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INTRA-REGIONAL DIVERSIFICATION OF THE LEVEL OF ENTREPRENEURSHIP RELATIVE TO THE COMPETITIVENESS OF EASTERN POLAND POVIATS

WEWNĄTRZREGIONALNE ZRÓŻNICOWANIE POZIOMU PRZEDSIĘBIORCZOŚCI WZGLĘDEM KONKURENCYJNOŚCI POWIATÓW POLSKI WSCHODNIEJ

Summary: The process of a unit's operation takes place in a space of endogenous and exogenous resources. Entrepreneurship plays an important role in the efficient allocation of resources. The purpose of the article is to analyse the diversity of the level of entrepreneurship of counties ('powiat') in relation to their competitiveness using the synthetic measure of counties of eastern Poland. Data from BDL CSO for 2010-2017 were used as source material. Entrepreneurship and competitiveness are the main determinants of the region's development. A much higher level of competitiveness was characteristic of counties with a higher level of entrepreneurship measure, and the best units are: Mielec, Bieszczady, Leski, Tarnobrzeg, Mielec and Białystok. In 2010, the entrepreneurship measure ranged from 0.04 to 0.43, in 2017 from 0.13 to 0.53 (competitiveness measure from 0.31 to 0.46; from 0.32 to 0.52). The position of counties was shaped by investment outlays, gross value of fixed assets, sold production of industry, economic entities, and own income.

Keywords: entrepreneurship, competitiveness, synthetic measure, county ('powiat'), eastern Poland.

Streszczenie: Proces działania jednostki odbywa się w przestrzeni endogenicznych i egzogenicznych zasobów. Przedsiębiorczość odgrywa istotną rolę w efektywnej alokacji zasobów.

Celem artykułu jest analiza zróżnicowania poziomu przedsiębiorczości powiatów względem ich konkurencyjności z zastosowaniem miary syntetycznej powiatów Polski Wschodniej. Jako materiał źródłowy wykorzystano dane z BDL GUS z lat 2010-2017. Przedsiębiorczość i konkurencyjność są głównymi determinantami rozwoju regionu. Zdecydowanie wyższym poziomem konkurencyjności charakteryzowały się powiaty o wyższym poziomie miary przedsiębiorczości. Najlepsze jednostki to powiaty: mielecki, bieszczadzki, leski, tarnobrzeski, mielecki, białostocki. W 2010 r. miara przedsiębiorczości wahała się od 0,04 do 0,43 w 2017 r. od 0,13 do 0,53 (miara konkurencyjności od 0,31 do 0,46; od 0,32 do 0,52). Na pozycję powiatów wpływały nakłady inwestycyjne, wartość brutto środków trwałych, produkcja sprzedana przemysłu, podmioty gospodarcze, dochody własne.

Słowa kuczowe: przedsiębiorczość, konkurencyjność, miara syntetyczna, powiat, Polska Wschodnia.

1. Introduction

The process of a unit's operation takes place in a space filled with internal and external environment. They form a network of mutual connections [Zaucha 2012], which refer to endogenous and exogenous resources (characteristic for the region), the use of which is to ensure qualitative and quantitative changes in the local economy. Resources such as the natural environment, financial, social and infrastructural resources used in market and social relations are interdependent and occur at the same time. They should therefore be considered together. There is a correlation between the fundamentals of municipalities' operation and the level and living conditions of the inhabitants. The essence of these activities is to ensure cohesion in its three dimensions: economic, social and territorial. This increases the competitiveness of the area.

W. Kosiedowski states that all activities in the aspect of current functioning or development should occur in conditions of the so-called spatial order, indicating a specific way of using space, social and economic facilities in connection with the adopted objectives of regional/regional development objectives/development, as well as social preferences [Kosiedowski 2005].

Entrepreneurship activity varies regionally, which results from the structural features of regions and endogenous factors occurring in their area. The factors that create a kind of field of forces generating or blocking the entrepreneurship of the region include: demographic characteristics of the region, regional labour market, quality of human capital, housing resources and their standard, and infrastructure equipment [Huczek 2016].

E. Łaźniewska and M. Gorynia state that regional competitiveness can be defined as the permanent ability to compete with other regions, to ensure sustainable economic development [Łaźniewska, Gorynia 2012]. Competitiveness is the ability to succeed in economic competition. It is the ability of regions to adapt to changing conditions in order to maintain or improve their position in the ongoing competition between regions [*Instytucje i instrumenty...* 1996]. The region's conditioning of

competitiveness is a favourable climate for the development of entrepreneurship and innovation. This enables enterprises to achieve high economic efficiency [Piotrowska-Trybull 2004].

2. Purpose and research method

The purpose of the article is to analyse the diversity of the level of entrepreneurship of counties ('powiat') in relation to their competitiveness using the synthetic measure. The analyses were carried in the counties of eastern Poland (87 in 5 voivodeships). The source material was based on data from the Local Database of the Central Statistical Office for 2010-2017.

In order to determine the measure of synthetic development, in the first stage, variables were selected from the demographic aspect, economy, technical and social infrastructure, finances and the environment, which overlap with each other and describe entrepreneurship and competitiveness. From the set of selected variables, those characterized by low spatial variability and high correlation of variables (according to the inverted matrix method) [Wysocki, Lira 2005; Wysocki 2010; Malina 2004], were removed.

In the next stage, the selected variables were subjected to the procedure of zeroed unitarization using the following formulas:

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \text{ when } x_i \in S, \tag{1}$$

$$z_{ij} = \frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \text{ when } x_i \in D, \tag{2}$$

where: S − stimulant, D − destimulant; $i = 1, 2 ... n; j = 1, 2 ... n, x_{ij}$ − means the value of the j-t feature for the examined unit, max − the maximum value of the j-t feature, min − the minimum value of the j-t feature [Wysocki, Lira 2005; Młodak 2006; Dziekański 2017; Kukuła 2000].

Using the distance of each element of the object from the pattern and anti-patterner, Euclidean distances of individual objects from the pattern and anti-patterner were calculated according to the formula:

$$d_i^+ = \sqrt{\frac{1}{n} \sum_{j=1}^{m} \left(z_{ij} - z_j^+\right)^2}, \tag{3}$$

$$d_i^- = \sqrt{\frac{1}{n} \sum_{j=1}^{m} \left(z_{ij} - z_j^-\right)^2}, \tag{4}$$

where: n − stands for the number of variables forming the pattern or anti-template, z_{ij} − stands for the value of the uniformized feature for the examined unit

[Wysocki 2010; Zalewski 2012]. Next, the synthetic measure values were determined according to the TOPSIS method for individual objects based on the formula:

$$q_i = \frac{d_i^-}{d_i^- + d_i^+}, \text{when } 0 \le q_i \le 1, i = 1, 2, \ldots, n; \ q_i \in [0; 1]; \tag{5}$$

where: d_i^- means the distance of the object from the anti-template (from 0), d_i^+ means the distance of the object from the template (from 1). Higher values of the qi measure indicate a more favourable financial situation of the commune [Hwang, Yoon 1981; Łuczak, Wysocki 2012; Dziekański 2017].

In order to interpret the obtained measures, the division into quartile groups was used, where the size of the indicator in the first group means a better unit, and the lower the group, the weaker the units. The mutual compliance of the results obtained was also verified based on the correlation coefficient and regression analysis [Dziekański, Wyszkowski 2018].

3. Entrepreneurship and the level of competitiveness

Entrepreneurship, whose most tangible expression is the initiation of new business ventures, is one of the pillars of the development of modern economies. It influences the development of regions through the efficient use of available resources, innovative activities, and growing competition. It stimulates regional development through the more complete and comprehensive use of regional resources [Glinka, Gudkova 2011]. In order for entrepreneurship to have a real impact on the development of the region, favourable economic, mental, legal and institutional conditions must occur [Kola-Bezka 2010].

Nowadays, entrepreneurship is treated as a broad category, including economic, technological and cultural aspects. Entrepreneurship can be recognized as a permanent base of the regional economy. D. Valliere and R. Peterson recognized that entrepreneurship influences the development of regions through the efficient use of available resources, innovative activities, as well as growing competition. These effects are characterized by long-term duration, which is why they are noticeable after a certain period of time [Valliere, Peterson 2009]. A. Klasik believes that entrepreneurship is the basis for the development of regional economies and their communities. The combination of entrepreneurial and competitive abilities of the regions allows treating these development potentials as co-determinants of their sustainable development [Klasik 2006].

E. Skawińska points out that entrepreneurship plays a significant role in the efficient allocation of existing resources as well as the creation of new ones. This involves people working in search of innovation and detecting new relationships in the existing economic and social system [Skawińska 2009].

Meyer-Stamera defined competitiveness as the ability of a given town or region to ensure high and growing incomes as well as to improve the livelihoods of the people living there [Meyer-Stamer 2008]. Klasik and Kuźnik define the region's competitiveness as an advantage or distance in relation to other regions. It is the result of a consciously undertaken and conducted strategy of competing with other regions. Competing includes groups of related regions in terms of size and rank, profile and position, distance and neighbourhood, the resultant of 1) the attractiveness of the offered service addressed to current and potential residents, investors and visitors to the region, 2) strengths, i.e. the strengths of the region, 3) export strength, which is created by products that are the region's brand, 4) productivity, i.e. the relations between the potential, which the regions have at their disposal [Klasik, Kuźnik 2001].

Regional competitiveness as a multidimensional concept is determined by many quantitative as well as qualitative factors and the interrelationship between them. In models, factors including social and economic, make up the hierarchical system (competitiveness pyramid [Lengyel 2004]; hat of competitiveness [Martin 2003], competitiveness tree [*ECORYS-NEI* 2001; *A Study on the Factors of Regional Competitiveness*…]. The number of those that significantly affect competitiveness is not only limited but also variable, depending on the stage of development of the region [Łaźniewska et al. 2012, p. 45.]. The authors of the RCI index took into account economic and social factors. They assumed that competitiveness means the ability to provide an attractive and sustainable environment for companies and residents of the region to work and live in [Dijkstra et al. 2011]. The RCI (Regional Competitiveness Index), based on NUTS 2 regions (Nomenclature des unités territoriales statistiques), extends the economic analysis of the competitiveness of regions with social aspects [European Commission 2017].

Klasik points to three main sources of competitiveness of the region: intellectual potential, material and institutional infrastructure [Klasik, Kuźnik 2001]. The competitiveness of regions is determined by factors of various nature that fall into the category of regional development factors, but not all of the latter are factors of competitiveness. Competitiveness results from the strengths, i.e. the most important strengths of the region, whose source lies among others in the education system, economic structure and infrastructure [Stawasz 2004]. The competitiveness of regions can be understood as the potential that allows them to compete with other regions for capital conditioning the development of an individual. It is manifested by the ability to attract capital and aid resources and to retain the production factors in the region [Bossak, Bieńkowski (eds.) 2001].

The competitiveness of regions is influenced by such elements as the diversity of economic structures, communication accessibility, well-developed scientific and research facilities as well as the existing business-related environment. They favour the development of entrepreneurship, while their scarcity and weaknesses in the general level of development mean that the region has a weaker position in relation to the others [Markowski, Stawasz 2001]. Competitiveness is the ability to

achieve long-term and effective growth in an open economy. Changes in the factors determining development usually occur simultaneously and are interrelated, often on the basis of feedback. Each cause is the result of past events, while each effect is the cause of phenomena that will occur in the future [Oleńczuk-Paszel 2012].

4. Diversification of the level of entrepreneurship in eastern Poland poviats in relation to competitiveness

Table 1 summarizes the values of the measure of synthetic entrepreneurship and competitiveness of counties in eastern Poland in 2010 and 2017 in subsequent quartile groups. The first group includes those with the best situation in terms of entrepreneurship and competitiveness, the last group has the weakest.

Table 1. Quartile groups measuring the synthetic entrepreneurship and competitiveness of eastern Poland counties in 2010-2017

	TOPSIS entrepreneurship			TOPSIS competitiveness		
	2010	2017	2017/2010	2010	2017	2017/2010
A	bieszczadzki 0.43 leski 0.43 staszowski 0.42 mrągowski 0.36	mielecki 0.53 bieszczadzki 0.5 leski 0.5 tarnobrzeski 0.36	chełmski 2.25 suwalski 1.1 przemyski 0.79 augustowski 0.44	białostocki 0.46 ełcki 0.46 mielecki 0.45 kielecki 0.44	mielecki 0.52 białostocki 0.51 olsztyński 0.5 starachowicki 0.44	włoszczowski 0.18 mielecki 0.16 kazimierski 0.13 stalowowolski 0.09
B	puławski 0.35 mielecki 0.35 sanocki 0.35 olsztyński 0.33	świdnicki 0.35 buski 0.35 konecki 0.35 łańcucki 0.31	białostocki 0.42 olsztyński 0.42 przeworski 0.4 kielecki 0.32	puławski 0.43 bieszczadzki 0.43 ostrowiecki 0.43 starachowicki 0.41	tarnobrzeski 0.43 buski 0.43 staszowski 0.43 sandomierski 0.41	świdnicki 0.08 kolbuszowski 0.08 sandomierski 0.08 skarżyski 0.07
C	starachowicki 0.3 gołdapski 0.3 konecki 0.29 kielecki 0.25	janowski 0.3 jarosławski 0.3 hajnowski 0.3 przemyski 0.25	niżański 0.31 lidzbarski 0.31 starachowicki 0.3 mrągowski 0.22	jarosławski 0.4 zambrowski 0.4 tarnobrzeski 0.39 sandomierski 0.38	janowski 0.4 jasielski 0.4 jędrzejowski 0.4 pińczowski 0.38	chełmski 0.06 opolski 0.06 brzozowski 0.06 suwalski 0.05
D	janowski 0.24 jarosławski 0.24 jasielski 0.24 chełmski 0.04	zamojski 0.24 opatowski 0.24 działdowski 0.24 chełmski 0.13	konecki 0.21 sandomierski 0.21 piski 0.21 grajewski −0.26	przemyski 0.37 lidzbarski 0.37 nidzicki 0.37 kazimierski 0.31	krasnostawski 0.37 opolski 0.37 zamojski 0.37 hrubieszowski 0.32	lubelski 0.02 bieszczadzki 0.02 ostrowiecki 0.02 grajewski −0.03 staszowski −0.04

Note: Sorted by quartile for 2017; the table shows the three best units in the group and the weakest one; the best and the weakest in a given year in a given population.

Source: own calculations of the authors based on the data from the Local Data Bank of Statistics Poland.

The value of the synthetic measure allowed to divide the counties of eastern Poland into four groups. A much higher level of competitiveness was characteristic of counties with a higher level of entrepreneurship measure. In 2010, the entrepreneurship measure ranged from 0.04 (Chełm) to 0.43 (Bieszczady and Leski), in 2017 from 0.13 (Chełm) to 0.53 (Mielec). The best units in the aspect of entrepreneurship are the counties of Mielec, Bieszczady, Leski, Tarnobrzeg, and the

weakest are Chełm (despite a significant improvement in the studied area), Zamość and Opatów (in 2017).

The measure of the competitiveness of counties in 2010 ranged from 0.31 (Kazimierz) to 0.46 (Białystok), in 2017 from 0.32 (Hrubieszów) to 0.52 (Mielec). The units belonging to group A (the best in the studied area) are Mielecki, Białystok, Olsztyn, the weakest Hrubieszów, Zamość, and Krasnystaw in 2017).

Group A represents the best situation in terms of entrepreneurship and competitiveness, characterized by high values, among others, in terms of investment outlays and gross fixed assets in enterprises, sold production of industry, entities entered in the register, and own revenues.

The box chart (Figure 1) indicates a small dispersion of data in terms of both competitiveness and entrepreneurship [Łuczak 2007]. The position of the Mielec counties is influenced by the position of the aviation and electromechanical industries, which is the main profile of manufacturing companies in the region. The strength of the area is the existence of key facilities for university and higher education centres for key companies, cooperation between enterprises, R&D and research hubs. The county's economic activity and employment are its very strong point.
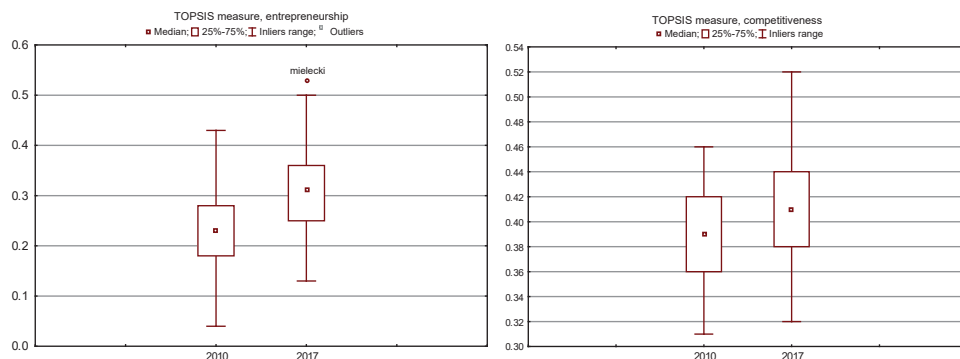

Fig. 1. The dispersion of eastern Poland counties in the aspect of entrepreneurship and competitiveness in 2010 and 2017

Source: own calculations of the authors based on the data from BDL GUS.

Measures of spatial diversity indicate the relative stability of dispersion of counties in eastern Poland regarding their entrepreneurship and competitiveness. In 2017, compared to 2010, one can indicate the stability of the studied area according to the standard deviation (0.08-0.08 measure of entrepreneurship; 0.04-0.04 measure of competitiveness). The diversity coefficient is also indicated by the classic coefficient of variation, which in the analysed period amounted to 0.27-0.33 (entrepreneurship, 2017-2010) and 0.10-0.09 (competitiveness), respectively. The value of the range

indicates for the analysed phenomenon a slight increase in diversity (0.41-0.39 − entrepreneurship and 0.20-0.15 competitiveness, 2017-2010).

Table 2. Differentiation of the measure of synthetic entrepreneurship and competitiveness of eastern Poland counties in 2010 and 2017

	TOPSIS entrepreneurship		TOPSIS competitiveness	
	2010	2017	2010	2017
average	0.24	0.31	0.39	0.41
median	0.23	0.31	0.39	0.41
standard deviation	0.08	0.08	0.04	0.04
quarter (quartile) deviation	0.23	0.31	0.39	0.41
classic coefficient of variation	0.33	0.27	0.09	0.10
positional coefficient of variation	1.00	0.99	1.01	1.01
min	0.04	0.13	0.31	0.32
max	0.43	0.53	0.46	0.52
the range	0.39	0.41	0.15	0.20
quartile range	0.10	0.11	0.05	0.06
skewness	0.46	0.51	0.10	0.31
measure of concentration-kurtosis	−0.02	0.19	0.64	−0.08

Source: own calculations of the authors based on the data from Local Data Bank of the Central Statistical Office (BDL GUS).

Figure 2 presents correlograms describing the relationship between the measure of entrepreneurship and competitiveness in 2010 and 2017. In the period under review, the counties converged. The correlation coefficient between the measure in 2010 and 2017 was 0.910 (entrepreneurship) and 0.925 (competitiveness). A high correlation index may indicate a similar reaction of the counties in both studied areas to changes in the economy. The outlying units are Ostrowiec, Staszów, Puławy, Mielec, Olsztyn and Białystok, characterized by a high level of entrepreneurship.

The Pearson correlation coefficient between the value of the measure of synthetic entrepreneurship and competitiveness in 2010 was 0.699 and in 2017, 0.744 (Figure 3). This may indicate the stable spatial diversity of units and the convergence process. The group of outstanding units includes the counties of Białystok, Rzeszów, Staszów, Bieszczady, Mielec and Kielce. These are units with a high level of entrepreneurship and competitiveness.

When analysing the stability of the spatial diversity of entrepreneurship and competitiveness of counties in eastern Poland in 2010-2017, correlation coefficients can be used. Its value was 0.7469 (Table 3), which may indicate that to a very similar extent they described their diversity in the examined areas, and the spatial diversity

of phenomena was stable. The level of the phenomenon under investigation had the greatest impact on investment outlays, gross value of fixed assets in enterprises, sold production of industry, entities registered and registered unemployment rate, and own income.
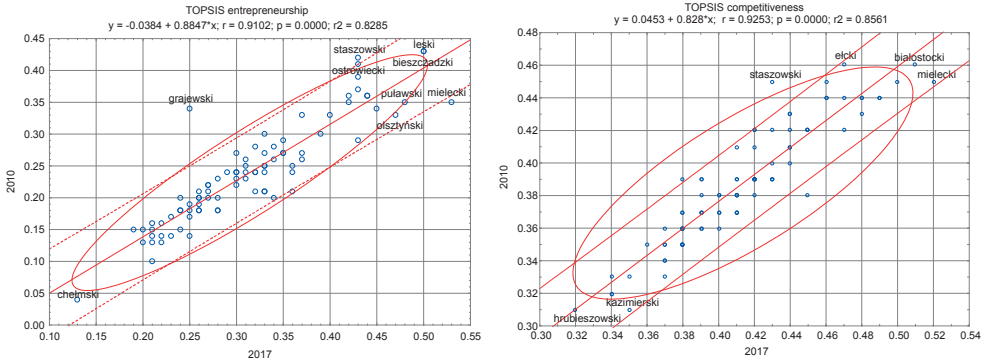

Fig. 2. The ratio of the synthetic measure of entrepreneurship and competitiveness of eastern Poland counties in 2010 and 2017

Source: own calculations of the authors based on the data from Local Data Bank of the Central Statistical Office (BDL GUS).

Fig. 3. The ratio of the synthetic measure of entrepreneurship and competitiveness (year on year) of eastern Poland counties in 2010 and 2017

Source: own calculations of the authors based on the data from Local Data Bank of the Central Statistical Office (BDL GUS).
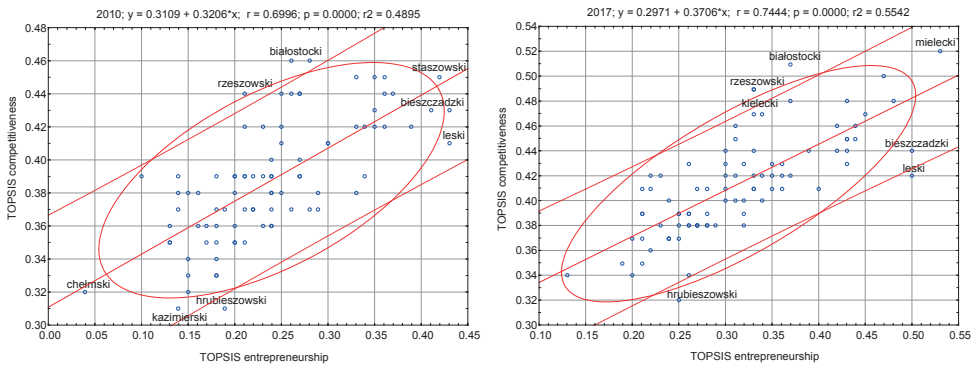
Table 3. Correlation of a synthetic measure with elements of its structure for eastern Poland counties in 2010-2017

	TOPSIS$_{entrepreneurship}$	TOPSIS$_{competitiveness}$
TOPSIS$_{entrepreneurship}$	1	.7469
TOPSIS$_{competitiveness}$	.7469	1
investment outlays in enterprises	.4853	.4572
gross value of fixed assets in enterprises	.6331	.5474
industrial output sold	.5545	.5056
entities entered in the register	.8236	0586
registered unemployment rate	.7862	.5832
net migration rate	.0984	.4072
registered unemployment rate	−0.1506	−0.3073
employment	.1185	.4173
housing stock	0.162	.0223
forest land	−0.1761	.0745
own income	.4323	.4197
property expenses	−0.0807	.0227

Note: Linear correlation coefficients for observations from sample 1-696; critical value (at a two-sided 5% critical area) = 0.0743 for $n = 696$.

Source: own calculations of the authors based on the data from Local Data Bank of the Central Statistical Office (BDL GUS).

Regression analysis allows to create a linear model, and when creating it, to decide which variables will be the explained variable and which variables will be the explanatory one. The regression model describing the dependence of variables takes the form:

f TOPSIS$_{entrepreneurship}$ = $\sum$ (TOPSIS$_{competitiveness}$ investment outlays in enterprises, gross value of fixed assets in enterprises, sold production of industry, entities entered into the register, registered unemployment rate, employed, housing resources, forest area, own income, property expenditure).

The results of the analysis for TOPSIS show that the presented regression model allows explaining $R = 0.961819$ ($r^2 = 0.961148$) of variations of variables. The high values of F statistics (1433.797) and the corresponding level of probability p confirm the statistical significance of the linear model. The t-Student statistic value for the p parameter means that all parameters are statistically significant. The value of the determination coefficient ($R2$) indicates a good fit of the regression model to the data.

Table 4. KNK estimation, TOSPS synthetic measure, entrepreneurship of eastern Poland counties in 2010-2017 (observations 1-696 used)

	Rate	Standard error	t-Student	p-value
Constant	−0.0336690	0.0128669	−2,617	0.0091
TOPSIS $_{competitiveness}$	−0.160630	0.0356427	−4,507	<0.0001
Investment outlays in enterprises	9.97668e−06	4.71997e−07	21.14	<0.0001
The value of fixed assets in enterprises	1.51503e−06	6.37321e−08	23.77	<0.0001
Industrial output sold	1.58783e−06	6.66292e−08	23.83	<0.0001
Business Unit(s)	0.00523898	8.37067e−05	62.59	<0.0001
Net migration rate	0.00102191	0.000315123	3.243	0.0012
Unemployment rate	−0.00108435	0.000137030	−7,913	<0.0001
Number of persons employed	−5.48474e−07	8.48147e−08	6,467	<0.0001
Housing stock	−0.000165110	2.11862e−05	−7,793	<0.0001
Forest areas	3.10809e−07	1.15880e−07	2,682	0.0075
Own income	0.000113585	1.19628e−05	9.495	<0.0001
Capital expenditure	−1.42634e−05	5.93866e−06	−2,402	.0166

Arithmetic mean of the dependent variable	0.275761	Standard deviation of the dependent variable	0.085535
Sum of squared residues	0.194142	Residual standard error	0.016860
Coefficient of Determination R square	0.961819	Corrected R-square	0.961148
F (12, 683)	1433.797	P-value for the F test	0.000000
Log credibility	1860.631	Crit. inform. Akaike	−3695.261
Crit. Bayes-Schwarz	−3636.172	Crit. Hannan-Quinn	−3672.414

Source: own calculations of the authors based on the data from Local Data Bank of the Central Statistical Office (BDL GUS).

5. Conclusions

Regional development refers to positive changes on the social, economic, technological and technical as well as ecological levels, which contribute to the growth of the economic potential, competitive position and increase of the quality of life of residents. Entrepreneurship and competitiveness are the main determinants of the region's development. Competitiveness is becoming more and more a development factor. If the entrepreneurship of the region can be considered a prerequisite for regional development, then the region's competitiveness is a sufficient condition.

Enterprises play an important role in the economy. They affect the competitiveness of the economy and stimulate its growth. They perform economic functions in the

economy (this applies to ensuring the most favourable management effects), technical (this covers the broadly understood preparation and implementation of production processes) and social (this is fulfilled in relation to its own staff and in relation to the environment). Other functions performed by enterprises are shaping the functioning of the labour market, creating the possibility of the fuller use of existing resources and combinations of production factors, stimulating local development and the positive impact on the environment. Some competitiveness factors remain outside the influence of local authorities. A flagship example is the spatial location of the local government unit or some natural resources. Other factors may be more or less shaped by the said authority, and one of the most important among them is local entrepreneurship, the development of which is directly conducive to the increase of economic competitiveness of the local government unit, which in turn facilitates the development of entrepreneurship.

The value of the synthetic measure allowed to divide the counties in eastern Poland into four groups. A much higher level of competitiveness was characteristic of the units with a higher level of entrepreneurship measure. In 2010 the entrepreneurship measure ranged from 0.04 to 0.43, while in 2017 from 0.13 to 0.53. The best enterprises in 2017 in terms of entrepreneurship were the counties of Mielec, Bieszczady, Leski, Tarnobrzeg, and the weakest − Chełm (despite a significant improvement in the studied area), Zamość and Opatów.

The measure of competitiveness of the counties in 2010 ranged from 0.31 to 0.46, in 2017 from 0.32 to 0.52. The best units in 2017 were Mielecki, Białystok, Olsztyn, while the weakest Kazimierz, Hrubieszów, Zamość, and Krasnystaw.

The correlation coefficient of entrepreneurship and competitiveness of counties in eastern Poland in 2010-2017 was 0.7469. This indicates a similar degree of description of the phenomenon under study in separate areas. They were shaped to the greatest extent by investment outlays, gross value of fixed assets in enterprises, sold production of industry, entities registered and registered unemployment rate, and own income.

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