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COMPETITIVENESS OF THE REGIONS IN THE CONTEXT OF SMART SPECIALIZATION (ON THE EXAMPLE OF ŚWIĘTOKRZYSKIE)

KONKURENCYJNOŚĆ REGIONÓW W KONTEKŚCIE INTELIGENTNEJ SPECJALIZACJI (NA PRZYKŁADZIE ŚWIĘTOKRZYSKIEGO)

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Summary: Currently, an important element of solutions for restoring the competitive position of regions has been the adoption of the Europe 2020 Strategy, with its implementation in the years 2014–2020. It assumes the selection and development of smart specializations, posing an opportunity to achieve a sustainable competitive advantage by Polish regions. Hence, the aim of the article is to assess the level of competitiveness of the Świętokrzyskie region compared to other provinces, including any chance of developing regional expertise in order to improve the region's competitiveness. To assess the level of competitiveness of Polish regions Z. Hellwig's standard method was used. Świętokrzyskie province was in the group of provinces with low levels of competitiveness. There is an urgent need to take action to reduce the gap of the region studied in relation to other regions. This should be conducive to the development and strengthening of selected smart specialization for Świętokrzyskie, which are areas with well-established strengths the region and the only potential areas of building development.

Keywords: region, regional competitiveness, regional specialties, Hellwig method.

Streszczenie: Obecnie istotnym elementem rozwiązań służących odbudowaniu pozycji konkurencyjnej regionów stało się przyjęcie Strategii Europa 2020, której realizacja przypada na lata 2014–2020. Zakłada ona wybór i rozwijanie inteligentnych specjalizacji, stwarzających szansę osiągnięcia trwałej przewagi konkurencyjnej przez polskie regiony. Stąd celem artykułu jest ocena poziomu konkurencyjności regionu świętokrzyskiego na tle pozostałych województw wraz z określeniem szans rozwijania specjalizacji regionalnych w celu podniesienia konkurencyjności województwa. Do oceny poziomu konkurencyjności polskich regionów wykorzystano metodę wzorca Z. Hellwiga. Województwo świętokrzyskie znalazło się

w grupie województw o niskim poziomie konkurencyjności. Istnieje pilna potrzeba podjęcia działań zmierzających do zmniejszenia dystansu badanego regionu w stosunku do pozostałych. Powinno temu sprzyjać rozwijanie i umacnianie wybranych inteligentnych specjalizacji dla Świętokrzyskiego, które stanowią zarówno obszary o ugruntowanych mocnych stronach województwa, jak i obszary budujące dopiero potencjał rozwoju.

Słowa kluczowe: region, konkurencyjność regionów, specjalizacje regionalne, metoda Hellwiga.

1. Introduction

Socio-economic development of regions is based largely on innovation and technology transfer. The dynamics of contemporary development processes is affected by referring to the challenges of globalization, competition and the general process of building a knowledge-based economy. Innovation of regional economies, which is a key factor in the high competitive position of regions (both domestically and internationally and which leads to the success of regions), is the element connecting these challenges. So, Europe 2020 strategy, aiming to improve competitive position of regions, plays an important role in the new financial perspective 2014–2020. It assumes the identification and support of endogenous development potentials and the formation of regional specializations described as intelligent [Walczyk 2012].

Hence, the purpose of this article is to assess the level of competitiveness of the Świętokrzyskie region compared to other provinces, including any chance of developing regional expertise in order to improve its competitiveness.

Using the Hellwig method [Hellwig 1968], the Świętokrzyskie region's competitive position compared to other provinces in 2013 has been determined and a qualitative analysis of the development of potentials and opportunities to develop regional specializations chosen for the Świętokrzyskie has been made. The Hellwig method, reliable and widely used, allowed for the synthetic comparison of Polish regions according to the level of competitiveness.

2. Competitiveness of regions

The competitiveness of the regions should be seen as their ability to mutual rivalry, rivalry in the national and international scale and succeeding in the ongoing economic competition between them. According to B. Winiarski, competitiveness of regions is referred to as „their ability to adapt to changing conditions, in terms of maintaining or improving position in the ongoing competition between the regions" [Winiarski 1999]. Competitiveness of the region is therefore the advantage or the distance separating it from other regions that co-create a group of similar strategic objectives. The competitive strategy itself is employed by them knowingly [Klasik 2002].

Competitiveness of the region can be seen in terms of static, defining its competitive position at a given moment in time; and dynamic, which means that analysis of the factors of regional competitiveness is done in the long term.

The presented definitions of competitiveness reflect general approach and insufficiently emphasize that only if in this particular region there is an above average concentration of factors in comparison with other regions of the country or with other countries, can the competitive advantage of the region in the field appear. One of the most important factors for this advantage is the potential of R + D + I [Główny Instytut Górnictwa 2013]. Assessing this potential in comparison with other regions is to identify existing and potential areas of competitive advantage in the provinces.

3. Methodology of investigations

Classification of regions from the point of view of their competitiveness was examined using Z. Hellwig's method, based on the synthetic indicators, using data for 2013. Z. Hellwig's taxonomic method, also called standard method, is based on the construction of an abstract object P_0, called the pattern of development (in particular, it may it be the real object). In this article, the meter was used to organize provinces according to the attained level of competitiveness. Included diagnostic variables are first subjected to standardization. In the next stage characteristics of the variables taken into account were specified, among which stimulants and destimulants of development were distinguished.

The pattern of development has been defined as an object characterized by the highest values for stimulants and smallest for destimulants. The distance between the counties and the object P_0 (standard), designated as a church, is calculated as follows:

$$c_{io} = \sqrt{\sum_{k=1}^{K} (z_{ik} - z_{ok})^2}, \ (i = 1, 2, 3, ..., N). \tag{1}$$

The created variable c_{io}, according to formula (1), is not regulated. To meet this demand, the so called relative taxonomic measure of development is constructed, which is calculated as follows:

$$d_i = 1 - \frac{c_{io}}{c_o}, \ (i = 1, 2, 3, ..., N), \tag{2}$$

where:

$$c_o = \overline{c}_o + 2 \cdot s_o, \tag{3}$$

$\overline{c}_o$, s_0– respectively, the arithmetic mean and standard deviation over c_{io} (i = 1, 2, 3, ..., N); d_i – synthetic indicator.

The obtained synthetic measure of development d_i (2) assumes a value between 0 and 1. The upper limit is 1, and the probability that it will be less than 0 is small. The closer to unity the value of measurement d_i is, the less different from the pattern the given object (Province) is, and it is characterised by higher levels of socio-economic development.

4. The competitive position of the Świętokrzyskie region against other regions in 2013

To evaluate the level of competitiveness of the Świętokrzyskie province compared to other regions of the country Z. Hellwig's method was applied. Given the availability of the statistical basis as measures of determining the level of competitiveness of the regions in 2013, the following diagnostic features [GUS 2013, 2014] were used:

x_1 – net migration per 1000 population,

x_2 – the number of students per 1000 population,

x_3 – the number of graduates in technical fields of study,

x_4 – share of adults in secondary education in the total of the professionally active,

x_5 – employment rate – the share of those in jobs in the total resident population aged 15 and above (%),

x_6 – share of employed in industries in the total of employed in the national economy (%),

x_7 – share of employed in financial mediation and services to real estate and businesses in the total of employed in the national economy (%),

x_8 – area of trade fair facilities (m^2),

x_9 – total of trade fairs exhibitors in a year,

x_{10} – the number of loan funds,

x_{11} – the number of innovation and entrepreneurship centres,

x_{12} – the number of R&D centres,

x_{13} – employed in R&D activities,

x_{14} – employed in R&D activities per thousand employed in the national economy,

x_{15} – total of employed[1] in R&D activities in FTE[2] per thousand of professionally active,

x_{16} – share of employees with a professor's title and degree of doctor habilitated in the total of employed in R&D activities,

x_{17} – outlays on R&D activities (current prices) *per capita* (in Polish zloty),

x_{18} – outlays on R&D activities (current prices) in relation to GDP (%),

[1] The data cover only employees directly involved in R&D activities, who spend at least 10% of their nominal working time on such activities.

[2] FTE – Full-time equivalents are conversion units used to indicate the real employment in R&D activities. One full-time equivalent means one person-year spent entirely performing R&D activities [GUS 2014].

x_{19} – outlays on industrial innovative activities per one employed in industries (in Polish zloty),

x_{20} – patents granted per one million of inhabitants.

x_{21} – GDP *per capita* (in Polish zloty),

x_{22} – gross value added per one employed in industries (in Polish zloty),

x_{23} – industrial production sold per one employed in industries (in Polish zloty),

x_{24} – investment outlays *per capita* (in Polish zloty),

x_{25} – share of industrial investment outlays in total of investment outlays (in Polish zloty),

x_{26} – number of small and medium enterprises per thousand resident population,

x_{27} – average gross monthly pay (in Polish zloty),

x_{28} – retail sale *per capita* (in Polish zloty),

x_{29} – users of accommodation facilities (in thousands of people),

x_{30} – gas supply system in km,

x_{31} – water supply system in km,

x_{32} – sewage system in km,

x_{33} – hard surface public roads per 100 km^2,

x_{34} – railway lines operated standard gauge per 100 km^2.

Adopted diagnostic features demonstrating the competitiveness of regions relate to their attractiveness as regards the flow and quality of development impulses of endogenous conditions. In Polish conditions, most competitive regions have the highest level of economic development, which is reflected in the synthetic indicator of GDP *per capita* (x_{21} feature). The level of development also determines the competitiveness of the sectoral structure of employment, productivity and economic sectors measured: gross value added and sold production (features x_5, x_6, x_7, x_{22}, x_{23}).

In the knowledge-based economy the competitiveness of regions is determined by the quality of human resources. Human resources, who, due to qualifications they have, are engaged in creative activities, advancement, dissemination and application of scientific and technical knowledge, thus becoming an indispensable factor that generates progress and innovativeness (features x_2, x_3, x_4, x_5), are of fundamental importance for the development of a region.

The measure of the attractiveness of the region for the influx of people is net migration (x_1 feature). Temporary migration for tourism (x_{29} feature) is also important. In turn, the investment attractiveness is evidenced by indicators related to the size of investment (features x_{24}, x_{25}).

Competitiveness is also conditioned by the presence of regional business environment institutions, the existence and activities of which testify to the commercial cooperation and encourage networking by traders close contacts of regional, interregional and international (feature x_9). Business provides and leads to economic activation of regions (feature x_8). The number of business organizations shows the access to and quality of the banking sector in the region (feature x_{12}). The number of these organizations shows the saturation of institutions supporting

the development of innovation and entrepreneurship in the region (feature x_{11}). The number of external sources allows for the obtaining of the transferred capital to companies through professionally managed funds (features x_{10}, x_{12}).

The primary determinant of the competitiveness of the regional structures is the ability to create and absorb innovations, as determined by: the number of R&D units (features x_{12}–x_{16}), sizes of those working in a modern innovation and creating sectors of the economy (feature x_7), and by the activities to stimulate innovation, which are defined by: expenditures on R&D and innovation activities in enterprises (features x_{17}–x_{19}), and number of granted patents, which is a measure of the effectiveness of R&D (x_{20} feature).

The level of competitiveness is also evidenced by human development index entrepreneurship, particularly SMEs (feature x_{26}), and the material conditions of the population, which are identified by their income and consumption (features x_{27}, x_{28}).

Tangible factors – "hard", which form the basis necessary for the development activities in the area, are of crucial significance among the factors affecting competitiveness by building up its potential. Among them, technical infrastructure the development of which is a tool to promote competitiveness (features x_{30}–x_{34}) is very important.

Classification by synthetic measure calculated by Z. Hellwig, based on 34 selected features, identified as the most competitive in 2013 the following provinces: Mazowieckie, Wielkopolskie, Śląskie, Dolnośląskie with a synthetic index calculated values amounting to provinces, respectively, 0.54; 0.43; 0.43; 0.42.

In the next group are the Małopolskie region (0.40), Pomorskie (0.37) and Łódzkie (0.30). A group of decidedly less competitive regions are the Zachodniopomorskie (0.24) Kujawsko-pomorskie (0.21) and Podkarpackie (0.20). The Warmińsko--mazurskie was ranked last, with the index value of 0.13.

Calculated synthetic competitiveness indicator allowed the isolation of groups of provinces characterized by a similar level of competitiveness. In this way, four groups of provinces were identified:

group I – the regions with the highest competitiveness,

group II – the provinces with high rate of competitiveness,

group III – the provinces with a low rate of competitiveness,

group IV – the provinces with the lowest rate of competitiveness.

The group with the highest competitiveness in 2013 was: Mazowieckie, Wielkopolskie, Śląskie, Dolnośląskie ($d_i \geq 0.41$).

The second group consisted (in 2013) of the following provinces: Małopolskie, Pomorskie and Łódzkie ($0.27 \leq d_i < 0.41$).

In the third group were in 2013 the remaining provinces, namely: Zachodniopomorskie, Podkarpackie, Lubelskie, Świętokrzyskie, Opolskie, Podlaskie, Lubuskie and Warmińsko-mazurskie. ($0.13 \leq d_i < 0.27$).

In 2013 there was not any province in the group with the lowest rate of competitiveness ($d_i < 0.13$).

Spatial diversity of competitiveness level of Polish provinces in 2013 is shown in Figure 1.

Figure 1. The level of competitiveness of Polish regions in 2013

Source: the author's study.

The analysis of competitiveness in 2013 highlighted its importance in the development of most Polish regions. The vast majority of the synthetic Z. Hellwig indices calculated in 2013 compared to 2012 increased or for the few provinces remained unchanged (Kujawsko-pomorskie, Lubelskie and Podlaskie). Especially noticeable positive processes were observed in the case of the provinces

Dolnośląskie and Śląskie, which advanced to the group of provinces with the highest competitiveness in 2013 compared with 2012. The leaders of competitiveness, both in 2012 and 2013, are Mazowieckie, Wielkopolskie, Dolnośląskie and Śląskie.

Świętokrzyskie region is among the provinces with low levels of competitiveness. There is an about 10 point difference in the value of the synthetic index in this group of provinces. In contrast, the distance between them and the leader – Mazowieckie province, is about 40 points. Despite the decline in the Hellwig indicator from 0.16 in 2012 to 0.14 in 2013, Świętokrzyskie region retains 12th place in competitive position in the ranking of regions in both years.

In the light of the analyzed characteristics, Świętokrzyskie province falls in the number of R&D units, employment in research and development per 1,000 people working in the national economy, the number of people employed in R&D, employment in R&D in FTE per 1,000 economically active persons (total), capital investment per 1 inhabitant (16th place) and the share of employed in financial intermediation and real estate and business in total employment in the national economy (%), the number of loan funds, the number using accommodation (thousand people) – 15th place.

The region is most advantageous in terms of net exhibition space in m^2 and the total number of exhibitors during the year (2nd place), public roads in Poland on 100 km^2 (3rd place) and the share of investment in the industry in total investment outlays in zloty and retail 1 citizen in zloty – 7th and 8th place, respectively.

The analysis shows that the factors promoting the competitiveness of Świętokrzyskie are connected with the business community (exhibition services), while weakening competitiveness factors are associated with innovativeness of the economy of the region. It would be advisable to systematically study the region's competitiveness in the Regional Territorial Observatories.

5. Smart specialization of Świętokrzyskie is the chance to increase its competitiveness

Regional development is dependent on the potential of a community in a particular area. In turn, the potential is determined by factors affecting the development of a defined space, which are in the positive relationships and correlations. Among them are endogenous and exogenous factors of regional development. Own potential of the area, or factors associated with the location and its resources are considered to be internal (endogenous) growth factors [Proniewski, Juchnicka 2013].

Hence the development priorities included in the strategic documents should derive from endogenous opportunities to influence development processes. Their choice must also be preceded by a thorough diagnosis of the socio-economic analyzed space. The expression of adopted priorities are regional specialties developed and strengthened in development policy implemented by local authorities. They are referred to as having clearly exposed the manufacturing profile, with highly

developed sector of the economy or the kind of manufactured goods. This profile is characterized by specialization dominant in the study area, which concentrates the majority of employment in a given type of activity and this specialization is overwhelming in the creation of regional GDP. Expertise may also result from the originality of the activities occurring only in this particular region [Miłek 2013].

The years 2013 and 2014 were a period of intensified work on changes to the existing regional innovation strategies. The aim of this work is to enter the innovation strategy in the Europe 2020 guidelines. This strategy involves the promotion of smart specialization region, which enjoys benefits from its specificity and uniqueness. Regions should focus on a small number of priorities and the development of a large enough economic potential and innovation, which will become the basis for achieving a competitive advantage on a global scale [Dziemianowicz, Szlachta, Peszat 2014]. Having a smart specialization will condition the access to European funds after 2013.

The choice of smart specialization for Świętokrzyskie was made on the basis of studies and regional analyzes. They are consistent with the Świętokrzyskie Regional Development Strategy until 2020. Four main smart specializations (vertical) were isolated: resource-efficient construction, metal-casting industry, health and health-related tourism, and modern agriculture and food processing. Horizontal specializations which include: information and communication technologies (ICT), sustainable energy development and trade fair and congress industry play a reinforcing role in the implementation of vertical specialisations [Sejmik Województwa Świętokrzyskiego 2014].

Regional specialties: resource-efficient construction and metal-casting industry, refer to the base of the Świętokrzyskie industry, i.e. building, foundry and metal industry. Endogenous development potentials make these specializations which have their origin in possession of mineral riches such as rock materials, minerals for chemical and energy industries. Specializations are also the result of a long tradition of manufacturing and processing of metals. The development of specialization should be associated with the existing research and development potential in the field of construction materials, metals and mechanical engineering technology. And inventive scientific achievements and existing university research infrastructure allow for defining the areas of development of cooperation between scientists and local businessmen influencing the regional specialization, e.g. metal technologies, machinery and special equipment, innovative building materials.

A large share of agriculture in the economy translates into the development of the agri-food industry. Krugman index value calculated for working people according to NACE sections in 2011 amounted to 0.335 for the Świętokrzyskie and was ranked third in the country (higher than the average employment in agriculture influences the high level of specialization – Krugman index value was 0.162) [Miłek, Nowak 2015]. Świętokrzyskie has the potential for the development of organic farming and there is a certification center for such products. A major problem in the agri-food

sector is the lack of producer groups, agri-food manufacturing and insufficient marketing of regional products. Actions to develop processing plants should be taken, using innovative production methods.

Natural protected areas and sanatoriums with an established position in the country have the potential to develop tourism and health-care in the test region. Specializations put the accent on spa tourism, spa and wellness tourism, medical tourism, recreation and tourism area. The future of this specialization is based also on the possibilities of using sulphuric and thermal water. Świętokrzyskie region's potential in terms of tourism, in the context of regional specialization is not enough – the region does not have expertise in this field either in terms of employment, or on the basis of Gross Value Added. The weakness of the Świętokrzyskie is an insufficient number of hotels and accessibility.

Construction and metal-casting industry are currently characterized by a large impact on the economy of the province and are strongly linked to its internal potential. Świętokrzyskie has the potential to be competitive in these areas. On the other hand, areas connected with modern agriculture, food processing, health tourism and health prevention have less influence on the current economic situation of Świętokrzyskie, but these areas have a high potential that thanks to "intelligent" support will allow for faster development of the region.

6. Conclusions

The assessment of the level of competitiveness in 2013 highlighted its importance in the development of Polish regions. The most competitive regions are: Mazowieckie, Wielkopolskie, Śląskie, Dolnośląskie. In the next group were the provinces: Małopolskie, Pomorskie and Łódzkie. A group of decidedly less competitive regions consists of: Zachodniopomorskie, Kujawsko-pomorskie and Podkarpackie. The last place was taken by Warmińsko-mazurskie region. Mazowieckie region strengthened its position and decreased the distance the rest of the provinces in relation to the leader of the ranking. It seems that innovativeness, being a key factor in the competitiveness of regions, is not enough for the growth of competitiveness.

Currently, a new accent in the regional innovation policy is intelligent specialization. Its basic assignment is to improve innovation in the region. Thus, in practice it is not possible to translate simply: the effects of specialization regional development – increasing the competitiveness of regions. An integrating element of this algorithm would be innovation of economy, which should include research and development activity, companies' innovativeness and their network connections. It should be remembered that smart specialization will not be the only source of growth in the competitiveness of regions [Główny Instytut Górnictwa 2013]. However, it can give hope to decrease disparities between regions.

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