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The Relationship between the Entrepreneurship and the Local Environment: Evidence from Poland

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Abstract:

Purpose: *The main goal of the research is to investigate the importance of geographical proximity between regions as an entrepreneurship development factor compared to other determinants of entrepreneurship.*
Design/Methodology/Approach: *Three neighbouring regions in south-eastern Poland demonstrating a different level of economic development were selected for the study. The study was carried out at the local level using the division of the three regions into 61 local administrative units. The taxonomic measure of development based on the Weber median and regression analysis (2SLS estimators) were employed. The analysis cover the 2008-2017 period.*
Findings: *The research revealed the weak impact of inter-regional proximity on the entrepreneurship development in less developed regions. The difference in motives for starting a business (opportunity versus necessity entrepreneurship) was indicated as a probable cause for the weak impact of inter-regional geographical proximity on entrepreneurship development in less developed regions.*
Practical Implications: *The study results can be utilised in subsequent examinations of inter regional convergence across Europe.*
Originality/Value: *The value of the paper is the a "territorial" approach to entrepreneurship process which have not been sufficiently examined so far. The research seeks to contribute to a better understanding of the entrepreneurship process in countries which have relatively recently adopted market rules, eg. Poland.*

Keywords: *Entrepreneurship, local development, geographical proximity, Poland.*

JEL codes: *R12, R30.*

Paper type : *Research article.*

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1. Introduction

Local development issues are interesting to many research fields. This interest has intensified along with globalisation and an urge to find effective solutions designed to improve the utilisation of local economy resources and improve the well-being of local communities. Local development in the era of increasing globalisation is perceived as a reaction to the negative effects of globalisation manifested, inter alia by the growing development disparities between states, regions and local economies. As a consequence, there has been increased migration from less developed areas and poor use of endogenous local resources. Therefore, prevention against the negative effects of globalisation calls for the identification and strengthening of the main factors, which determine local development trajectories and dynamics.

Sztando (2017) notes that local development has a dual nature: local and supra-local. The first refers to long-term, multi-dimensional and self-sustaining local structures and their interconnectedness. This is a coordinated process, which serves the local community interests. The main goal is to increase the local communities' quality of life through labour market improvement and increasing the residents' wealth. The second refers to structural changes in the local environment related to supra-local transformations, i.e. the assessment of the effects of local changes juxtaposed with the broader environment (regional, national, global).

An example of local level changes, which produce great effects, is entrepreneurship development. This is understood as not only the individual efforts of entrepreneurs to achieve economic objectives, but primarily as a process which, apart from local community members, includes a wider network composed of consumers, suppliers and competitors. Entrepreneurship in this context should be regarded as an important local development factor, which triggers supra-local effects, because entrepreneurship in any local environment intensifies and improves the use of endogenous resources. It also fits into the global economic and social development process with its variety of positive and negative effects.

Against the backdrop of various factors, which may influence entrepreneurship's development dynamics and directions, the geographical (spatial) location, in particular inter-regional and intra-regional proximity, are strongly linked to local specificities (Torre and Wallet, 2014; van Ham *et al.*, 2017). Such proximity, especially in the case of regions and local communities, which largely differ in terms of economic development, may be a factor stimulating entrepreneurship development in less developed regions. This does not only denote geographical proximity, but also other proximity dimensions such as (Torre and Wallet, 2014):

- organised proximity, which results in business entities acting together, especially those which operate in the same economy sectors (cooperation links, clusters);

- institutional proximity, which facilitates the implementation of joint support forms for enterprise development in the private and public sectors;
- social proximity, understood as the relations between business participants. This dimension involves, inter alia, knowledge and experience exchange among the enterprise employees of neighbouring regions and local communities;
- cognitive proximity, based on cooperation in the field of innovation, research and development, and know-how.

Proximity between neighbouring regions and local communities may, therefore, be an important stimulating factor for entrepreneurship development, provided, however, that it is not limited to geographic proximity. It rather becomes an impulse for multi-level cooperation. Several reasons may justify the importance of studying inter-regional and intra-regional (local) proximity:

- positive neighbourhood impact on entrepreneurship development may further encourage various forms of cooperation between enterprises in regions where such cooperation is weak or non-existent;
- identification of the significance of the neighbourhood may enhance the establishment of wider organisational and institutional cooperation of less developed regions with enterprises in more developed ones;
- owing to the fact that many factors influence the development process of entrepreneurship, it is important to determine the importance of the neighbourhood in terms of other conditions.

Against this background, the main goal of the research is to investigate the importance of geographical proximity between regions as an entrepreneurship development factor compared to other determinants of entrepreneurship process in Poland. Three neighbouring regions (NUTS-2) in south-eastern Poland were selected for the study: Małopolskie, Podkarpacie and Świętokrzyskie. A number of premises determined the choice:

- the main research problem concerns an assessment of the regions' neighbourhood importance in shaping entrepreneurship development; hence, the geographical proximity of the regions in question is a prerequisite;
- out of the three regions, Małopolska demonstrates a much higher level of economic development than the other two. This may create the possibility of faster than average entrepreneurship development along its borders with the other two regions;
- the Małopolska and Podkarpackie regions border Slovakia and the Ukraine; thus, some of these regions' local communities are geographically peripheral. This makes it possible to study the importance of this feature for entrepreneurship development, especially when juxtaposed with other parts

of the regions (located in the vicinity of cities or internal borders between regions).

The research hypothesis assumes that there is a positive impact of regional proximity on entrepreneurship development at the local level in Poland's south-eastern regions.

This research has been justified by the fact that the spatial aspects of entrepreneurship development and consequently the need for a "territorial" approach to this issue have not been sufficiently examined so far (Müller, 2016; Korsgaard *et al.*, 2015; Johannsson and Dohlstrand, 2009). Furthermore, the question regarding the importance of entrepreneurship development factors in the most developed economies and regions of Western Europe and in Central and Eastern European countries has not been addressed. The literature on the subject shows that some authors assume significant differences in entrepreneurship in these two parts of Europe (Kalantaridis *et al.*, 2007; Smallbone and Welter, 2001; Baumgartner *et al.*, 2013). Therefore, what seems to be important is the examination of entrepreneurship development problems in countries which have relatively recently started to develop their economies according to market rules (e.g. Poland). Further study results can be utilised in subsequent examinations of inter-regional convergence across Europe.

The study was carried out at the local level. The three regions (NUTS-2) division included 61 local territorial units, which would correspond to the NUTS-4 classification.[3] The spatial diversification of entrepreneurship development was assessed with the use of taxonomic measures of development based on the Weber median. The regression analysis (2SLS estimators) was used to identify the specific features of local environments, which determine entrepreneurship. The years 2008–2017 form the chronological scope of the examination. Data collected by the Polish Central Statistical Office in the Local Data Bank were used for the research purposes.

The first part of the study includes the critical analysis of the literature related to the relationship between entrepreneurship and regional and local development. The following part describes the applied research methods. The third section presents the spatial diversification of entrepreneurship in the studied regions. This is followed by the presentation of the study results – the local environment features and their relationship with entrepreneurship. The summary contains the research conclusions.

2. Entrepreneurship and Place (territory) as a Subject of Research

Entrepreneurship is one of those economic and social categories whose conceptual scope cannot be described in one simple definition (Quintero, Andrade and Ramírez,

[3]*Although the NUTS-4 level is not used in the territorial units classification in the EU, this division of the local environment has been used in order for the reader to have a better perception of the situation. In the case of Poland, this corresponds to territorial units, i.e. the poviats.*

2019). This diversity stems from the diverse impact of entrepreneurship on the economy and society, from an individual household, through the local and regional to the global level. Furthermore, different factors may play a dominant role in shaping enterprise development dynamics at each of these levels. In certain circumstances, entrepreneurship development may be of fundamental importance in solving unemployment issues and improving the use of local human capital resources. In others, the foundation of new enterprises and the development of existing ones may result in improved economy competitiveness and the residents' quality of life on a local and regional scale.

Regardless of the types of problems solved as a result of entrepreneurship development, however, this process always results in better use of endogenous local and regional development factors (Medeleanu and Ignat, 2014, 61-65). This is an important role of entrepreneurship, as the regional development experience in various Western European countries has demonstrated that external investments have not resulted in changes in dynamics acceleration and thus the reduction of inter-regional disparities. Furthermore, there is a strong relation between regional development dynamics and the scale and scope of inclusion of a given region's specific resources into development processes. The use of the resources may offer an advantage over other regions (Todtling, 2011). Entrepreneurship, as a component of endogenous development factors, should therefore significantly stimulate regional and local development.

Müller (2016) carried out a literature review on the relation between entrepreneurship and regional and local development. There are two main approaches:

- examination of the role of entrepreneurship in boosting regional development;
- examination of the importance of specific conditions for entrepreneurship development at the local and regional levels.

In the case of the former, the research results indicate that there are numerous positive effects of the impact of entrepreneurship on regional development. This impact is mainly demonstrated in the economic sphere:

- creating new jobs and the reduction of unemployment (Dejardin and Fritsch, 2011; Müeller *et al.*, 2008; Andersson and Noseleit, 2011);
- GDP growth, labour productivity and production efficiency improvement (Audretsch and Keilbach, 2004a; Koo and Kim, 2009; Baumgartner *et al.* 2013);
- increased competitiveness of regions and economy innovativeness (Bosma *et al.*, 2011; Acs and Plummer, 2005; Audretsch *et al.*, 2012; Davids and Koen, 2018).

Entrepreneurship also positively impacts changes in the social sphere. The regional aspect of these changes encompasses:

- the improvement of residents' quality of life (Johnstone and Lionais, 2004; Laukkanen and Niittykangas, 2003; Svensson *et al*., 2012);
- the instillation of entrepreneurial attitudes and culture in the region (Audretsch and Keilbach, 2007; Audretsch *et al.*, 2008; Aoyama, 2009; Dodd and Hynes, 2012);
- the diversification of the economy structure in rural areas (Kalantaridis and Bika, 2011);
- support for local infrastructure development and better care of natural resources (Grabher, 2002; Bauwens, 2016; Frits and Storey, 2014).

By contrast, the authors of research who focused on the identification of the most important conditions for entrepreneurship development at the regional and local levels point to the special role of:

- support rendered by institutions, which utilise regional policy instruments in order to encourage the creation of new enterprises, the arrangement of local business organisations and the provision of expert services for local businesses (Bruce *et al*., 2009; Caliendo and Kritikos, 2010; Gebhardt, 2012; Sternberg, 2012; Kijek, 2019);
- availability of high-quality human capital in connection with a well-developed education system (Audretsch *et al.*, 2008; Audretsch *et al*., 2010; Alama-Sabater *et al.*, 2011);
- availability of financial capital (e.g. local banks) (Audretsch and Keilbach, 2004b; Naude *et al.*, 2008; Rogers, 2012);
- unemployment rates (Fritsch and Falck, 2007; Santarelli *et al.*, 2009);
- household income level (Garofoli, 1994; Feldman, 2001; Folmer *et al*., 2010);
- the region's economic specialisation and household structure (Thissen *et al*., 2013; Torre and Wallet, 2014; Bosma and Schutjens, 2011);
- social capital quality (Johannsson and Dahlstrand, 2009; Malecki, 2012; Feldman and Zeller, 2012);
- accessibility to the region's resources, infrastructure and proximity to scientific institutions (Benneworth, 2004; Kalantaridis, 2009; Berggren and Dahlstrand, 2009; Tokila and Tervo, 2011);
- proximity to urban centres (Baptista and Preto, 2011; Sternberg, 2012; Audretsch *et al.*, 2012).

This general review of the entrepreneurship research results reveals a great variety of research directions. Many aspects of and conditions for entrepreneurship development are highlighted in such studies. It seems, however, that relatively little is known about the reasons why the same factors in some local environments and regions stimulate entrepreneurship development while in others this impact is far less visible. It is

necessary to study the relations between entrepreneurship conditions and the characteristics of local communities in order to find the reason for the latter. This research approach, therefore, requires a transition from the regional to the local level. As Kleinhans *et al.* (2017), and Müller (2016) point out, this has been mostly ignored so far. Moreover, entrepreneurship research has been mainly carried out in urban areas. The research results presented here can, therefore, contribute to a certain extent to filling the research gap in this regard.

3. Materials and Methods

The three studied regions in south-eastern Poland (NUTS-2) differ from each other quite significantly in their overall economic development level. Podkarpacie and Świętokrzyskie are ranked among the least economically developed regions (among Poland's lowest GDP per capita), while Małopolska is ranked relatively high when it comes to economic development level (GDP per capita in 2016 was nearly 30% higher than in the other two regions). Furthermore, in the years 2004–2016, Małopolska was characterised by the higher average annual GDP growth rate (current prices) at a level of nearly 7%. Podkarpacie's level was 6.0% and Świętokrzyskie's 5.2%. Even greater disparities can be noticed in terms of global GDP amount in each region. In 2016, Podkarpacie's GDP accounted for 48.9% of the total amount of GDP in Małopolska. In the Świętokrzyskie region, it was only 29.4%. Furthermore, Małopolska reported one of Poland's highest indexes of enterprises' share in R&D expenditures (1.4%). It was also ranked second among all of Poland's 16 regions with an amount of nearly PLN 3.2 billion in 2016. For comparison, the other two regions of south-eastern Poland reported much lower R&D expenditures: in Podkarpacie it was about PLN 0.8 billion and in Świętokrzyskie, PLN 0.1 billion (Błachut *et al.,* 2018). The data confirm that over several years there has been a development gap between these three neighbouring regions.

Such circumstances justify the hypothetical assumption that neighbouring Małopolska offers a positive impact on the entrepreneurship development level of the other two regions. If geographical proximity is also related to other forms of proximity (organisational, social, cognitive), Podkarpacie's and Świętokrzyskie's entrepreneurship in the areas bordering Małopolska should be strongly stimulated for this reason. This, in turn should benefit the local communities and offer a competitive advantage over others, especially those located in peripheries along the state border.

This assumption seems to be justified in light of research carried out in other countries. These authors (Cassi and Plunket, 2013; Davids and Frenken, 2018; Jespersen *et al.*, 2018) stated that geographical proximity favours the development of network connections between enterprises, which in turn results in organisational proximity, especially cognitive proximity, which supports innovation processes. Furthermore, geographical proximity sets the basis for the creation of a "business ecosystem", which, as is the case with natural ecosystems, transfers positive and negative changes in the immediate environment onto a further environment (neighbourhood). On the

one hand, this may lead to new cooperation opportunities, and on the other this may also create new risks (Katimertzpoulas and Vlados, 2017).

The studies assumed that proximity of local communities to regions of different economic development stimulates entrepreneurship because it fosters networking in the organisational, institutional, social and, above all, cognitive spheres. This further stimulates the innovation process among enterprises in less developed local territorial units.

The study of the spatial aspects of entrepreneurship development requires entrepreneurship assessment at the local level. Only this kind of approach offers the opportunity to expose the different features related to the spatial distribution of enterprises and to determine the role of space in enterprise development. The presented research uses the division of the three regions into 61 local administrative units. These are divided into four groups:

(1) units located along the state border (the border with the Ukraine and Slovakia) – 13;
(2) units located along the internal borders of the three regions in south-eastern Poland – 14;
(3) units adjacent to the largest cities – 26;
(4) cities over 50 thousand inhabitants – 8.

The taxonomic measure of development was used to assess the differences in the entrepreneurship development level in the local units. The entrepreneurship development level was defined as the quantitative and qualitative advancement of the business entities' development. Quantitative measures of this development include a number of entities in relation to the number of inhabitants and the enterprise sector's structure. The quality characteristics refer to the business entities' financial indicators. Finally, six variables were used to build a synthetic measure of the entrepreneurship development level:

y_1 – number of business entities per 10,000 inhabitants;
y_2 – number of newly registered business entities per 10,000 inhabitants;
y_3 – the share of the manufacturing sector in the total number of business entities;
y_4 – the amount of investment outlays per one enterprise which employs ten or more employees;
y_5 – return on sales index (the sales financial result ratio vs sales revenues)
y_6 – enterprise debt ratio (liabilities to assets ratio).

These variables, in accordance with the principles of the taxonomic analysis methods meet the basic statistical criteria, i.e. the variability coefficients' value is greater than 10%, and the value of Pearson's correlation coefficients between variables does not exceed 0.7.

In the next step, the taxonomic measure of development based on the Weber median was used (Młodak, 2006). The use of the Weber median method is recommended for the study of complex socio-economic phenomena, as it allows the overcoming of the distorting effect of outliers (which is important when the diagnostic features are asymmetric), while taking into account mutual (also indirect) dependencies between diagnostic features (Sompolska-Rzechuła, 2013).

The Weber median is a multi-dimensional generalisation of a classic median. It is a vector, which minimises the sum of Euclidean distances from given points, which represent objects in consideration. In other words, this is a point in space which is somewhat "centrally positioned" in a given space of objects, yet at the same time it is resistant to the occurrence of outliers (Młodak, 2006).

The variables' normalisation with the use of the Weber median was carried out according to the following formula:

a) for stimulants[4] ($y_1 - y_5$ variables):

$$z_{ij} = \frac{y_{ij} - Om(y_{0j})}{1{,}4826 * m\tilde{a}d(Y_j)} \quad (1)$$

b) for destimulants (y_6 variable):

$$z_{ij} = -\frac{y_{ij} - Om(y_{0j})}{1{,}4826 * m\tilde{a}d(Y_j)} \quad (2)$$

for $i = 1,2, \ldots, n$, where:
y_{ij} – the value of the j feature for the i object,
$Om(y_{0j})$ – Weber median coordinates
$m\tilde{a}d(Y_j)$ – the median absolute deviation in which the distance between the features and the Weber median is tested:

$$m\tilde{a}d(Y_j) = med_{i=1,2,\ldots,n}\left|y_{ij} - Om(y_{0j})\right| \quad (3)$$

The abstract object (φ_j) with the maximum values of normalised features was assumed as the coordinate of the development pattern vector:

$$\varphi_j = \max_{i=1,2,\ldots,n} z_{ij} \quad (4)$$

The distance of the given object from the development pattern vector was defined as:

$$d_i = \operatorname{med}_{j=1,2,\ldots,m}\left|z_{ij} - \varphi_j\right| \quad (5)$$

[4]*Stimulants are features whose higher values indicate a higher entrepreneurship development level. Destimulants – their features are the inverse of stimulants.*

A synthetic measure of the entrepreneurship development level was calculated according to the formula:

$$\mu_i = 1 - \frac{d_i}{d_{\_}} \tag{6}$$

where: $d_{\_} = med(d_i) + 2{,}5 \cdot mad(d_i)$ (7)

The entrepreneurship development level increases alongside the measure value in a given territorial unit, compared to the other units in the study.

The main research problem, however, is not limited to finding an answer to the question about the scale of the spatial diversification of entrepreneurship development. It is also an attempt to determine the importance of specific features of local communities, which shape this process. The literature review shows that this assessment should include such features of the local environment as: demographic potential, the labour market situation, socio-economic structure, technical infrastructure and the scale of the institutional support for the entrepreneurial process. The (X_i) variables representing the level of development of a given feature were adopted for the aforementioned characteristics (Table 1).

Table 1. *The socio-economic characteristics of a local territorial unit*

Variable	Variable description
Demographic potential	
X_1	Population per 1 km^2
X_2	Population change per 1000 inhabitants
X_3	Population at mobile working age 18-44 (% of total population)
X_4	Share of population (aged 15-64) with tertiary and secondary education
Labour market	
X_5	Registered unemployment rate
X_6	Employment rate per 1,000 inhabitants
X_7	Average monthly gross wages and salary (relation to the national average)
Socio-economic structure	
X_8	Rural population (% of total population)
X_9	Legal protected area (% of total area)
X_{10}	Built-up and urbanized areas (% of total area)
X_{11}	Arable land (% of total area)
Technical infrastructure	
X_{12}	Water supply systems - length in km per 100 km^2
X_{13}	Sewage systems - length in km per 100 km^2
X_{14}	Local hard surface roads in km per 100 km^2
Institutional environment	
X_{15}	Communes investment expenditure per one commune (mln PLN)
X_{16}	EU funds per capita (PLN)
X_{17}	Communes own-source revenues per capita (PLN)
Location	

Z_1	The geographical distance between the provinces's capital and the cities over 50 thousand inhabitants (in km)
Z_2	The geographical distance between the provinces's capital and the region's capital (in km)
Z_3	The geographical distance of the provinces's capital to the border with Małopolska (in km)

Source: *Own study*.

In order to verify the cause-and-effect links between the characteristics of the local communities and the development of entrepreneurship, regression analysis was used. The following regression equation was employed:

$$Y_i = \alpha_0 + \alpha_i X_i + \beta_i Z_i + \varepsilon_i \qquad (8)$$

where:
Yi – variables representing the entrepreneurship development level in the local territorial unit *i;*
X_i – variables representing the socio-economic characteristics of the territorial unit *i;*
Z_i – variables representing the location of a territorial unit *i;*
ε_i – random error.

Synthetic measures are widely used in the spatial differentiation analysis of various economic categories. These measures are the result of the transformation of the diagnostic variables group. On the one hand, data aggregation allows the drawing of a general picture of development. On the other hand, this process leads to certain generalisations and some information loss, which may interfere with the econometric estimation. Thus, the individual indicators used for the synthetic measure of the entrepreneurship development were employed in the regression analysis. The variables were selected in order to provide a comprehensive description of the development level of business entities in local units. The selected variables represent: entrepreneurship quantitative measures (number of registered entities – y_1), changes in the number of enterprises (number of newly registered entities – y_2) and qualitative characteristics (enterprises' investment activity – y_4).

In order to verify the significance of location in the socio-economic space as a factor of entrepreneurship development, the following variables representing the location of a given territorial unit: a) within a given region (geographical distance to the largest urban centres in the region); and b) in the case of the Podkarpackie and Świętokrzyskie units, the geographical distance to the border with Małopolska, were introduced into the basic regression equation.

The literature review indicates that there are two-way interactions between the local environment characteristics and the entrepreneurial process. For example, a larger number of enterprises determines the scope of the so-called tax base, which describes the local governments' income potential. Conversely, the higher the level of a commune's own income is, the greater the possibility for pursuing local,

entrepreneurship-friendly policies. Similarly, two-way relations exist between entrepreneurship and the labour market. The presence of endogenous variables in the set of explanatory variables is the reason for the inconsistency of the OLS estimator because of the correlation of these variables with random effects. One of the ways to solve the endogeneity problem is to use the instrumental variable method of estimation. In order to ensure consistent estimates of the regression equation for cross-sectional data, the 2SLS (*two stages least squares*) estimator was chosen as an estimation method. There are several reasons for choosing this method: the 2SLS estimator is compatible with endogenous regressors and it is resistant to variable co-linearity and specification errors (Koop, 2015). The use of the 2SLS estimator is specifically justified when the number of endogenous variables equals the number of instrumental variables. The Durbin-Wu-Hausman test is one of the tools used for the verification of the endogeneity of explanatory variables hypothesis, where the null hypothesis assumes that the OLS estimator is consistent (Koop, 2015). In turn, the *F*-test verifies the validity of the instruments used.

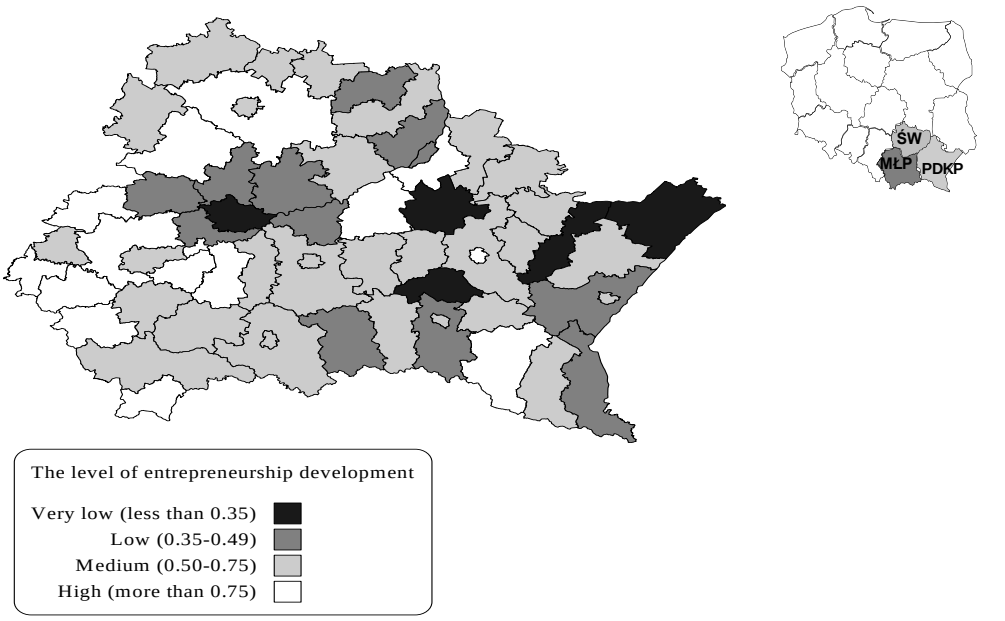
The analysis of the relationship between the entrepreneurship development level and the characteristics of the local environment was carried out with the use of mean variable values for the 2008–2017 period. The ten-year period made it possible to eliminate short-term fluctuations in business operations caused by externalities, such as the global economic crisis past 2008. The lagged average values from the 2002–2007 period were used as instruments for endogenous variables. The figures used in the research were retrieved from the Polish Central Statistical Office dataset (CSO; Local Data Bank).

The research method adopted allows for the initial identification of the specific features of local environments, which determine the entrepreneurial process; however, the method has some limitations. The use of the average variable values from the 2008–2017 period makes it possible to eliminate short-term interferences; however, at the same time it limits the scope of inference about the changes dynamics in the studied phenomenon over time. In addition, the methodology applied only allows the identification of the traces of the location impact on the business development process. Despite the limitations, the method adopted allows the establishment of the strength and direction of impact of local environment features on entrepreneurship, which was the main objective of the study. Further in-depth examination of the mechanisms underlying the relations identified in this study (dynamic nature, geographical spread) may be used as a guideline for future research.

4. Spatial Diversification of the Entrepreneurship Development Level

The synthetic measure values of entrepreneurship development indicate a local variation in the intensity of the phenomenon in the three analysed regions of south-eastern Poland (Figure 1).

Figure 1. *Spatial diversification of the entrepreneurship development at the local level*



Source: *Own study based on CSO data*.

If the synthetic measure mean, and in particular the groups of territorial units (distinguished by their geographical location), is taken into consideration, the mean values indicate, however, relatively limited diversity of this process between the specified groups - Table 2.

Table 2. *The synthetic measure of the entrepreneurship development at the local level*

Enterprises location	Average	Median	Min.	Max.
I. Along the state border	0.56	0.51	0.09	0.98
II. Along the internal inter-regional borders	0.58	0.57	0.35	0.91
III. Adjacent to the largest cities	0.62	0.63	0.03	0.95
IV. Cities over 50 thousand inhabitants	0.63	0.63	0.40	0.87

Source: *Own study based on CSO data.*

Certain differences are only visible between the units located peripherally from the cities (groups I, II) or in proximity to the cities (groups III, IV). It is worth noting that the entrepreneurship development level in the areas located near the internal borders of the three regions studied is similar to entrepreneurship in the immediate vicinity of state borders. At the same time, the location of enterprises near the administrative boundaries of the regions (state and intra-regional borders) determines a lower level of entrepreneurship development in comparison with cities and their surroundings. This can be seen as a manifestation of the limited significance of regional geographical proximity for entrepreneurship development. It may mean that the positive effects

offered by organisational, social and geographical proximity have not been achieved. The data presented in Table 2 suggest that the urban centres carry certain significance for entrepreneurship development in their immediate surroundings; while the entrepreneurship development level in groups III–IV is similar to one another, it differs in relation to groups I–II.

Such circumstances call to find the reasons for the relatively weak entrepreneurship development in the areas located along the internal borders of the three regions. Internal differentiation of each of the separated groups of local territorial units may be one of the reasons behind this (Table 2). This forms a basis upon which to infer that in the case of some local territorial units their geographic location is a limiting factor for entrepreneurship development, while in others such limitations are of little importance. The territorial units located along the state border are a good example.

There is such a unit in this group (Tatrzański poviat, located near the border with Slovakia), which is ranked first among all 61 units surveyed. There is also another unit (Lubaczów poviat), which is 59th in the same ranking. In the first case, the features of the natural environment (mountainous area) and the mountain tourism traditions are the main stimulating factor for entrepreneurship. For comparison, the Lubaczów poviat mainly comprises agricultural areas located in the vicinity of the border with the Ukraine.

A similar differentiation, although related to other reasons, is characteristic for the remaining groups of local territorial units distinguished in this study. This may indicate the need to conduct similar future examinations; however, the regions should be divided into even smaller territorial units (e.g. communes corresponding to the NUTS-5 level), because only then would it be easier to distinguish more homogeneous territorial groups in terms of entrepreneurship development level.

A small diversification between the regions in question might be another of the possible reasons for the low importance of inter-regional neighbourhoods in the development of entrepreneurship. In the case of the regions studied, however, such a reason does not exist.

As can be seen from Table 3, entrepreneurship in Małopolska is more developed compared to the rest of the regions. This should support the utilisation of geographical proximity for the stimulation of entrepreneurship development in Podkarpackie and Świętokrzyskie. As the research shows, however, the actual situation differs. Therefore, the earlier assumption may be confirmed, namely that cities demonstrate a relatively greater importance in each of the regions and thus impact entrepreneurship in their immediate proximity. This underlines the impact of urban environments rather than the role of the inter-regional neighbourhood. In order to determine the importance of other factors for the development of entrepreneurship, correlation and regression were employed.

Table 3. *The synthetic measure of the entrepreneurship development level in regions*

Region	Average	Median	Minimum	Maximum
Małopolskie	0.67	0.77	0.35	0.98
Podkarpackie	0.53	0.55	0.03	0.88
Świętokrzyskie	0.56	0.58	0.07	0.91

Source: *Own study based on CSO data.*

5. Local Environment Characteristics and the Entrepreneurial Process

The regions considered in this study also differ in terms of socio-economic characteristics (Table 4). In 2008–2017, local units of the Małopolska region demonstrated higher demographic potential (X_1–X_4) in comparison to the Podkarpackie and Świętokrzyskie regions: the population density was two times higher, there was a higher population growth rate, and a slightly higher number of people with tertiary or secondary education. The analysed regions are of a similar demographic structure. The share of the working-age population (X_3) in all regions demonstrated small local variations ($Vs_i = 0.03$) and due to its low diagnostic value, this element was excluded from the subsequent analysis.

Furthermore, the labour market in Małopolska functioned more efficiently as manifested by a lower unemployment rate, a higher employment rate per 1,000 inhabitants and higher wages. This region was also characterised with higher urbanisation and better technical infrastructure with a relatively similar land development structure compared to the Podkarpacie and Świętokrzyskie provinces – (X_9–X_{11}).

In addition, the Małopolska communes were characterised by a higher income potential (X_{17}) and investment activity (X_{15}) compared to the communes of the other two regions. Among the features analysed (X_1–X_{17}), only the volume of EU funds (X_{16}) per capita in Podkarpacie and Świętokrzyskie was higher than in Małopolska (which may have resulted from the fact that these two regions were included into a special EU support scheme under the "Development of Eastern Poland" Operational Programme since 2007).

Table 4. *The socio-economic characteristics at the local level in 2008-2017*

Variable	MAŁOPOLSKIE		PODKARPACKIE		ŚWIĘTOKRZYSKIE	
	$\bar{x}_i$	Vs_i	$\bar{x}_i$	Vs_i	$\bar{x}_i$	Vs_i
X_1	220.6	*2.66*	118.8	*3.63*	108.2	*4.29*
X_2	3.38	*1.36*	1.51	*2.45*	-2.19	*1.19*
X_3	0.41	*0.03*	0.41	*0.02*	0.39	*0.03*
X_4	0.42	*0.20*	0.39	*0.20*	0.40	*0.17*
X_5	9.09	*0.31*	14.14	*0.30*	13.80	*0.35*
X_6	217.2	*0.40*	199.8	*0.50*	182.8	*0.36*
X_7	93.0	*0.09*	84.2	*0.07*	86.4	*0.07*
X_8	0.51	*0.54*	0.59	*0.51*	0.55	*0.46*

X_9	52.4	*0.63*	44.8	*0.69*	64.7	*0.48*
X_{10}	0.06	*1.89*	0.04	*2.15*	0.05	*2.01*
X_{11}	0.61	*0.24*	0.53	*0.26*	0.64	*0.29*
X_{12}	122.3	*0.95*	78.4	*1.48*	110.3	*0.51*
X_{13}	80.7	*1.62*	79.8	*1.50*	40.6	*1.84*
X_{14}	142.2	*0.52*	74.0	*0.98*	100.2	*0.45*
X_{15}	11.46	*0.32*	8.28	*0.47*	7.78	*0.37*
X_{16}	10 217.1	*0.55*	13 188.0	*0.80*	12 383	*0.38*
X_{17}	1 794.5	*0.33*	1 297.6	*0.36*	1 407	*0.29*

***Source**: Own study based on CSO data.*

In general, it could be assumed that the Małopolska region demonstrated more favourable conditions for the development of entrepreneurship than Podkarpackie and Świętokrzyskie (with these two demonstrating relative similarity). This is indicated by the results of a correlation analysis (Table 5).

***Table 5.** Correlation* between the local environment characteristics and the entrepreneurship*

Variable	X_1	X_2	X_4	X_5	X_6	X_7	X_8	X_9
Y_1	0.709	-	0.75	-0.436	0.698	0.627	-0.697	-
Y_2	0.668	0.346	0.599	-0.32	0.588	0.49	-0.546	-
Y_4	-	-	-	-	0.337	0.442	-	-
Variable	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}
Y_1	0.686	-0.364	0.618	0.583	0.552	0.637	-	0.878
Y_2	0.606	-0.435	0.536	0.595	0.502	0.621	-	0.759
Y_4	-	-	-	-	-	-	0.342	0.258

Pearson correlation coefficients statistically significant at 0.05 significance level.
***Source**: Own study based on CSO data.*

The correlation analysis demonstrates that the quantitative development of the enterprise sector was accompanied by: a higher population density, population increase, better education level of the inhabitants, lower unemployment rate, higher number of employees, higher level of wages, higher share of developed land area, lower share of arable land, better technical infrastructure, higher income potential of the commune units and a larger scale of investment expenditure in these units. The variables analysed in the study demonstrated that only X_9 (the share of protected areas) and X_{16} (EU funds per capita) did not demonstrate significant relation to the Y_1 or Y_2 values (number of registered enterprises). In the case of the Y_4 variable, which describes the enterprises' investment activity, only the correlation of four variables – the ones describing the labour market (X_6, X_7) and the institutional environment (X_{16}, X_{17}) – proved to be statistically significant.

For equation (8) the Akaike information criteria (AIC) and Bayesian information criteria (BIC) were used. Ultimately, the following explanatory variables were used

in the regression analysis to describe the Y_1 and Y_2 variables: X_2, X_5, X_8, X_{11}, X_{14}, X_{15}, X_{17}, and in order to describe the Y_4 variable: X_1, X_6, X_7, X_{16}. It was initially assumed that the X_5, X_6, X_7 and X_{17} variables are endogenous. The Z_1 variable (distance in kilometres from a city over 50 thousand residents) and Z_2 (distance in km from the provincial capital) were alternatively used as variables controlling the location of the 61 local units. Statistically better results were obtained for the Z_1 variable (these results are presented in Table 6). Due to the endogenous character of some explanatory variables, in the first stage, the regression equation parameters were estimated with the use of the 2SLS method.

The results of estimation 1 for the number of registered enterprises per capita (Y_1) indicate that *ceteris paribus* the increase in the number of business entities was supported by the increase in population (X_2) and the higher income potential of communes (X_{17}). In turn, a higher share of arable land (X_{11}) reduced the number of business entities in the local units of the analysed regions in a statistically significant way. The R^2 value indicates that the equation corresponds to the original data by about 80%. The F test values indicate that the instruments are valid. Nonetheless, the Durbin-Wu-Hausman test results ($p = 0.36$) indicate the rejection of the hypothesis about the endogeneity of the X_5 and X_{17} variables and the consistency of the OLS estimators. In the next stage, regression estimation (1) was made with the use of the OLS (estimation 4). Similar results were obtained as with the use of 2SLS in terms of the statistical significance of the variables, their impact direction and strength. The regression function explains the changes in the Y_1 variable by approximately 80%. The correctness of estimates is confirmed at a 5% significance level by the F test value ($p < 0.01$) and the fact that random elements are subject to a normal distribution (JB test, $p > 0.05$). Finally, there is no residual heteroskedasticity (White test, $p > 0.05$).

In estimation 2 of the number of newly registered business entities (Y_2), as in the case of the first equation, a positive and statistically significant influence of the X_2 and X_{17} variables, as well as the negative impact of variable X_{11}, were recorded. Unlike estimation (1), this time the Durbin-Wu-Hausman test results pointed to the validity of the 2SLS method, and the F test values indicate the validity of the instruments. In addition, estimation 2 indicates that *ceteris paribus* the increase in the number of registered enterprises was enhanced by better transport infrastructure (X_{14}), as well as the communes' higher investment expenditure (X_{15}). This signals the important role of local and regional institutions for infrastructure development. Other research also indicates the importance of such institutions (Baungarher *et al.*, 2013; Takila and Tervo, 2011; Gebkardt, 2012).

The results of estimation 3, which explains the investment expenditures of the enterprises variable (Y_4) suggest that, all others things held equal, the investment growth of enterprises was statistically and positively affected by: the number of employees (X_6), the level of wages (X_7) and European funds per capita (X_{16}). The population density increase (X_1) *ceteris paribus* contributed to lowering the value of variable Y_4.

Table 6. *Estimates of equation (8): N=61*

Estimation	1	2	3	4	5	6
Y_i	Y_1	Y_2	Y_4	Y_1	Y_2	Y_4
Method	2SLS			OLS		
Const.	**54.28*** (20.45)**	**53.37** (13.12)**	**-1610.6**** (610.01)	**45.90** (18.38)**	**54.21*** (11.98)**	**-1432.5*** (535.7)**
X_1	-	-	**-0.521**** (0.112)	-	-	**-0.535*** (0.117)**
X_2	**0.758** (0.296)**	**1.98*** (0.22)**		**0.751** (0.317)**	**1.93*** (0.24)**	-
X_5	-0.631 (0.57)	0.558 (0.438)		-0.498 (0.44)	0.348 (0.38)	-
X_6	-	-	**2.69*** (0.75)**	-	-	**2.89*** (0.85)**
X_7	-	-	**20.45*** (7.70)**	-	-	**17.94** (7.02)**
X_8	-7.056 (9.10)	-	-	-4.64 (9.12)	-	-
X_{11}	**-23.97* (12.48)**	**-47.32*** (8.65)**	-	**-21.71* (11.59)**	**-45.96*** (98.71)**	-
X_{14}	-	**0.117*** (0.022)**	-		**0.101*** (0.002)**	-
X_{15}	-0.009 (0.02)	**0.042** (0.02)**	-	-0.015 (0.02)	**0.031* (0.017)**	-
X_{16}	-	-	**0.012*** (0.002)**	-	-	**0.012*** (0.002)**
X_{17}	**0,037*** (0.007)**	**0.014* (0.005)**	-	**0.039*** (0.007)**	**0.017*** (0.004)**	-
Z_1	0.114 (0.08)	0.120 (0.08)	Z_2: 0.64 (0.92)	0.116 (0.085)	0.112 (0.080)	Z_2: 0.520 (0.87)
R^2/ adj. R^2	0,822	0.820	0.506	0.823/0.800	0.825 /0.800	0.508/ 0.463
DWH (p)	0.761	0.04	0.505	-	-	-
F-test	X_5: 107.3 X_{17}: 70.9	X_5: 82.2 X_{17}: 122.1	X_6: 598.4 X_7: 18.3	-	-	-
F(p)	-	-	-	0.001	0.001	0.001
JB (p)	-	-	-	0.27	0.40	0.11
White (p)	-	-	-	0.32	0.15	0.05

Notes: **, **, *** indicate statistical significance: * p < 0.1; ** p < 0.05; ***p < 0.01. Robust standard errors in parentheses.*
DWH-Durbin-Wu-Hausman; F-test -weak instrument (F)
Source: *Own calculations.*

The equation is approximately 50% aligned with original data, and the Durbin-Wu-Hausman test results ($p = 0.302$) indicate the rejection of the hypothesis about the endogeneity of the X_6 and X_7 variables. In the next stage, the OLS regression estimation (3) was conducted. Similar results were obtained as with the use of 2SLS in terms of the statistical significance of the variables, and their impact direction and strength.

In estimates 1 through 6, the statistical impact of a territorial unit location (Z_1, Z_2) on the entrepreneurship development indicator Y_i in relation to the largest cities in the region was not significantly confirmed.

The group of 61 territorial units NUTS 4 comprises eight cities of more than 50 thousand inhabitants. These are characterised by higher variable values in terms of both entrepreneurship (Y_1) and the local communities' socio-economic features (X_i). These cities belong to the IV group – the group of the highest entrepreneurship development level (Table 2). It can, therefore, be assumed that the results of estimations 1–6 are under the influence of these units.

Therefore, the next stage is a robustness check; the regression equations for the group of 53 territorial units were estimated (excluding cities with a population of 50,000 and above). The estimation results are presented in Table 7. The results of the Durbin-Wu-Hausman test indicate that the OLS estimator provides consistent estimation of the regression equation parameters for the Y_1 and Y_4 variables, while for the Y_2 variable it is reasonable to use the 2SLS estimators.

The calculation results again demonstrated that the agricultural character of the local units indicated by the share of arable land in the total unit area (X_{11}), other things held equal, limited the number of existing (estimation 8) and newly created (estimations 9–10) business entities. Entrepreneurship in rural areas (in particular where agricultural functions predominate) is quite strongly related to the local natural environment resources. Entrepreneurship here is mainly oriented towards tourists, including agritourism as one of the forms of agricultural activity diversification (Alsos and Carter, 2006; van der Ploeg *et. al.,* 2000). This may be one of the reasons why entrepreneurship development possibilities are limited in rural areas, as only a small number of farmsteads are located in attractive tourist areas. The important role of the natural environment as a factor conducive for entrepreneurship development in the examined area can be demonstrated by the highly advanced processes in place in the most popular mountainous resorts in Małopolska (Figure 1). Limited interest in starting a business may be indicated as another reason for the weaker entrepreneurship development in rural areas, especially in the case of rural residents who value the need to preserve a rural lifestyle over business success (Korsgaard *et al.*, 2014).

Furthermore, it was reconfirmed that in local units in Małopolska, Podkarpacie and Świętokrzyskie, settlement attractiveness measured by population change (X_2) *ceteris paribus* contributed towards an increase in the number of newly registered enterprises (estimations 9–10). A positive relation between a growing number of inhabitants and the advancement of the entrepreneurial process is also emphasised in other research (Fritsch and Falck, 2007). This may be attributed to various factors: enterprises are in direct proximity to a large number of consumers (especially in cities and their surroundings), greater accessibility to most recent knowledge necessary for business success and greater accessibility to innovations created in urban agglomerations.

Table 7. *Estimates of equation (8): N=53*

Estimation	7	8	9	10	11	12
Yi	Y_1	Y_1	Y_2	Y_2	Y_4	Y_4
Method	OLS		2SLS		OLS	
Const.	**56.85** (25.07)**	**77.02** (27.35)**	**57.75*** (13.37)**	**75.14*** (13.30)**	-759.2 (496.3)	**−906,1* (504.1)**
X_1	-	-	-	-	-0.339 (0.54)	-0.26 (0.48)
X_2	**1.24** (0.58)**	**1.29**** (0.62)	**1.908*** (0.519)**	**1.659*** (0.504)**	-	-
X_5	-0.57 (0.48)	-0.69 (0.47)	0.508 (0.456)	0.203 (0.538)	-	-
X_6	-	-	-	-	**5.46*** (0.96)**	**5.26*** (0.89)**
X_7	-	-	-	-	5.38 (7.14)	5.96 (7.00)
X_8	-17.77 (16.97)	-26.04 (15.59)	-	-	-	-
X_{11}	-17.84 (11.90)	**-23.56** (11.34)**	**-52.17*** (13.35)**	**-62.67*** (13.83)**	-	-
X_{14}	-	-	**0.133** (0.059)**	**0.137** (0.07)**	-	-
X_{15}	-0.678 (0.89)	-1.18 (0.99)	0.031 (0.619)	-0.303 (0.714)	-	-
X_{16}	-	-	-	-	**0.013*** (0.003)**	**0.015*** (0.003)**
X_{17}	**0.041*** (0.007)**	**0.042*** (0.009)**	**0.012* (0.006)**	**0.014* (0.007)**	-	-
Z_1	0.094 (0.102)	-	0.118 (0.085)	-	-1,56 (1,16)	-
Z_2	-	-0.050 (0.063)	-	-0.046 (0.057)	-	0.781 (0.90)
R^2/adj. R^2	0.675/0.625	0.667/0.615	0.675	0.658	0.587/ 0.543	0.583/ 0.538
DWH (p)	0.591	0.236	0.03	0.06	0.684	0.804
F-test (F)	-	-	X_5: 60.8 X_{17}: 124	X_5: 56.3 X_{17}: 127.3	-	-
F(p)	0.001	0.001	-	-	0.001	0.001
JB (p)	0.343	0.06	-	-	0.003	0.005
White (p)	0.35	0.169	-	-	0.07	0.25

Notes: **, **, *** indicate statistical significance: * p < 0.1; ** p < 0.05; ***p < 0.01. Robust standard errors in parentheses. DWH-Durbin-Wu-Hausman; F-test -weak instrument.*
Source: *Own calculations.*

A positive impact of transport infrastructure (X_{14}) on the number of newly established enterprises, as well as the positive impact of the X_{17} variable (communes income potential) on the number of existing enterprises proved statistically significant. Conversely, the impact of municipal investment expenditures (X_{15}) on the numbers of both existing and newly established enterprises has not been confirmed.

In the case of the Y_4 variable, the re-estimation of the equation in the group of 53 territorial units (estimations 11–12) confirmed the statistically significant impact of the X_6 (number of employees) and X_{16} (EU funds per capita) variables on the outlays of enterprise investment. Nonetheless, the JB test results ($p<0.05$) do not confirm the hypothesis that the residuals are normally distributed, which limits the inference based on the obtained results.

In the group of 53 local units, the statistically significant impact of the location of the unit in relation to urban centres upon the enterprise development indicators was not confirmed this time.

As seen from the data presented (Tables 3 and 4), among the local units in consideration, the more favourable Y_i and X_i variable values were attributed to the local units of the Małopolska region. This might have also distorted the estimation results regarding the characteristics of the local environment, which determines entrepreneurship in the weaker regions, i.e. Podkarpacie and Świętokrzyskie. In respect of the sensitivity testing of estimation results 1–12, the parameters of the regression equations were estimated in the next stage only for territorial units from the Podkarpacie and Świętokrzyskie regions. Table 8 presents the results with the highest diagnostic value.

The results of estimations 13–14 indicate that the local territorial units in Podkarpackie and Świętokrzyskie compared to estimations 1, 4 and 7–8 confirm a statistically significant positive impact of communes' investment expenditure (X_{15} – estimation 14) and their income potential (X_{17} – estimations 13–14) on the number of existing enterprises. On the one hand, this may indicate that communes with a high level of own income stand a greater chance of introducing local solutions designed to support entrepreneurship. On the other hand, it is also possible that enterprises are formed more often in areas, where a relatively strong enterprise sector already exists, thus ensuring a relatively high level of own income for the communes. This is indicated, inter alia, by the results of estimations 15–16. These indicate that *ceteris paribus*, the communal income potential increase (X_{17}) affects the increase in the number of newly registered enterprises (Y_2).

In the group of 39 territorial units, the statistically significant positive impact of settlement attractiveness (X_2 – estimation 16), as well as the negative impact of the share of agricultural land share in the total unit area (X_{11} – estimation 15) on the number of newly registered enterprises were confirmed.

The results of estimations 13–16 reveal a certain specificity of local units from the Podkarpackie and Świętokrzyskie regions in comparison to the Małopolska region. The results of the calculations indicate a statistically significant effect of the registered unemployment rate (X_5) on the number of both already existing and newly registered enterprises. This has a reverse influence direction, however, to that resulting from the correlation analysis (Table 5) of 61 territorial units. With other conditions remaining unchanged, the increase in the registered unemployment rate created incentives to increase the number of enterprises in Podkarpacie and Świętokrzyskie. Such dependence was not manifested when the analysis also included local units from the Małopolska region. This might indicate that the increase in unemployment was a stronger incentive for the Podkarpacie and Świętokrzyskie residents to start up their own businesses than for those of Małopolska.

Table 8. *Estimates of equation (8): N=39*

Estym.	13	14	15	16	17	18
Yi	Y_1	Y_1	Y_2	Y_2	Y_4	Y_4
Method	2SLS				OLS	
Const.	25.03 (20.68)	21.06 (19.65)	18.90 (17.50)	12.26 (18.73)	**-1805,86** (743.2)**	**-1866,96** (728.31)**
X_1	-	-	-	-	**-0.685*** (0.13)**	**-0.690*** (0.137)**
X_2	-0.448 (0.29)	-0.350 (0.298)	0.667 (0.434)	**0.829** (0.423)**	-	-
X_5	**0.987*** (0.374)**	**1.411*** (0.421)**	**1.756*** (0.351)**	**2.309*** (0.441)**	-	-
X_6	-	-	-	-	**3.05*** (0.78)**	**3.12*** (0.85)**
X_7	-	-	-	-	**23.74** (10.00)**	**23.67** (10.00)**
X_8	-9.58 (7.59)	-9.22 (7.88)	-	-	-	-
X_{11}	-12.10 (11.62)	-12.09 (10.35)	**-22.51* (13.39)**	-20.52 (13.80)	-	-
X_{14}	-	-	0.019 (0.024)	0.015 (0.031)	-	-
X_{15}	0.010 (0.035)	**0.068** (0.030)**	0.002 (0.06)	**0.093* (0.051)**	-	-
X_{16}	-	-	-	-	**0.009*** (0.003)**	**0,009*** (0.002)**
X_{17}	**0.042*** (0.006)**	**0,042*** (0.007)**	**0.033*** (0.007)**	**0.029*** (0.007)**	-	-
Z_2	**-0.117** (0.05)**		**-0.179*** (0.05)**		-0.44 (1.33)	-
Z_3	-	**-0.103*** (0.026)**	-	**-0.127*** (0.03)**		0.378 (0.83)

R^2/ adj. R^2	0.900	0.906	0.838	0.836	0.535/0.464	0.536/ 0.465
DWH (p)	0.015	0.004	0.001	0.0001	0.696	0.487
F-test	X_5: 52.6 X_{17}: 66.6	X_5: 44.6 X_{17}: 69.2	X_5: 48.09 X_{17}: 103.6	X_5: 39.4 X_{17}: 76.4	-	-
F(p)	-	-	-	-	0.00002	0,00005
JB (p)	-	-	-	-	0,46	0.546
White (p)	-	-	-	-	0.21	0.338

Notes: **, **, *** indicate statistical significance: * p < 0.1; ** p < 0.05; ***p < 0.01.*
Robust standard errors in parentheses.
DWH-Durbin-Wu-Hausman; F-test - weak instrument (F).
Source*: Own calculations.*

Thus, it can be concluded that the differentiation between *opportunity* and *necessity* entrepreneurship, as emphasised in the literature, is applicable here (Williams and Williams, 2017). Małopolska may serve as an example of the first of these forms of entrepreneurship – new market opportunities, including strengthening the market position through innovation, perceived by entrepreneurs as an important feature and the main factor enhancing entrepreneurship development (Jaspersen *et al.* 2008). Nevertheless, in the case of the other two regions, the main motive for starting a business is largely the inability to obtain the expected income that comes with relatively high unemployment. Thus, the only solution is to start one's own business. Such enterprises, however, are in most cases poorly adapted to market needs and have limited opportunities to establish cooperation with other economic entities. This hampers network structures or the creation of clusters, thus, benefiting from geographical, organisational, social or cognitive proximity.

What is more, entrepreneurship development in the Podkarpacie and Świętokrzyskie provinces is conditioned by the location of a unit. The statistically significant dependence of the number of enterprises (Y_1, Y_2) and the distance between the province and region capitals has been confirmed: the greater the distance, *ceteris paribus*, the lower the Y_1 and Y_2 values. Additionally, the distance of NUTS 4 unit capitals from the border with the Małopolska region was also statistically significant: the longer the distance, *ceteris paribus*, the lower the Y_1 and Y_2 values. This dependence may, however, result from the parallel overlap of the border location of local units. In the case of Podkarpacie, for example, the increase in the distance of local units from the border with Małopolska is dependent on closer proximity to the state border. As previously established, border areas generally demonstrate a lower entrepreneurship level.

In the case of the Y_4 variable, the results of estimations 17–18 are similar in terms of influence direction and strength, as well as the statistical significance of individual coefficients (X_1, X_6, X_7, X_{16}). This is also the case for estimations 3 and 6. This means that the positive impact of the number of employees, the wage level and the volume of EU funds per capita on the amount of investment expenditure of enterprises was

confirmed. In the case of regions in eastern Poland, these results confirm the decision to include them in EU support schemes. EU funds contribute towards entrepreneurship development in these areas, not so much through quantitative indicators (the impact of X_{16} on Y_1 and Y_2 was not statistically significant), but through investment support for business entities.

6. Conclusions

Despite large development disparities between the three regions in Poland examined in this study, the research did not confirm the hypothesis assuming the positive impact of inter-regional proximity on the advancement of entrepreneurship development in less developed regions. This is confirmed by the relatively low entrepreneurship development level in local communities located along the internal borders of the three regions of south-eastern Poland. The level was more akin to that in the peripheral areas along the state border with the Ukraine and Slovakia rather than to the entrepreneurship level in the largest cities and their immediate surroundings.

The research results, however, support the significant role of urban centres in stimulating entrepreneurial processes. The income level of local government units also played an important role, which may confirm the importance of local government budget-financed activities, such as technical and social infrastructure development, local tax policies etc., on increasing entrepreneurial process dynamics. The related activities designed to improve settlement attractiveness and modernize local economic structures (reduction of the role of agriculture) created further stimuli for entrepreneurship processes in less developed areas.

The difference in motives for opening up enterprises in Małopolska compared to those in Świętokrzyskie and Podkarpacie may be a probable cause for the weak impact of inter-regional proximity on entrepreneurship development in less developed regions (Świętokrzyskie, Podkarpackie). In the case of less developed regions, growing unemployment was the factor which accelerated the process of creating new business entities. In Małopolska, however, such a relationship was not found. This may mean that other factors, rather than the labour market situation and employment opportunities, formed incentives for residents to set up businesses. These different motives made it difficult to transfer the geographic proximity benefits to other dimensions of network bonds.

Geographical proximity to more economically developed region did not have a major impact on the entrepreneurship development level in less developed regions of Poland, because this was not related to benefits in the organisational and social sphere. Insufficient enterprise innovativeness in the more advanced region (Małopolska) might be possible reason for a weak impact on entrepreneurship development in neighbouring regions (Podkarpackie, Świętokrzyskie). A low social capital level in the studied regions, which hinders the creation of mutual ties between entrepreneurs, might be another explanation. These issues require further research. In-depth

inference in this area also requires the use of panel data and spatial econometric methods at the next stage of research. Empirical materials ought to be enriched with qualitative research, which includes information on the scale, scope and conditions of the inter-regional cooperation of enterprises.

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