Table 1. Indicators of socioeconomic development

No.	Social indicators
1	x_1 – Birth rate per 1000 population (S)
2	x_2 – Number of outpatient clinics per 10,000 population (S)
3	x_3 – Average floor area per person in residential buildings (S)
4	x_4 – Percentage of dwellings with central heating (S)
5	x_5 – Gross enrollment rate in primary schools (S)
6	x_6 – Number of children enrolled in kindergartens per 1,000 children aged 3–5 years (S)
7	x_7 – Number of books in public libraries per 1000 population (S)
8	x_8 – Number of welfare recipients per 10,000 population (D)
9	x_9 – Total public welfare expenditure per capita (S)
	Economic indicators
10	x_{10} – Number of employed adults per 1000 population (S)
11	x_{11} – Unemployment rate in the working-age population (D)
12	x_{12} – Number of businesses entered into the REGON business register per 10,000 population (S)
13	x_{13} – Municipal own-source revenues per capita (S)
14	x_{14} – Proportion of investment expenditures in total expenditures (S)
	Infrastructure indicators
15	x_{15} – Coverage of the water supply network per 100 km^2 (S)
16	x_{16} – Coverage of the gas supply network per 100 km^2 (S)
17	x_{17} – Coverage of the sewerage network per 100 km^2 (S)
18	x_{18} – Percentage of the population with access to the water supply network (S)
19	x_{19} – Percentage of the population with access to the gas supply network (S)
20	x_{20} – Percentage of the population with access to the sewerage network (S)
21	x_{21} – Total number of hotel beds per 1000 population (S)
	Environmental indicators
22	x_{22} – Percentage of nature conservation areas in the total area of the municipality (S)
23	x_{23} – Green areas per 1000 ha (S)
24	x_{24} – Forest cover in % (S)
25	x_{25} – Mixed waste collected per capita per year (D)
26	x_{26} – Industrial and municipal wastewater requiring treatment that is evacuated to water bodies or the ground per capita per year (D)
27	x_{27} – Number of natural monuments per 1000 ha (S)

S – stimulant, D – destimulant
Source: own elaboration.

3. The composite (synthetic) measure of socioeconomic development was calculated with the use of Hellwig's development pattern method.

The composite measure of socioeconomic development was designed based on the following observation matrix [Hellwig, 1968]:

$$X = \begin{bmatrix} x_{11} & x_{12} \ldots & x_{1m} \\ x_{21} & x_{22} \ldots & x_{2m} \\ \ldots & \ldots \ldots & \ldots \\ x_{n1} & x_{n_2} \ldots & x_{nm} \end{bmatrix}, \tag{2}$$

where: x_{ij} ($i = 1,2, \ldots, m$) is the value of the j^{th} attribute of the i^{th} object.

The selected diagnostic variables are expressed in different units of measurement, and they have to be normalized for comparative purposes. The aim of the normalization procedure is to standardize data and eliminate units of measurement. Data were normalized with the use of the following formula:

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$$z_{ij} = \frac{(x_{ij} - \bar{x}_j)}{S_j}, \quad (j= 1, 2, \ldots, m), \tag{3}$$

where:

$$\bar{x}_j = \frac{1}{n}\Sigma_{i=1}^{n} x_{ij} \qquad s_j = \sqrt{\frac{1}{n}\Sigma_{i=1}^{n}(x_{ij} - \bar{x}_j)^2} \tag{4}$$

The above procedure produced matrix Z of the standardized values of attributes.

$$Z = \begin{bmatrix} z_{11} & z_{12} \ldots & z_{1m} \\ z_{21} & z_{22} \ldots & z_{2m} \\ \ldots & \ldots \ldots & \ldots \\ z_{n1} & z_{n_2} \ldots & z_{nm} \end{bmatrix}, \tag{5}$$

The matrix was used to establish the development pattern, namely an abstract object P_0 with the most desirable values of the analyzed variables, i.e. the highest values of stimulants and the lowest values of destimulants [Hellwig, 1968]:

$$P_0 = [z_{01}, z_{02}, \ldots, z_{0k}], \tag{6}$$

where: $z_{0k} = \max \{z_{ik}\}$, when z_k is a stimulant, and $z_{0k} = \min \{z_{ik}\}$, when z_k is a destimulant.

In the next step, Euclidean distances were calculated between each analyzed object, i.e. a rural municipality (P_i), and the identified development pattern (P_0):

$$q_i = \sqrt{\Sigma_{j=1}^{m}(z_{ij} - z_{0j})^2} \tag{7}$$

The calculated Euclidean distances were used to compute Hellwig's composite (synthetic) measure of development:

$$S_i = 1 - \frac{q_i}{q_0} \qquad (i = 1, 2, \ldots, n), \tag{8}$$

where:

$$q_0 = \bar{q}_0 + 2S_0, \quad \bar{q}_0 = \frac{1}{n}\Sigma_{i=1}^{n} q_i, \quad s_0 = \sqrt{\frac{1}{n}\Sigma_{i=1}^{n}(q_i - \bar{q}_0)^2} \tag{9}$$

The socioeconomic development of the analyzed municipalities was assessed based on the values of Hellwig's composite measure of development. The described measure generally assumes values in the range of [0,1]. Values closer to 1 represent higher levels of development in the evaluated municipalities. However, Hellwig's composite measure can take on negative values when the value of one attribute is significantly lower relative to the remaining parameters, and when numerous objects are analyzed [Wysocki, 2010].

4. The analyzed objects (municipalities) were arranged in a linear order, and the studied municipalities were grouped into four classes of socioeconomic development based on the arithmetic mean and standard deviation of Hellwig's composite measure. The classes were established with the use of the following procedure [Wysocki, 2010]:

– Class I – high level of socioeconomic development:

$$S_i \geq \bar{S}_i + s_{s_i},$$

– Class II – medium-high level of socioeconomic development:

$$\bar{S}_i \leq S_i < \bar{S}_i + s_{s_i},$$

– Class III – medium-low level of socioeconomic development:

$$\bar{S}_i - s_{s_i} \leq S_i < \bar{S}_i,$$

– Class IV – low level of socioeconomic development:

$$S_i < \bar{S}_i - s_{s_i},$$

where:

S_i – value of the composite measure,
$\bar{S}_i$ – arithmetic mean of the composite measure,
S_{s_i} – standard deviation of the composite measure.

RESULTS AND DISCUSSION

The calculated values of Hellwig's composite measure were used to evaluate the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Based on the results, the municipalities were divided into four classes in line with the adopted procedure, and they are presented in Table 2.

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Table 2. Rural municipalities in Podkarpackie Voivodeship divided into four classes of socioeconomic development

Class	Level of socioeconomic development	Range	No. of municipalities
I	Medium-high	0.136-0.247	18 (17%)
II	High	0.090-0.135	38 (35%)
III	Medium-low	0.045-0.089	39 (36%)
IV	Low	-0.003-0.044	14 (13%)

Source: own elaboration.

The values of the composite measure of socioeconomic development ranged from -0.003 to 0.247. The highest value was noted in Lutowiska municipality, and the lowest value was determined in Gawłuszowice municipality.

The largest number of municipalities were allocated to class III with a medium-low level of socioeconomic development. Class III was composed of 39 municipalities, i.e. 36% of the total number of the analyzed objects. Class II denoted a medium-high level of socioeconomic development, and it grouped 38 municipalities (35%). It should be noted that the classes representing the highest and lowest levels of development were least numerous. Class I contained 18 municipalities (17%), and class IV was composed of 14 municipalities (13%). The spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship are illustrated in a map in Figure 2.

The development of class I and II municipalities is fueled mainly by the proximity of urban centers and major transport routes. Cities stimulate the development of the adjacent areas, in particular the performance of non-agricultural sectors of the local economy [Chodkowska-Miszczuk, 2004] which receive an additional boost from good transport links to other parts of the region [Ferens, 2013]. It should also be noted that many urban dwellers relocate to the adjacent rural areas [Harasimowicz, 2018]. This trend was observed in the municipalities of Świlcza, Trzebownisko and Krasne. Urban residents escape from the hustle and bustle of cities, and they can quickly and conveniently commute to work from the surrounding rural areas [Palej, 2008]. In many cases, rural municipalities with high and medium-high levels of socioeconomic development have well-developed technical infrastructure and are situated in the vicinity of national and regional roads. Poland's longest motorway, A4, intersects 12 class I municipalities (Trzebownisko, Krasne, Miejsce Piastowe, Świlcza, Czudec, Ostrów, Gorzyce, Dębica, Jasienica Rosielna, Besko, Zaleszany, Czarna) and one class II municipality (Żyraków). These municipalities are also characterized by a high number of employed adults per 1000 population, high gross enrollment index for primary schools, high birth rate, and high average floor area per person in residential buildings.

The majority of class III and IV municipalities are situated in the peripheral parts of the studied voivodeship. These municipalities are characterized by low availability of transport services due to their peripheral location, low quality of transport infrastructure, high transport costs, and remote location from regional hubs of economic activity [Miszczuk, 2010]. The study also revealed that the level of socioeconomic development decreased over distance from the regional capital. Three class III municipalities (Wielkie Oczy, Stubno and Medyka) and two class IV municipalities (Fredropol and Radymno) are situated along the Polish-Ukrainian border. Two class III municipalities (Komańcza and Krempna) and one class IV municipality (Jaśliska) border Slovakia. In these municipalities, low and medium-low levels of development can be largely attributed to poorly developed technical infrastructure and remote location from the major roads. An analysis of the selected indicators revealed that the development of class III and class IV municipalities was also compromised by a high number of welfare recipients, high unemployment and low birth rates relative to other municipalities.

The presented analysis supported the identification of the main problems in the rural municipalities of Podkarpackie Voivodeship. The most pressing social problems were a low number of outpatient clinics per 10,000 population and low public welfare

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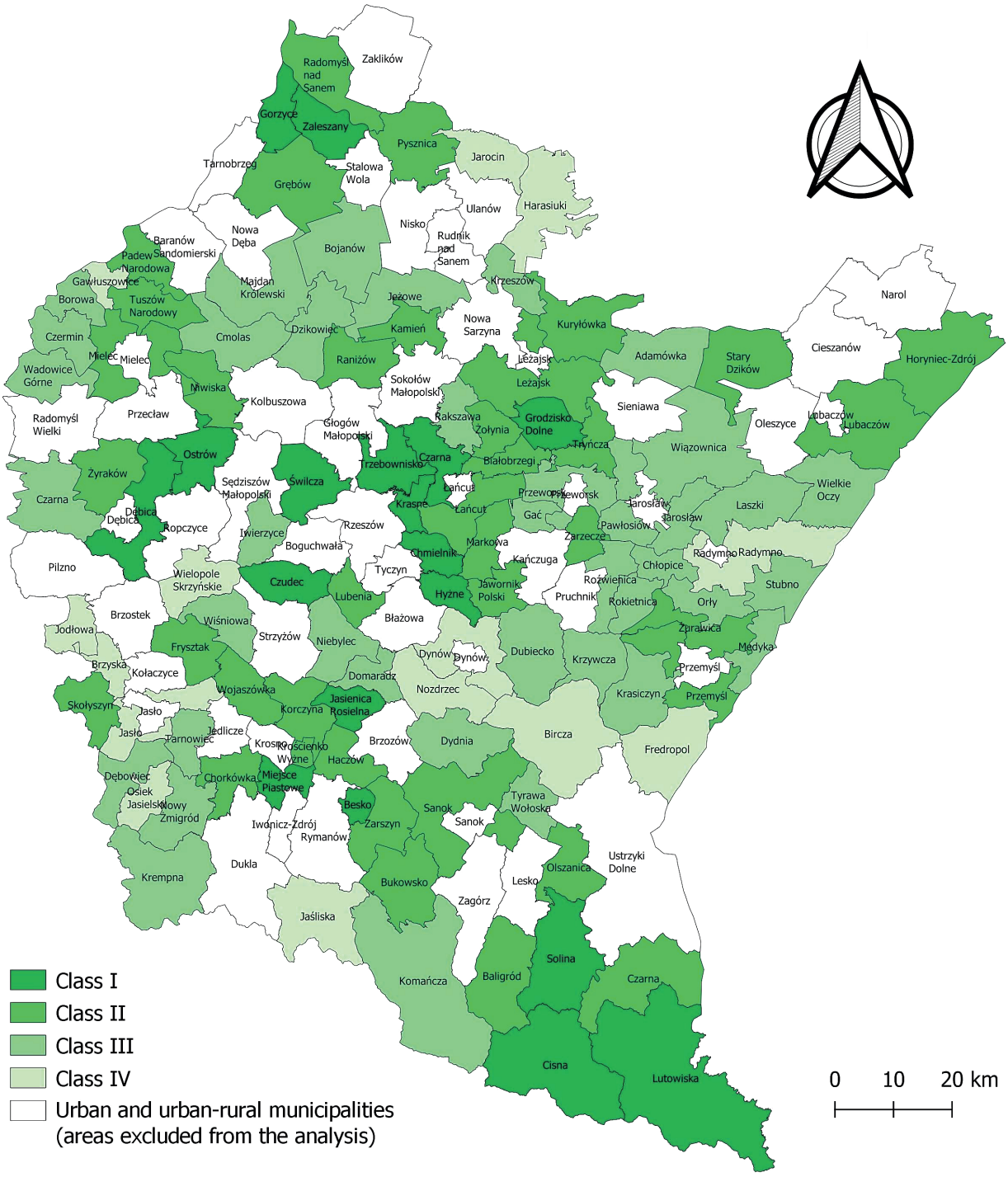

Figure 2. Spatial variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship in 2018
Source: own elaboration based on Statistics Poland data.

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expenditure. In the group of economic indicators, many municipalities were characterized by a low number of employed adults per 1000 population and a relatively high unemployment rate in the working-age population. These findings give cause for concern because undesirable values of the analyzed indicators exacerbate poverty in rural areas [Błaszczyk, 2006]. The majority of the studied municipalities also had low own-source revenues per capita and a low number of businesses listed in the REGON register per 10,000 population. An analysis of infrastructure indicators revealed that similarly to most rural municipalities in Poland [Bański & Czapiewski, 2008], the municipalities in Podkarpackie Voivodeship are characterized by low availability of public utilities, in particular gas supply networks. The evaluated environmental indicators do not pose risks for the development of rural municipalities in Podkarpackie Voivodeship. The quality of the natural environment is high, and the most valuable animal and plant species and their habitats are legally protected in various ways. Nature conservation areas are an important element of Polish and European ecological networks. Bieszczady National Park, Cisna-Wetlina Landscape Park and San Valley Landscape Park belong to the East Carpathians Biosphere Reserve, a transboundary protected area. Podkarpackie ranks fourth in Poland in terms of the highest proportion of nature conservation areas in the voivodeship's territory [Development strategy of Podkarpackie Voivodeship 2030. Draft, 2019]. The only environmental indicators that require significant improvement were mixed waste collected per capita per year, and industrial and municipal wastewater requiring treatment that is evacuated to water bodies or the ground per capita per year. Undesirable values of these indicators were noted mainly in municipalities with a well-developed tourist infrastructure.

CONCLUSIONS

The results of this study revealed considerable variations in the socioeconomic development of rural municipalities in Podkarpackie Voivodeship. Class III was the largest group of 39 municipalities with a medium-low level of socioeconomic development. Class II was a similarly sized group of 38 municipalities with a medium-high level of development. The smallest groups were Class I (18 municipalities) with a high level of socioeconomic development, and Class IV (14 municipalities) with a low level of development. Rural municipalities in Podkarpackie Voivodeship face numerous challenges, mostly in social and economic domains. Above all, low municipal own-source revenues considerably limit public spending in various areas, including social welfare. Inhabitants of the analyzed municipalities are also characterized by low levels of professional and economic activity, which is reflected in a low number of employed adults per 1000 population, a relatively high unemployment rate in the working-age population, and a small number of businesses entered into the REGON business register per 10,000 population. Podkarpackie is also deficient in technical infrastructure, mainly gas supply networks. Environmental indicators were generally satisfactory, and the only parameters that required improvement were mixed waste collected per capita per year, and industrial and municipal wastewater requiring treatment that is evacuated to water bodies or the ground per capita per year, mainly in municipalities with a well-developed tourist sector.

Spatial factors such as the proximity of urban centers and major transport routes play a very important role in the development of the studied municipalities. Classes I and II grouped municipalities situated in the direct vicinity of cities: Rzeszów, Przemyśl, Stalowa Wola, Mielec and Sanok, with good access to major transport routes. In turn, municipalities with medium-low and low levels of socioeconomic development are situated remotely from urban hubs and transport routes, mostly in peripheral areas of Podkarpackie Voivodeship.

Author contributions: The authors have approved the final version of the manuscript. The authors have contributed to the paper as follows: K.P. developed the concept and designed the study, J.F. collected the

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data, J.F. and K.P. analyzed and interpreted the data, J.F. prepared the draft of the article, K.P. revised the article critically for important intellectual content.

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REFERENCES

Bański, J., Czapiewski, K. (2008). *Ekspertyza. Identyfikacja i ocena czynników sukcesu społeczno-gospodarczego na obszarach wiejskich* [*Expert assessment. Identification and evaluation of socioeconomic success factors in rural areas*]. Warszawa, Instytut Geografii i Przestrzennego Zagospodarowania PAN.

Brodziński, Z. (2011). *Stymulowanie rozwoju obszarów wiejskich na poziomie lokalnym na przykładzie gmin województwa warmińsko-mazurskiego* [*Stimulating the development of rural areas at the local level on the example of municipalities in the Voivodeship of Warmia and Mazury*]. Warszawa, Szkoła Główna Gospodarstwa Wiejskiego.

Błaszczyk, B. (2006). Lokalne bezrobocie i ubóstwo – wyzwanie społeczne i moralne [Local unemployment and poverty – a social and a moral challenge]. *Principia*, 46, pp. 245–257.

Chodkowska-Miszczuk, J. (2004). Urbanizacja obszarów wiejskich a rozwój działalności pozarolniczej na przykładzie powiatu bialskiego [Urbanization of rural areas and development of non-agricultural activities on the example of Bialski poviat]. In: *Alternatywne źródła dochodów na gospodarstwie domowym* [*Alternative sources of income in households*]. E., Pałka (ed.). Kielce, Instytut Geografii Akademii Świętokrzyskiej im. Jana Kochanowskiego w Kielcach, pp. 109–119.

Dziekański, P. (2015). Wykorzystanie wskaźnika syntetycznego do oceny poziomu rozwoju samorządu na przykładzie gmin wiejskich województwa świętokrzyskiego [The application of a composite indicator for evaluating the development of territorial self-governments on the example of rural municipalities in Świętokrzyskie Voivodeship]. *Determinanty rozwoju Polski. Finanse publiczne*, pp. 261–279.

Ferens, E. (2013). Turystka jako element wielofunkcyjnego rozwoju obszarów wiejskich na przykładzie województwa mazowieckiego [Tourism as an Element of the Multifunctional Development of Rural Areas: Case of Mazovia Region]. *Zeszyty Naukowe SGGW w Warszawie. Ekonomika i Organizacja Gospodarki Żywnościowej*, 102, pp. 113–125.

Harasimowicz, A. (2018). Suburbanizacja a rola obszarów otaczających miasto – ujęcie teoretyczne [Suburbanization and the role of areas surrounding cities – a theoretical approach]. *Studia Miejskie*, 29, pp. 115–130. doi:10.25167/sm2018.029.08.

Heffner, K., Stanny, M. (2007). Zróżnicowanie gmin wiejskich ze względu na poziom rozwoju społeczno-gospodarczego [Variations in the socioeconomic development of rural municipalities]. In: *Zróżnicowanie poziomu rozwoju społeczno-gospodarczego obszarów wiejskich a zróżnicowanie dynamiki przemian* [*Variations in the Level of Socio-Economic Development of Rural Areas in Poland in Comparison to the Variations in Transformation Dynamics*]. A., Rosner (ed.). Warszawa, Instytut Rozwoju Wsi i Rolnictwa Polskiej Akademii Nauk, pp. 153–164.

Hellwig, Z. (1968). Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i strukturę wykwalifikowanych kadr [The application of the taxonomic method in the typological classification of countries based on their level of development and the availability and structure of a qualified workforce]. *Przegląd Statystyczny*, 15(4), pp. 307–327.

Holgado Molina, M. d. M., Salinas Fernández, J.A., Rodríguez Martín, J.A. (2015). A synthetic indicator to measure the economic and social cohesion of the regions of Spain and Portugal. *Revista de Economía Mundial*, 39, pp. 223–239.

Janusz, M. (2020). The standard of living and its spatial differentiation among rural municipalities in Warmia-Masuria province. *Acta Scientiarum Polonorum Administratio Locorum*, 19(4), pp. 211–228. doi:10.31648/aspal.5687.

Kamińska, A., Janulewicz, P. (2009). Klasyfikacja gmin wiejskich województwa lubelskiego na podstawie rozwoju społeczno-gospodarczego [The Lubelskie voivodeship rural local communities classification according to their social and economic development

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level]. *Folia Pomeranae Universitatis Technologiae Stetinensis. Oeconomica*, 275(57), pp. 31–42.

Knapik, W., Kowalska, M. (2014). Zróżnicowanie obszarów wiejskich w Polsce na tle procesów społeczno-ekonomicznych i demograficznych [Diversification in the rural areas of Poland as against a background of socioeconomic and demographic processes]. *Problemy Drobnych Gospodarstw Rolnych* [*Problems of Small Agricultural Holdings*], 1, pp. 37–54.

Kryk, B. (2019). Rola kapitału ludzkiego i partycypacji społecznej w rozwoju lokalnym w opinii samorządów województwa zachodniopomorskiego [The role of human capital and social participation in local development in the opinion of local governments of the Zachodniopomorskie Voivodeship]. *Acta Scientiarum Polonorum Administratio Locorum*, 18(1), pp. 81–92. doi:10.31648/aspal.3656.

Kuropka, I. (2001). Prognozowanie na podstawie modelu ekonometrycznego [Forecasting based on an econometric model]. In: *Prognozowanie ekonomiczne. Metody i zastosowanie* [*Economic forecasting. Methods and application*]. M., Cieślak (ed.). Warszawa, Wydawnictwo Naukowe PWN, pp. 104–139.

Malina, A., Zeliaś, A. (1997). Taksonomiczna analiza przestrzennego zróżnicowania jakości życia ludności w Polsce w 1994 r. [Taxonomic Analysis of the Spatial Differentiation of the Quality of Life in Poland in 1994]. *Przegląd Statystyczny*, 44(1), pp. 11–27.

Miszczuk, A. (2010). Peryferyjność regionów [Peripherality of regions]. In: *Europejskie wyzwania dla Polski i jej regionów* [*European challenges for Poland and Polish regions*]. A., Tucholska (ed.). Warszawa, Ministerstwo Rozwoju Regionalnego, pp. 236–250.

Ossowska, L. (2016). Zmiany poziomu rozwoju społeczno-gospodarczego w regionie Pomorza Środkowego na tle gmin województw sąsiednich [Changes in the level of socio-economic development in Middle Pomerania compared to communities of neighboring voivodeships]. *Zeszyty Naukowe Wydziału Nauk Ekonomicznych*, 2(20), pp. 77–90.

Palej, A. (2008). Post-Suburbia-miasta o nowych „sercach" [Post-suburbia: cities with new "hearts"]. *Czasopismo Techniczne. Architektura*, 105(4-A), pp. 3–9.

Panek, T., Zwierzchowski, J. (2013). *Statystyczne metody wielowymiarowej analizy porównawczej. Teoria i zastosowania* [*Statistical methods for multidimensional comparative analyses. Theory and application*]. Warszawa, Oficyna Wydawnicza SGH.

Pawlewicz, A., Cieślak, I., Pawlewicz, K., Szuniewicz, K. (2015). Natura 2000 sites and socio-economic development of rural communes in Eastern Poland. *Economic Science for Rural Development Conference Proceedings*, 38, pp. 14–23.

Pawlewicz, K. (2017). Analiza poziomu rozwoju społeczno-gospodarczego gmin wiejskich województwa warmińsko-mazurskiego [Analysis of the socioeconomic development of rural municipalities in the Voivodeship of Warmia and Mazury]. In: *Kształtowanie przestrzeni wiejskiej* [*Management of rural space*]. A. Nowak, R. Cymerman (eds.). Olsztyn, Uniwersytet Warmińsko-Mazurski w Olsztynie. Wydział Geodezji, Inżynierii Przestrzennej i Budownictwa. Instytut Budownictwa, pp. 93–114).

Pérez, A.G., López, M.H., Echeverría, F.R. (2015). *Sustainable development synthetic indicators based on distance for Venezuela*. 7th International Conference on Urban Rehabilitation and Sustainability: Mechanics, Energy, Environment, 42. Rome, WSEAS Press, pp. 194–200.

Stanny, M. (2013). *Przestrzenne zróżnicowanie rozwoju obszarów wiejskich w Polsce* [*Spatial diversity of rural development in Poland*]. Warszawa, Instytut Rozwoju Wsi i Rolnictwa Polskiej Akademii Nauk.

Strategia rozwoju województwa – Podkarpackie 2030. Projekt [*Development strategy of Podkarpackie Voivodeship 2030. Draft*]. (2019). Rzeszów.

Strategia rozwoju województwa podkarpackiego na lata 2007–2020 [*Development strategy of Podkarpackie Voivodeship for 2007–2020*]. (2006). Rzeszów.

Wysocki, F. (2010). *Metody taksonomiczne w rozpoznawaniu typów ekonomicznych rolnictwa i obszarów wiejskich* [*Taxonomic methods for the economic classification of agriculture and rural areas*]. Poznań, Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu.

Ziemiańczyk, U. (2010). Ocena poziomu rozwoju społeczno-gospodarczego gmin wiejskich i miejsko-wiejskich w województwie małopolskim [An assessment of socio-economic development of rural and urban-rural communities in the Malopolska province]. *Infrastruktura i Ekologia Terenów Wiejskich*, 14, pp. 31–40.

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