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INTRODUCTION

The impact of cities on their surroundings is significant, irrespective of the rate and directions of their development. The influence of the development of spatial and functional peripheral areas as well as the ties between them are one of the constant study problems realized by researchers in the range of different scientific disciplines. Cities develop at a different pace and are characterized by different currents of the development; nevertheless, the influence they exert on their environs is relevant. In response to problems pertaining to the development of cities and the need for identification of their connections with the environment, researchers in various disciplines undertake to conduct studies in this respect.

The scientific articles contained in this volume deal with contemporary processes going on at the meeting point of urban areas and their surroundings. They are concerned with such issues as: financing integrated territorial investments, cities as growth poles, cities within the polarized socioeconomic space, innovation potential of cities in Poland, and also address questions connected with the development and transformations of cities which have been degraded.

We hope that this volume will offer a source of interesting and inspiring knowledge resulting from interdisciplinary scientific studies in the scope of functioning, planning and managing the development of cities.

Agnieszka Dembicka-Niemiec

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WPROWADZENIE

Oddziaływanie miast na ich otoczenie jest istotne niezależnie od tempa i kierunków ich rozwoju. Wpływ miast na zmiany struktury przestrzennej i funkcjonalnej obszarów peryferyjnych oraz powiązania między nimi są jednym ze stałych problemów badawczych realizowanych przez badaczy z zakresu różnych dyscyplin naukowych. Miasta rozwijają się w zróżnicowanym tempie i charakteryzują się odmiennymi kierunkami rozwoju, jednak ich oddziaływanie na otoczenie jest istotne. W odpowiedzi na pojawiające się problemy rozwoju miast oraz na potrzebę identyfikacji ich powiązań z otoczeniem badacze z rożnych dyscyplin podejmują badania w tym zakresie.

Zawarte w prezentowanym tomie artykuły naukowe dotyczą współczesnych procesów zachodzących na styku obszarów miejskich i otoczenia. Do problemów tych należą takie zagadnienia, jak: finansowanie zintegrowanych inwestycji terytorialnych, miasta jako bieguny wzrostu, miasta w polaryzowanej przestrzeni społeczno-gospodarczej, potencjał innowacyjny miast w Polsce. Są to także zagadnienia związane z rozwojem i przemianami miast zdegradowanych.

Wyrażamy nadzieję, że prezentowany tom będzie źródłem interesujących i inspirujących wiadomości, które stanowią pokłosie interdyscyplinarnych badań naukowych w zakresie funkcjonowania, planowania i zarządzania rozwojem miast.

Agnieszka Dembicka-Niemiec

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Robert PERDAŁ*, Paweł CHURSKI**, Tomasz HERODOWICZ***,
Barbara KONECKA-SZYDŁOWSKA****

CITIES IN THE POLARISED SOCIO-ECONOMIC SPACE OF POLAND[1]

MIASTA W SPOLARYZOWANEJ PRZESTRZENI SPOŁECZNO-GOSPODARCZEJ POLSKI

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ABSTRACT: The process of socio-economic development is subject to changes resulting from the interaction of contemporary socio-economic megatrends which modify the influence of development factors and affect the polarisation of development in space. The measures to date, adopted as part of the cohesion policy and intended to decrease the differences, have not produced the desired results. This leads to the search for new solutions which include place-based intervention. Here, a special role is played by the largest cities performing the function of development poles. They can positively affect the development of the surrounding area. The work aims to identify the importance of cities in terms of socio-economic inequalities in Poland. The analysis is carried out at the local level and covers the years 2004-2016. The research includes three stages. What is discussed in the first is the role of cities as development poles. The second presents an analysis and classification of spatial differences in the level and dynamics of the development of the largest cities. The third stage determines the influence of these cities on the surroundings.

KEY WORDS: city, polarisation, diffusion, cohesion policy, Poland

ABSTRAKT: Proces rozwoju społeczno-gospodarczego ulega zmianom wynikającym z oddziaływania współczesnych megatrendów społeczno-gospodarczych, które modyfikują oddziaływanie czynników rozwoju i wpływają na polaryzację rozwoju w przestrzeni. Dotychczasowe działania w ramach polityki spójności zmierzające do zmniejszenia zróżnicowań nie przynoszą oczekiwanych rezultatów. Skłania to do poszukiwań

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nowych rozwiązań, do których należy interwencja zorientowana terytorialnie. W działaniach tych szczególną rolę odgrywają największe miasta pełniące funkcję biegunów rozwoju. Są one potencjalnymi emitorami pozytywnych efektów rozwojowych na swoje otoczenie. Celem pracy jest identyfikacja znaczenia miast w układzie nierówności społeczno-gospodarczych Polski. Analiza prowadzona jest na poziomie lokalnym i obejmuje lata 2004-2016. Postępowanie badawcze obejmuje trzy etapy. W pierwszym etapie omawia się rolę miast jako biegunów rozwoju. Drugi etap obejmuje analizę i klasyfikację zróżnicowań przestrzennych poziomu oraz dynamiki rozwoju największych miast. Trzeci etap dotyczy identyfikacji wpływu tych miast na otoczenie.

SŁOWA KLUCZOWE: miasto, polaryzacja, dyfuzja, polityka spójności, Polska

1. Introduction

Cities are special places in socio-economic space, performing the functions of development and growth poles. Their privileged position results from the spatial diversification of development processes, which is the basis for the current phase of development of the capitalist economy (Amin 2004). The competitive advantages of cities are the result of the interaction of agglomeration effects, extensively discussed in the source literature (as understood by Marshall-Arrow-Romer, Porter or Jacobs) (Beaudry, Schiffauerova 2009). They strengthen endogenous resources of cities, while their exogenous relations increase in power and range. Based on these regularities, cities become places with a relatively higher level of development, which can affect their immediate and more distant surroundings. It should be remembered, however, that if the consequences of agglomeration effects occur spontaneously, the effects of diffusion require reinforcement. As a result, the development policy should involve, on the one hand, the optimisation of consequences of agglomeration effects, including counteracting its negative implications. On the other hand, the cohesion policy should be oriented towards supporting diffusion effects, both strengthening them in the centres of their development and growth and increasing their range of influence on the surrounding areas. This leads to a decrease in the scale of spatial development differences, considered by D. Harvey (2016) the basis for the functioning of contemporary capitalism, which can reach a socially acceptable level (Faludi 2006; Molle 2007). Seeking to achieve this state, intervention in socio-economic development ought to make a full use of agglomeration and diffusion effects, which seems to be the only effective solution to a successful cohesion policy considering inefficiency of compensatory mechanisms.

The external determinants of the development process, different in various parts of the world, including in Western Europe and East-Central Europe, are related to long-term changes in economic systems (Naisbitt, Naisbitt 2016; Horváth 2015). The present period of these changes results from the transformation aimed at shaping postmodernistic conditions for running business activity, characteristic of the current stage of cognitive capitalism development (Harvey 1990; Moulier-Boutang 2012). They are strengthened by globalisation, the impact of which increases along with the ongoing process of economic integration. In these conditions, shaped by the megatrends indi-

cated, a real challenge is an effective impact on regional development factors aimed to optimise economic processes and, as a consequence, to improve the standards of life (The Future of Cohesion Policy… 2015). These factors change their scope as well as impact mechanism and are greatly diversified in space. However, it does not change the possibility of organising them in the traditional categories of the capital: human, social, financial and material supplemented with broadly understood innovations (Churski et al. 2018; Konecka-Szydłowska et al. 2019).

The paper aims to identify the importance of cities in terms of development inequalities of socio-economic space in Poland. The analysis is carried out at the local level and covers the years 2004-2016. The research includes three stages. What is discussed in the first is the role of cities as growth and development poles in the era of the interaction of contemporary megatrends in socio-economic development. The second presents an analysis and classification of spatial differences in the level and dynamics of the development of the 109 largest cities (over 40,000) against the background of all the communes in the country. The third stage determines the influence of these cities on their surroundings. In order to identify the differences in the development level use was made of the synthetic indicator. It is the foundation for the classification of development differences based on cluster analysis (the algorithm of *k*-means) verified (within the scope of the optimisation regarding the classification of units into specific classes) using the random forest method (Perdał 2018).

2. Cities as growth and development poles

The origins of understanding cities as growth and development poles can be found in works concerning uneven development. Among them, the writings of such authors as J. Boudeville (1972, 1978) and J. Friedmann (1967) come to the fore. These works are strongly conceptually related to the nodal region of D. Whittlesey (1954) and are very similar to the concepts of A.O. Hirschman (1958) and G. Myrdal (1957).

On the basis of his former research into the steel industry in Brazil, J. Boudeville (1978) distinguished a polarised region (the city and the countryside) and an urbanised region. In view of the complexity of contemporary socio-economic development processes, it is difficult to indicate these types of regions in a clear form. Most often, the largest cities and their surroundings are mixed as regards their character and these are heterogeneous areas where traditional (hierarchic) settlement structures partially disappear. Thanks to local and regional links, these are functionally complementary areas showing a high degree of integration mostly due to high spatial accessibility and large everyday flows to work regarding mainly the pole – surroundings relation. Broadly understood industrial and service agglomerations are these types of poles of polarised space. Their growth is based on the most prosperous and technically and organisationally progressive enterprises, and on the fast diffusion of both technical and social innovation (Dziewoński 1989). It is worth adding at this point that J. Boudeville (1978) introduced the distinction using the term of the growth pole to define diversified

industrial cities, passive in character, the development of which depends on stimulation effects provided by development poles and industries located there that are driving forces, and the development pole to define industrial and service agglomerations containing propulsive enterprises usually innovative to a great extent, significantly affecting the development of growth poles.

In J. Friedmann' terminology (1967), the picture of main centres of changes emerges from the polarisation process, the so-called core regions and peripheries. A core region is a development pole consisting of a city and its hinterland, which together with other areas (peripheries), dependent on the core, creates a complete spatial system. A core region dominates peripheries through self-reinforcing polarisation mechanisms. Growth and development in the core-peripheries system takes place thanks to technical or organisational innovations, with development resulting in changes in the system structure. It should be additionally emphasised that J. Friedmann perceives polarisation mainly in the context of networks of socio-economic relations. Core regions are characterised by a wide and dense network of relations, both internal in character (which is indicative of a high degree of integration) and primarily external (mainly regional, national and international). This is closely linked to the degree of embeddedness of business activity in networks of social and interpersonal relations (Polany 1944; Granovetter 1985). A. Amin and N. Thrift (2002) highlight the importance of network nodes (core regions, growth and development poles) as broadly understood decision centres (economic, social, political). Hence, Hirschman's growth poles influence peripheries by economic links either through positive trickle-down effects or negative polarisation effects (in Friedmann's works these are centrifugal spread effects and centripetal backwash effects respectively). Positive trickle-down effects result from the complementarity between the activity of a pole and peripheries, transmission of innovations, relocation of activity to peripheries with lower agglomeration costs and daily economic migration (e.g. commuting to work).[2] Polarisation effects, on the other hand, are primarily related to a drain on high quality human capital from peripheries, a greater competitive advantage of cores over peripheries. A constant (cumulative) generation of positive development effects by cores and their immediate surroundings is congruent with the conception of G. Myrdal (1957), a Swedish economist, on the principle of circular and cumulative causation. In turn, negative changes generate a cumulative process of shrinking. These processes consolidate geographical unevenness of growth and socio-economic development, thus leading to increased polarisation and inequalities between cores and peripheries. If spread effects are stronger than backwash effects, a positive development result will follow. On the other hand, a reverse situation will be conducive to growing development divergence, mainly in a core-peripheries relation (Parr 1999) which may achieve a socially unacceptable level.

[2] According to D. Todd (1974), the mechanism of diffusion from development poles to the surroundings is based on the existence of a key sector (mostly industrial, less often service) and a series of multiplier mechanisms.

In this context, an impact range of a growth and development pole becomes a particularly important issue. According to W. Gaczek (2013: 42), "spatial range as well as forms and strength of this influence depend not only on the internal structure and economic base of different types of poles (large cities, agglomerations, metropolises), but also on the existence of intermediate centres in space (large and medium-sized cities) and on the capability to absorb, assimilate and adapt positive impulses by units located in the surrounding areas." An exhaustive and separate typology of relations between a city and a region is difficult due to the multitude of dimensions in which these relations can be discussed (a sectoral approach: enterprises, households, public authorities; a material approach: goods and services, population, capital, information; both time and spatial a perspective) (Smętkowski 2011).

It is worth remembering that contemporary megatrends in socio-economic changes have consolidated the polarised space of Poland to a significant extent. The socio-economic transformation along with post-modernistic processes activated in a globalising world and the integration of East-Central Europe with EU structures have caused the Polish economy to open to market forces and global competition. This meant a shock and a structural crisis for the Polish economy which at the end of the 1980s and the beginning of the 1990s was in decline. In this situation some cities were affected by a strong deindustrialisation process and had problems with maintaining their economic base. Many centres, especially those with a monofunctional economy suffered from a socio-economic regression. The administrative reform of 1999 influenced further changes in location of various urbogenic activities and in many cases strengthened problems stemming from differences in the situation in the administrative-settlement hierarchy, including a gradual disappearance of functions (Śleszyński 2017; Churski et al. 2018). Nevertheless, in many cities (especially the largest ones), transformation problems seemed to be overcome. Owing to numerous favourable determinants and a coincidence of factors, growth and development in these cities were dynamic. This, in turn, activated the process of development spreading, which embraced secondary urban centres as they were strongly connected to the globalisation processes taking place (Ciołek 2017). The occurrence of the clear diffusion of socio-economic development from cores to peripheries, especially in the largest urban agglomerations is confirmed by the research of G. Gorzelak and M. Smętkowski (2019).

The development policy should be oriented towards strengthening (through the creation of appropriate conditions) spread effects and minimising a negative impact of backwash effects. In fact, it is a matter of bringing about the situation in which peripheral areas will have a minimal level of territorial capital ensuring, on the one hand – absorption of the positive multiplier effects coming from cores and, on the other one – guaranteeing effective mitigation of the negative effects of their impact. To this end, it is essential to orient development intervention to the needs of particular territories (Churski 2018).

3. The socio-economic development level of the largest cities in Poland

The synthetic analysis and classification of spatial differences of the largest Polish cities carried out with regard to the level and development dynamics against all the communes in the country allows stating that in both cases the situation is different, i.e. a high development level is accompanied by a low dynamics of development changes.

The investigated cities (and what is important the surrounding communes), as compared to the commune pattern, stand out above the average level of socio-economic development and perform the function of growth poles (Figure 1). What is noticeable in Western Poland is a bigger share of cities with a relatively higher development level in relation to the rest of the country. This situation can be partially explained by historical determinants, i.e. the location of the analysed centres in particular parts of the country functioning until 1918 in the Prussian, Russian and Austrian Partitions. They were characterised by various political, cultural and socio-economic systems which is also manifested in overall, contemporary differences in the socio-economic development level in Poland (Gawryszewski 2005; Grabowski 2018; Churski et al. 2019).

Fig. 1. Synthetic classification of communes and investigated cities in terms of the socio-economic development level (2004-2016)

Source: own study.

As regards the socio-economic development level, three classes of cities have been distinguished: with a very high, high and average development level. As compared to all the communes, none of the centres studied has shown a low development level. A total share of cities with a very high and high development level is 53% (58 units). The class embracing cities with a very high development level is the least numerous, comprising only three cities: Warsaw, Poznań and Wrocław. The number of cities with an average

and high development level is similar and makes up 51 and 55 cities, respectively. It should be emphasised that the socio-economic development level of Warsaw clearly deviates from the development level of the other cities. A mean value of the synthetic indicator for 2004-2016 was at the level of 0.413 for the capital; for the other cities of the "first ten" – 0.319 and for the cities from the "last ten" – 0.210 (Fig. 2). It is worth noting that the largest cities performing functions of regional centres are characterised by a relatively higher development level than medium-sized cities and/or without the function of voivodeship centres, e.g. the group of "last ten" consists of, among others: Bytom with the population of 166,000 and Piekary Śląskie in Śląskie Voivodeship, with 55,000 inhabitants (Figure 2). The earlier research conducted by P. Śleszyński (2017) showed that in the group of medium-sized cities what occurs are unfavourable trends related to their strong diversification, including the weakening of socio-economic importance and dysfunctions regarding relations between them and the surroundings. The confirmation of a strong mutual dependence of the population number (the hierarchy of cities) and the development level is the obtained values of R^2 determination coefficients, which amounted to 0.683 in 2004 and 0.777 in 2016. It should be emphasised here that it is not a straight-line dependence, because the matching function has the form of a second-degree polynomial, the graphic interpretation of which is a fragment

Fig. 2. Trajectories of the socio-economic development level of cities from the "first ten" and the "last ten" (2004-2016)

Source: own study.

of a parabola. This means that some cities with a relatively large population number are characterised by an average development level and some medium-sized cities – by a high level.

In the pattern of the development trajectories of cities belonging to various development classes after 2008, what is noticeable is a slight decrease, a certain stability until about 2012, and then growth (Figure 2). This situation should be related to the vulnerability of development of cities to the economic crisis (Churski et al. 2018; Konecka-Szydłowska et al. 2019).

On the other hand, an analysis of the dynamics of the development level allows stating that the cities studied, as compared to all the communes (this time different from the surrounding communes), do not stand out above the average level of the socio-economic development dynamics and do not perform functions of growth poles in this regard (Figure 3). In this case an impact of growth poles on development dynamics of their immediate surroundings is more noticeable.

Fig. 3. Synthetic classification of communes in terms of dynamics of the socio-economic development level (2004-2016)

Source: own study.

As regards the dynamics of the socio-economic development level, three classes of cities have been distinguished: with average, low and very low dynamics of development. A total share of cities with very low and low dynamics of the development level is high and amounts to 78%, the cities with low dynamics being as many as 63% (69 units). Cities that demonstrated very low dynamics of the development level in 2004-2016 are situated in Eastern and Southern Poland (mainly in Śląskie Voivodeship). It should be indicated, however, that when it comes to the dynamics of the socio-economic development level, regardless of the city size, what takes place is its minor diversification confirmed by similar mean values of the synthetic indicator of the dynamics of the

development level for the cities from the "first ten" and the "last ten", which were 0.342 and 0.320, respectively (Figure 4). The lack of important mutual dependences (linear and curve-lined) of cities' population number and the dynamics of the development level is confirmed by the obtained values of R^2 determination coefficients, which were 0.062 in 2004 and 0.078 in 2016. Similarly, as in the case of the development level of cities, in the pattern of the trajectory of the dynamics of the socio-economic development level after 2008, there are a noticeable minor decrease and certain lack of changes until about 2012 and then an increase (Figure 4). This situation should also be linked to the impact of the economic crisis.

Fig. 4. Trajectories of the dynamics of the socio-economic development level of cities from the "first ten" and the "last ten" (2004-2016)

Source: own study.

4. Impact of the largest cities in Poland

The identification of impacts of growth and development poles on their surroundings was made in a direct way, based on the value of the synthetic indicator of the socio-economic development level and its dynamics.[3] The analysis was conducted concern-

[3] This work does not discuss the impact range through functional urban areas. Delimitations in this context can be found in the works of, e.g.: P. Śleszyński (2013), K. Heffner, P. Gibas (2014, 2015) and they were systematised in the works of P. Sudra (2018). It is also a somewhat different approach that was described in the work edited by Wojciech Kisiała and Bartosz Stępiński (2013).

ing 18 regional centres which perform the function of (at least) regional growth and development poles and 600 communes situated within 35 km of the regional centres[4] (Smętkowski 2011) which are their impact zones. Certainly, the adoption of equal distances for the impact zones of, e.g., Warsaw and Opole or Zielona Góra is a certain convention assumed for the operational purposes of this analysis, which treats the discussed issue in general terms.

The mean value of the synthetic indicator of the development level (2004–2016) for voivodeship cities was 0.301, and for their impact zones 0.233, whereas for areas outside the impact zones – 0.205, with the national average of 0.213. Therefore, within a 35-km impact zone of regional centres, 20% of the communes are characterised by a high or very high development level and 42% of the communes – by low or very low one. In turn, outside the equidistance of 35 km, it is 4% and 75%, respectively (Table 1). Thus, the areas located closer to a regional centre enjoy a much more favourable socio-economic situation. Certainly, not every regional centre has the same impact on its surroundings (Figures 1 and 5). A clear difference lies in the size and situation of a city. The relatively strongest positive impact was identified in Warsaw, Poznań, Wrocław and Szczecin (the largest proportion of communes with a high and very high development level) and the weakest one in Białystok, Kielce, Rzeszów and Lublin (the largest proportion of communes with a low and very low development level).

Table 1

Structure of communes in terms of the development level (A) and its dynamics (B) depending on the distance from the voivodeship city (in %)

Type	Socio-economic development				Impact zones					
	level		dynamics		Poznań		Warsaw		Lublin	
	up to 35 km	over 35 km	up to 35 km	over 35 km	A	B	A	B	A	B
Very low	13.2	35.8	17.3	41.6	0.0	5.6	0.0	7.1	38.5	30.8
Low	29.3	39.4	20.0	23.8	8.3	0.0	6.8	9.5	35.9	15.4
Average	37.5	21.0	31.0	22.4	52.8	33.3	25.4	0.0	23.1	28.2
High	17.8	3.2	29.3	11.2	33.3	61.1	54.2	81.0	0.0	25.6
Very high	2.2	0.6	2.3	1.0	5.6	0.0	13.6	2.4	2.6	0.0
Generalisation										
Low*	42.5	75.2	37.3	65.4	8.3	5.6	6.8	16.7	74.4	46.2
Average	37.5	21.0	31.0	22.4	52.8	33.3	25.4	0.0	23.1	28.2
High**	20.0	3.9	31.7	12.2	38.9	61.1	67.8	83.3	2.6	25.6

* Very low + low.
** Very high + high.

Source: own study.

[4] In the case of Bydgoszcz and Toruń, the ranges overlapped, hence this system was considered jointly.

Fig. 5. Socio-economic development level and its dynamics in selected cities and their impact zones

Source: own study.

In the case of the dynamics of socio-economic development, the situation looks a bit different. The average annual rate of development dynamics for regional centres was 0.338 and for the impact zone 0.345. In turn, for the communes outside impact zones it was 0.335 with the national average of 0.337. Then, the development dynamics of regional centres is similar, although a bit lower, to the dynamics of their impact zones and at the same time comparable to the national average. Nevertheless, outside the impact zones of large cities, the dynamics is not clearly lower. The situation in this respect changes more if one considers commune classes distinguished in terms of the development dynamics. Then, what emerges is an exceptionally favourable situation of communes around the largest cities and less advantageous of those located outside their impact zones. Nearly 32% of the communes within the impact zones of regional centres are characterised by high or very high development dynamics, and outside them – only 12%. On the other hand, the share of communes with low or very low development dynamics was 37% and 65% in favour of the communes situated up to 35 km from the regional centre. The highest share of communes with the highest development dynamics was typical of the impact zones of Warsaw, Wrocław, Poznań and Zielona Góra. In turn, most communes with low or very low dynamics could be found in the vicinity of Białystok, Kielce, Bydgoszcz and Toruń, and Katowice.

5. Discussion and summing-up

The obtained results of the research procedure confirmed the polarisation of socio-economic development in Poland remaining at the local level, which was also noticed in the works of, e.g., P. Korcelli (2005), J. Bański (2010) or K. Ehrlich et al. (2012). In the polarised socio-economic space of Poland what is clearly visible are growth and development poles in the form of the largest cities (which influence positively their surroundings) and peripheries with the lowest development level. The differences in the development of Polish cities are determined partially by history, as evidenced by the lines of partition borders indicated in the spatial distribution of the development level. G. Gorzelak and B. Jałowiecki (1998) arrived at the same conclusions, showing that the location in the historical region was one of the factors that diversified Polish communes the most in terms of socio-economic processes. It should be indicated, however, that the differences observed can be strengthened mainly because of the nature of contemporary development processes determined by megatrends (e.g. transformation, globalisation, integration, post-modernisation). The impact of megatrends varies depending on the existing territorial capital and they either emphasise its strengths, or, and maybe first of all, intensify its weaknesses.

Socio-economic development takes its course spontaneously, regardless of the development policy implemented. This concerns especially agglomeration effects, related to the concentration of development factors in growth and development poles, i.e. in the largest urban centres. In Poland, mainly regional centres are such poles (the capitals of voivodeships), the strong development position of which as compared to

all the communes and the analysed cities confirms the topicality of the assumptions of classical theories of uneven development. Nevertheless, it should be emphasised that these centres are characterised by different historical determinants that diversify endogenous resources, which affects their individual development trajectories and the nature and scope of impacts on the surroundings. The example of Łódź is worth mentioning here. In the 19th and the 20th centuries, thanks to the extremely rapid development of the textile industry, the city was transformed from a centre with 500 inhabitants in 1810 into the agglomeration with nearly 500,000 residents in 1914 and over 850,000 in 1989. However, until 1918 it was only the capital of *ujezd* (meaning "a district" in the Russian language) in the Piotrków Governorate (Piotrków Trybunalski had a mere 32,000 inhabitants), despite being the second city of Congress Poland after Warsaw (and the fifth in the then Russian Empire). It was only after 1918 that it started to perform the function of a voivodeship centre, but it was a region with very changeable borders (e.g. in 1975-1999, Łódź Voivodeship was only composed of 13 communes neighbouring Łódź).

The identified regularities are highly persistent. A change in this situation is a serious challenge to the development policy. What is necessary here is a much higher dynamics of development changes in cities with a relatively lower development level in relation to the dynamics of cities with a higher development level. Presently, such diversification in terms of their development dynamics does not take place, which has been confirmed by the conducted studies. In order to accelerate development processes in cities with a lower development level and stop the processes of deepening divergence, a development policy should create conditions for strengthening networks of cities, including sub-regional centres, the position of which affects the socio-economic situation of peripheral areas, also the marginalised problem areas located outside the impact range of the largest agglomerations (Śleszyński 2017). However, it ought to be emphasised that supporting sub-regional centres should not consist in a simple redistribution of development factors (mainly financial capital) based on the compensatory model, the efficiency of which has already been questioned repeatedly (e.g. Gorzelak 2009; Drejerska 2010; Zaucha et al. 2015). Public support should depend as much as possible on the local development needs of a given area combined with the intense involvement of endogenous development factors according to a place-based approach (Barca 2009; Churski 2018). The networks of cities strengthened in this way and their closer relation to places of socio-economic degradation should contribute both to ensuring solid development foundations of urban centres themselves, a complementarity of functions in various patterns and also to the diffusion of growth stimuli and "pulling" declining areas through crisis pitfalls (Śleszyński 2017).

The analysis of the impact of the largest Polish cities on their surroundings has confirmed the existence of clear differences in terms of the diffusion of socio-economic development which takes place in various parts of the country. Among the regional centres, one could distinguish, according to Boudeville's (1978) terminology, development poles exerting a considerable influence on their surroundings and growth poles, passive

in character, which did not show a strong and positive impact on the neighbouring communes. The main development poles included Warsaw, Poznań, Wrocław, Gdańsk, Cracow, Katowice and Szczecin which embraced the largest proportion of communes with a high development level located in their vicinity. On the other hand, growth poles included mainly the voivodeship capitals of Eastern Poland (Olsztyn, Białystok, Kielce, Rzeszów and Lublin) and partially Łódź, Toruń and Bydgoszcz characterised by weaker and not always positive interactions, with the largest share of communes with a low development level in the surrounding area. This is in line with the research results of W. Gaczek (2013: 42-43), who states that "in a polarised region, especially in the initial phase, it is possible that the effects of the pole domination occur, negative for peripheral areas, also called the effects of a gradual disappearance. A large city, also as a result of the economies of scale, shows a high dynamics of development growth, often accompanied by very weak growth impulses transmitted outside. This will result in a weakening of the dynamics of economic growth of peripheries as a consequence of the transfer of development potential, migration of the population and the shift of capital to the centre. The period of negative results of polarisation and uneven spatial socio-economic development can be long and depends to a great extent on social factors and on the adopted solutions of the state's regional policy." A relatively weaker influence of the regional centres of Eastern Poland is determined to a higher degree by historical factors. Cities which are now capitals of voivodeships were sub-regional centres before World War 2, and large agglomerations – Lviv and Vilnius, which came to remain outside Poland after 1945, were natural development poles. Thus, the natural directions of attraction were disintegrated, which is manifested by the lack of historically developed strong social and economic ties (Śleszyński 2018). An effective interaction intended to change this situation requires that all levels of regional settlement patterns be strengthened consistently, making a full use of the network of nodes of these systems. This confirms the need to continue the development policy in Poland based on the polycentric pattern of urban centres striving to perform the function of development poles with increasing positive impacts on the surroundings.

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CREATIVE CLUSTERS IN POLAND AND THEORETICAL CLUSTER STRUCTURES – SIMILARITIES AND DIFFERENCES[1]

KLASTRY KREATYWNE W POLSCE A STRUKTURY KLASTROWE W UJĘCIU TEORETYCZNYM – PODOBIEŃSTWA I RÓŻNICE

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ABSTRACT: The goal of the paper is to examine the degree of congruence between cluster definition found in the literature on the subject and the actual creative clusters operating in Poland. The author set out to analyse the following features: cluster openness, whether goals of cooperation and common development strategy have been defined, spatial concentration of the entities and the significance of geographical proximity, as well as the relationship between cooperation and coopetition within clusters.

Openness of cluster structures was the only feature that has found clear confirmation in the conducted direct survey. In the majority of cases, clusters increased the number of entities (cluster members). At the same time, new entities were established in the cluster environment and with time have also become cluster members. As for the remaining three features, no clear confirmation could be obtained. For example, only 5 out of the 17 analysed creative clusters had common development strategies.

KEY WORDS: creative industries, clusters, coopetition, cooperation, Poland

ABSTRAKT: Celem opracowania jest ukazanie stopnia zgodności między definicją klastra w literaturze przedmiotu a funkcjonującymi w Polsce klastrami opartymi na działalności twórczej. Autor postanowił zanalizować następujące cechy: otwartość klastrów, zdefiniowanie celów współpracy oraz wspólnych strategii rozwoju, koncentrację przestrzenną podmiotów oraz znaczenie bliskości geograficznej, a także relację kooperacji i konkurencji w klastrze.

Jedyną cechą, która zdecydowanie znalazła potwierdzenie w przeprowadzonym badaniu bezpośrednim, była otwartość struktur klastrowych. Klastry w większości przypadków zwiększały liczbę podmiotów-członków. Tworzone były jednocześnie nowe podmioty w otoczeniu, które z czasem stawały się również członkami klastra. W przypadku pozostałych trzech cech trudno o ich jednoznaczne potwierdzenie. Przykładowo wspólne strategie rozwoju miało jedynie 5 z 17 analizowanych klastrów kreatywnych.

SŁOWA KLUCZOWE: działalności twórcze, klastry, koopetycja, kooperacja, Polska

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1. Background

Contemporary development processes in cities are focused on the development of internal potential based on creativity and innovation. The above leads to an increased interest in the creative sector, i.e. creative activities such as advertising, publishing, film, music, architecture, design and knowledge-intensive activities (KIAs) such as ICT, legal and consulting services (Department… 2013). While the market position of KIAs has already been well-established, the economic condition and prestige of creative activities may cause more concern. The reason is that the merger of creative activities, including in particular culture, with business still produces insufficient development stimuli. Especially when the problem is analysed from the economic point of view, because the social role of the sector is well noticed and undisputable.

In line with the new trends in the development of urban areas, various measures have been taken to increase the position of creative industries in the economy. They can take the form of central government support such as preferential VAT rates or national support programmes for (selected) creative sectors. However, more often they are local initiatives, such as exemption from a portion of rent charges for entities located in selected neighbourhoods and active in selected industries or setting up networks of creative cities. There is also cooperation between individual entities active in creative industries aimed at strengthening their market position. These entities establish networks, create strategic alliances, use outsourcing and form clusters.

The present paper is devoted to clusters dedicated to creative industries. There are currently about 20 clusters of the above type in Poland; while some are created, others are wound up. Nevertheless, they still constitute a significant part of the total number of clusters in the country, which is estimated at 130 (PARP 2018). It is worth noting that none of the above clusters was selected as the Key National Cluster. Thus, the question still remains whether Polish creative clusters will survive and if so, what will be their real impact like on the economy of cities and regions.

The aim of the present paper is to present the results of a survey of creative clusters to answer the question of whether creative clusters in Poland operate in accordance with the idea of clustering described in the literature on the subject. To answer the above question, the author examined the clusters' attitude to common development strategy, to their spatial concentration, as well as tried to determine how much open they are. Another important goal was to determine the relationships between cluster entities – whether they are based exclusively on cooperation or on coopetition? In view of the conceptual approach to clustering, the above question is important, or maybe even crucial.

The present paper consists of three basic parts. The first one is devoted to the concept of industrial clusters, including creative clusters, as dealt with in the specialist literature. The second part provides basic information about creative clusters in Poland. The third part presents selected conclusions following from the author's research.

2. Creative cluster concept in the literature on the subject

The concept of clusters emerged at the interface of various research trends originating from several fields of science: economic, management and social sciences. The problems of location in space were studied in classical theories and concepts of political economics (A. Smith, D. Ricardo), location theories by J. Thünen, A. Weber or A. Lösch, theories of Swedish scholars such as G. Myrdal or in contemporary work of location theorists (W. Isard and E.M. Hoover). However, the intellectual foundation of the cluster concept is Marshall's industrial district rooted in management sciences. The above term was used to define a geographical concentration of enterprises operating in a single or related industries, with the resulting effect of agglomeration based on the flow of knowledge between the enterprises, creation of specialized production and service factors and the emergence of a market of qualified labour force. The development concepts proposed later based on location advantage and system approach built upon and supplemented the above basic concepts. It is also worth noting that the concept of location can also be found in social sciences. It was accompanying the research on social capital (e.g. P. Bourdieu and R. Putnam).

M.E. Porter, his first works published in the 1990s, is regarded as the seminal figure of contemporary cluster research. For example, in his work of 1998, the researcher discussed four characteristic features of industrial clusters. Among them are: geographical concentration of entities, interactions between them, common development trajectories and coopetition. The above features can also be found, although with a different distribution of emphasis, in the works of other authors (among others Bathelt, Taylor 2002; de Berranger, Meldrum 2000; Gordon, McCann 2000; Gupta, Subramanian 2008; Rosenfeld 1997). In the literature on the subject, there is a dominant positive image of a cluster as a structure benefitting from the relationships of cooperation between its members. Clusters are presented as a specific form of spatial organization of industry and services, being the most mature form of production organization from the point of view of its ability for sustainable development. The most often mentioned cluster advantages are higher productivity being a result of diffusion of technological and organizational know-how and of proximity of entities, higher innovation, faster growth, keeping/increasing competitive advantage of the cluster or a growing number of jobs (e.g. Brodzicki et al. 2004; Gorynia, Jankowska 2008; Mariussen 2001; Skawińska, Zalewski 2009; Sternberg 2001). However, the creation and functioning of clusters may also be accompanied by threats. Among the weaknesses of cluster structures are: too narrow a specialization, threats resulting from simultaneous cooperation and competition, pressure for quick results, which may lead to a greater stress laid on more spectacular, but not necessarily sustainable effects. The literature on the subject also includes voices that do not fully accept the idea of clusters. For example, in the opinion of Martin and Sunley (2003) the cluster concept is too general and the definition lacks transparent terminology and cause and effect explanation of the mechanism of its functioning.

Also noteworthy is the lack of a widely accepted methodology of cluster research, which results in significant discrepancies in the literature of the subject concerning the number of members in the active clusters. Criticism also concerns the unclear manner of formulation of the concept of geographical proximity (mentioned, among others, by Martin, Sunley 2003, and Micek 2017) which in clustering is understood very broadly.

Creative clusters are formed in a variety of creative environments with the participation of cultural institutions, private sector entities active in creative industries as well as entities responsible for the commercialization of achievements, for educational activities, for research and development, and for the business environment. Venture capital institutions participating in the financing of innovative projects also play a role here. Larger cultural centres or universities can act as hubs, especially in Marshallian or state-anchored clusters (according to the classification by A. Markusen (1996)). At the same time, the composition of a cluster may change over time, e.g. due to the absorption of entities from the environment (e.g. Drake 2003; Gibson, Kong 2005).

International literature includes a host of studies on creative clusters. There is an especially large number of papers describing in detail a single creative cluster (e.g. the natural history film-making cluster in Bristol (Bassett et al. 2002)), video games cluster in Montreal (Darchen, Tremblay 2015) or a creative cluster in rural Cornwall (Harvey et al. 2012). However, what attracts attention in review articles is the varying scope covered by the research. Some of the works are devoted to one country (e.g. Chapain et al. 2010), the area of the European Union (e.g. ESPON 2011) or one city only (e.g. Heebels, Van Aalst 2010; Landry 2000; Pratt 2008). In geographical terms, it is worth noting that creative clusters are most often located in central districts of large cities and metropolitan areas, or in a larger area of inner-city districts. The reason for the above is that the leading cultural institutions, local government agencies and other resources (including infrastructure) are also located in such areas, all of which are factors contributing to the development of the creative sector.

3. Creative clusters in Poland

Statistics on the overall number of industrial clusters in Poland differ, which is due to the dynamics of the phenomenon. Initially, clusters were primarily bottom-up initiatives. Currently, a greater role is attributed to the authorities at the regional level. The inflow of EU subsidies was of great importance in this respect (e.g. under the Innovative Economy Operating Programme: Measure 5.1. Support for development of cooperative relations of supra-regional importance), which resulted in a sudden sprouting of artificial clusters, unlike natural clusters which emerge spontaneously, based on the existing resources. A sudden increase in the number of newly-established clusters in Poland was observed in 2007-2013. For example, in 2006 Bojar and Bis counted 44, Hołub-Iwan and Małachowska two years later (2008) – 56, and Polish Agency for Enterprise Development (PARP 2012) showed 212 clusters. However, after 2012, this

trend has changed and the number of clusters is gradually decreasing. When the EU funding stopped, some of them closed down their business activity as they failed to develop their own independent ways to build market presence. The report of PARP (2018) mentions 130 active clusters, of which over 60% are young clusters initiated after 2011. Such a short history is insufficient to achieve desired results. The largest number of clusters has been identified in the ICT sector, power engineering, construction and in the medical sector. A significant number of clusters can also be found in the metal industry, tourist sector and business services sector.

An important role in the functioning of each cluster is played by the facilitator – a person or an institution that facilitates cooperation in the cluster. At the initial stage of development of the cluster initiative, the facilitator's role is most often focused on soft activities related to motivating (potential) cluster members to start common activities. This role comes down to streamlining the process of information flow and to building trust in the structure as a whole as well as in its individual members. Over time, the role of the facilitator takes on a more business-like character and focuses on the utilization and strengthening of the cluster's competitive advantages.

Studies of creative clusters published on the Polish market can generally be divided into two groups: articles including analyses of the phenomenon on a micro scale (usually single case studies – e.g. Dyba 2016; Jankowska 2012; Polko, Wrana 2009; Stępień and others 2012) and publications (whose number is significantly larger) discussing creative clusters in general. The authors of this type of studies have analysed creative clusters from various angles. For example, in their study of 2013, D. Szymańska and S. Środa-Murawska conducted an analysis of spatial concentration of creative sector entities in Poland, using the location quotient (LQ). The authors identified areas offering favourable conditions for setting up clusters (Środa-Murawska, Szymańska 2013). In his papers, S. Olko deals with management in clusters and creative networks (e.g. Olko 2015). B. Jankowska focuses on the processes of internationalization of creative clusters (e.g. Jankowska, Gőtz 2017). In turn, the study by Bialic-Davendra et al. is an example of an article devoted to creative industry clusters in Poland against the background of Central and Eastern Europe (Bialic-Davendra et al. 2016). However, the conditions for the development of creative clusters and following the direction of their changes are a multi-faceted problem. Considering the growing (especially in large cities) number of entities in the field of creative activity, further interest in cluster structures could be expected. Clusters are most often created among entities of a similar industry that previously had mutual contacts with each other. And while undertaking cooperation within the cluster, they would like to increase the range of impact, establish cooperation with R&D or expand cooperation with the local/regional government. On the other hand, after talks with facilitators, it seems that clusters in Poland have adopted a wait-and-see attitude towards the European Commission's decisions regarding cluster policy. If the new budget for 2021-27 is not very favourable to clustering, the number of such structures will probably decrease significantly. In addition, clusters encounter numerous barriers (some of them are listed in Figure 1), which often stop the cluster's

development, such as lack of interest from local governments or dependence on external funding.[2]

4. Direct survey of creative clusters in Poland

4.1. Aim and research method

The aim of the study was to determine the extent to which the surveyed creative clusters correspond to the definition of a cluster. An attempt was made to define the clusters' approach to the joint development strategy and to geographical concentration and, at the same time, to establish the degree of openness of the structures. Determining the relationships between entities in the cluster was also important.

The research results presented in this study come from direct surveys carried out among facilitators of creative industry clusters operating in Poland. The survey was conducted in the autumn of 2018. After an initial telephone call announcing the conducted research, the facilitators filled out a special survey form containing 20 open- and close-ended questions. The questions concerned, among others, motives for establishing cluster structures, barriers to their functioning, internal and external connections, introduced innovative solutions or range of impact. Responses were collected from the coordinators of 17 clusters, for which creative industries were the only or one of several types of business activity. The analysed clusters were established in 2006-2015, with the biggest number created in 2011-2013. With the current number of entities working in the subject clusters ranging from 4 to 95 and in most cases this number has been steadily increasing since it was founded. Design and culture were the objects most frequently indicated by the respondents. The remaining clusters of the above type that are mentioned in various reports and statistics no longer exist. Only in the case of the Creative Industries Cluster from Szczecin, no clear answer has been obtained regarding whether the cluster still exists. The cluster's facilitator evaded giving a direct answer. Assuming that the cluster exists, the result would be 18 clusters based on creative industries, of which the 17 listed below (Table 1) took part in the survey.

4.2. Creative clusters in Poland and theoretical cluster structures – a comparative approach

The author focused on these conclusions and thoughts following from the study, which allow answering the important question: Bearing in mind the classical concept of an industrial cluster, are the observed relationships of the network or cluster character? It follows from the literature review, whose sample items are mentioned above, that networks and clusters are characterized by both similarities and differences. Voluntary

[2] The author developed the conditions for cluster development, including stimulating factors and factors limiting their functioning in another article (Namyślak 2019).

Table 1

Clusters including entities active in creative industries participating in the survey

Cluster name*	Location of the cluster's headquarters	Type(s) of activity	Date of establishment	Number of entities	Direction to change the number of entities**
Digital Entertainment Cluster (formerly European Game Centre)	Kraków	video games	2013	30	increases
"HubClub" Śląski Klaster ICT i Multimediów (HubClub Silesian ICT and Multimedia Cluster)	Ruda Śląska	ICT, multimedia	2013	20	still changing
Klaster Bibliotek Bialskich (Biała Podlaska Library Cluster)	Biała Podlaska	cultural activity	2010	4	constant
Klaster Biznesu Kultury BIZ-ART (BIZ-ART Culture Business Cluster)	Elbląg	design, publishing, performing arts, advertising	2011	5	steady at first, then decreasing
Klaster Biznesów Kreatywnych (Creative Businesses Cluster)	Zabrze	design, fashion photography, music, advertising	2012	48	increases
Klaster Innowacyjnego Przemysłu i Mody (Innovative Industry and Fashion Cluster)	Łódź	fashion design, media, advertising	2012	20	constant
Klaster Kultury i Turystyki Przemysłowej (Culture and Industrial Tourism Cluster)	Zabrze	culture, heritage, tourism	2012	40	increases
Klaster Poligraficzno-Reklamowy (Printing and Advertising Cluster)	Leszno	printing, advertising	2006	31	increases
Klaster Przemysłów Kreatywnych "MadeinŚląsk" (MadeinŚląsk Creative Industries Cluster)	Gliwice	design, archite-cture, advertising, multimedia	2013	40	increases
Klaster Przemysłów Kreatywnych (Creative Industries Cluster)	Bydgoszcz	music, media, publishing, film, computer games	2011	23	increases
Lokomotywa kultury (Engine of Culture)	Bielsko-Biała	design, multimedia, advertising, film	2011	53	first it grew, then it was constant
Lubuski Klaster Przedsiębiorczości i Turystyki (Lubuskie Province Cluster of Entrepreneurship and Tourism)	Zielona Góra	tourism, recreation, culture	2015	20	constant
Małopolski Klaster Turystyczny Beskid ('Beskid' Tourism Cluster of Małopolskie Province)	Nawojowa	tourism, multimedia	2011	14	increases

Table 1 contd.

Cluster name*	Location of the cluster's headquarters	Type(s) of activity	Date of establishment	Number of entities	Direction to change the number of entities**
Mazurski Klaster Turystyczny (Mazurian Tourist Cluster)	Mrągowo	tourism, culture renewable energy	2012	95	constant
MediaKlaster	Łódź	film activity	2007	15	constant
Śląska Strefa Dizajnu (Silesian Design Zone)	Cieszyn	design, advertising	2011	40	first it grew, then it started to fall
Śląski Klaster Kultury i Turystyki (Silesian Cluster of Culture and Tourism)	Pszczyna	culture, tourism	2013	53	increases

* Clusters in which creative activities are the only or dominant form of activity are highlighted
** Since its inception.

Source: own study.

involvement is a common feature in both network and cluster structures. Another similarity is the independence of entities in economic and legal terms and investments in creating relationships between entities, with these relationships – as the facilitators have claimed – being the subject of special meetings and debates financed from the cluster's common funds. The purpose of cluster promotion was served by various forms of participation in national and international fairs. A joint online webpage was also set up to create and strengthen information channels. The literature on the subject also mentions the transfer of resources between entities in networks and clusters. Human capital is among the principal resources of business entities. The present research proved that the flow of employees did take place, especially in the later period of functioning of some clusters. It was not planned and not all facilitators were happy about the fluid boundaries between the entities. Resources can also be understood as products or raw materials. However, in this respect, the existing connections were weak. The facilitators' answers showed a clear prevalence of intangibles in the flows within the clusters over the flows of products/semi-products or raw materials. Generally, the weakness of the above flows is a sign of the pursuit of maximum independence in terms of connections while leveraging other advantages that can be offered by a cluster structure. However, a joint dependence of entities on the resources controlled by other entities was observed (which is consistent with the literature on the subject), especially in the case of hub-and-spoke (1) and state-anchored (2) clusters.

According to the specialist literature, the above-mentioned features should be common for networks and clusters. Apart from them, there are also features that make both structures different. Among such features is openness of membership in the structure. Networks are by definition closed structures, while clusters are open ones. An analysis of changes in the number of entities constituting the subject clusters since their inception has shown that in most cases the above criterion was met. In 10 out of the 17 clusters the number of member entities was systematically growing until the current number (14-95 entities). In six clusters, the number was constant from the beginning and in one case it decreased. At the same time, in three clusters new entities were established that joined the cluster. However, this phenomenon was noticed only in the case of clusters which in addition to creative industries also specialize in other areas, such as the IT sector, printing and tourism. And the above were the areas in which the newly-created entities were active; hence, they did not represent creative industries.

Another feature making clusters different from networks is the definition of the objective of cooperation, which for networks is strictly business, while in a cluster it is a broader concept encompassing an entire strategy of functioning on the market. The survey showed that only five of the analysed creative clusters had agreed on common development strategies. Some respondents also said that for a long time their clusters had not even had any stated target or scope of cooperation defined. It was the lack of a common development strategy that made two facilitators hesitant about taking part in the study. They were aware of the need to implement common strategies in accordance with the cluster's idea, but – as they claimed – there was no agreement within

the cluster on joint strategic decisions (Figure 1). In some cases, the discussions on joint development strategies exacerbated the conflict of interest between companies.

Fig. 1. Barriers to the functioning of creative clusters in Poland

Source: own study.

Another important differentiating feature is the approach to geographical distance between entities within the structure. Networks are characterized by a lack of territorial restrictions. Geographic proximity does not matter. Clusters, on the other hand, are characterized by spatial concentration of entities and thus by greater importance of geographic proximity. The author initially assumed that the geographical distance between entities is significant for the intensity of the flow of knowledge and technologies in the cluster. In accordance with the idea of clustering, it seemed that such a dependence would be observed. It turned out, however, that no such relationship exists. Knowledge flows were indicated by 15 out of the 17 clusters, including both clusters located within one municipality and those separated by distances exceeding 100 km. Only two facilitators responded that there were no knowledge flows in their clusters. Interestingly, these were clusters whose members were located very close to one another, even in the same city. The flow of technology occurred only in two clusters concentrated in one city or in several neighbouring cities. The above leads to the conclusion that knowledge flows in the analysed clusters occurred regardless of the distance between entities, while the flows of technology occurred so rarely that it is difficult to talk about any dependencies. Confirmation of the above conclusions can be found in other responses given by the facilitators. They were asked whether the intensity of cooperation (in general) between entities in the cluster was dependent on the geographical distance between them. And also in this case, the answers were ambiguous. Eight of the seventeen respondents said that a small distance between entities

is important for the intensity of links between them (strongly agree – 6 indications, somewhat agree – 4 indications). The facilitators of 5 clusters said that there was not any such relationship (strongly disagree – 1, somewhat disagree – 4). The remaining facilitators were not able to reply to this question. Nevertheless, the answers obtained do not allow concluding that the intensity of connections is a function of geographical distance between entities.

Another issue is the approach to cooperation between entities. In networks, working relationships are based on cooperation, while in clusters – on cooperation and competition. As it turns out, coopetition (simultaneous cooperation while maintaining elements of competition between entities) is quite a rare phenomenon. Statements about this issue were generally pessimistic. In one of them the respondent said that the Polish economy is not yet ripe for coopetition, that companies prefer to act on their own because they do not trust one another, that some companies attract employees of other companies from the cluster and in such a situation it is difficult to form a real partnership. When asked about the relationship between cooperation and competition in the cluster, three clusters pointed to a balance, four to the dominance of cooperation, two to the dominance of competition, and as many as eight facilitators were not able to answer this question. The lack of facilitators' answers to this question was mainly the result of the existence of various relationships in the cluster which are difficult to be averaged and summarized in a single sentence. Clusters are based on social values that are associated with trust in the sphere of public activity. While synergy effects in the cluster can bring multifaceted benefits to all cluster members (in accordance with the win-win principle), networks are focused exclusively on increasing profits and sales.

5. Final conclusions

The present study aimed to present these features illustrating the functioning of creative clusters in Poland, which can help determine whether all clustering criteria – in accordance with the literature on the subject – have been met. The author decided to look at the following issues: openness of the cluster, definition of the aim of cooperation and of a common development strategy, spatial concentration of entities and the importance of geographic proximity, as well as at the relationship between cooperation and competition in the clusters. The only feature that definitely found confirmation in the study was openness of clusters which in most cases increased the number of members. At the same time, new entities were established in the cluster environment which with time were also becoming cluster members. However, in the case of the remaining three features, their presence cannot be unequivocally confirmed (Table 2). Joint development strategies were pursued by only 5 out of the 17 analysed creative clusters. Only eight facilitators stated that proximity between entities contributed to the intensity of relationships between them, and the intensity of knowledge or technology flows in the cluster was not dependent on the distance between the entities.

The task that turned out to be the most difficult was finding an answer to the question of relationship between cooperation and competition in a cluster – three clusters indicated a balance between cooperation and competition, four declared there was more cooperation, and two said there was more competition. As many as eight facilitators were unable to answer this question. At the same time, the comments of some of the facilitators included critical remarks about the idea of clustering. For example, some of them said that the Polish economy was not yet ready for coopetition and that companies preferred to act on their own. Where there is a significant difference in the approach to business activity and no intention to run a joint activity, there can hardly be any coopetition to speak of.

Table 2

Congruence of features of the analysed creative clusters with cluster features described in the literature on the subject

Cluster feature in accordance with specialist literature	Congruence with the analysed creative clusters		
	yes	no	hard to say
Open membership	×		
Definition of common development strategy		×	
Geographical concentration of entities; significance of geographical proximity			×
Working relationship in the cluster based on coopetition			×

Source: own study.

The presented results are another contribution to the research on clusters in Poland, including in particular creative clusters, although the study has not explicitly confirmed the compatibility between cluster image in the literature and the real situation of creative clusters. However, in the opinion of the author, it is the above lack of compatibility that is worth studying in depth. Maybe it is typical of more clusters in Poland? In the future, the author plans to conduct a more detailed analysis of the links within creative clusters and to define an optimum cluster model for the entire creative sector from the point of view of its further development.

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INNOVATION-BASED POTENTIAL FOR DEVELOPMENT OF CITIES IN POLAND

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ABSTRACT: The article aims to put forward a method for measuring the innovation potential of cities as one of the main drivers – alongside education and culture – of their development potential (Orankiewicz, Turała 2019). The discussion which is carried out in the paper starts with the concept of territorial capital put forward by Camagni and Capello (2013) and refers to other approaches to measuring the innovation potential of cities (Marszał 2012; Siłka 2018). The main assumptions behind the method of measurement are briefly described in the second part of the article – the proposed measurement of innovation potential reflects four factors: (1) the capacity to generate knowledge and innovative solutions; (2) the capacity to disseminate research results; (3) the capacity to bridge the gap between academia and economic activity or, in other words, the capacity to commercialise research outcomes and (4) the robustness of economic activity in the most innovative sectors. Data on the above factors of innovation potential were collected for all urban communes in Poland (306 cities) for the period between 2013 and 2016. A set of rankings of Polish cities based on their innovation potential between 2013 and 2016 is then presented – the third part of the article discusses the differentiation of innovation potentials of cities by region as well as in different classes in terms of city size. The final part of the article concentrates on the significance of various drivers of the innovation potential of cities.

KEY WORDS: cities, development potential, knowledge, innovation

ABSTRAKT: Za podstawowy cel artykułu przyjęto przedstawienie propozycji metody pomiaru potencjału innowacyjnego miast. Przyjmuje się, że potencjał innowacyjny jest jedną z podstawowych determinant rozwoju miast – obok kultury i edukacji oraz kształcenia na poziomie uniwersyteckim (por. Orankiewicz & Turała 2019). Artykuł omawia w pierwszej kolejności koncepcję kapitału terytorialnego sformułowaną przez Camagni'ego i Capello (2013) i odnosi się innych podejść do pomiaru opartego na innowacyjności potencjału rozwojowego miast (Marszał 2012; Siłka 2018). Założenia metody pomiaru zostały zwięźle opisane w drugiej części artykułu - proponowana metoda uwzględnia cztery czynniki: (1) potencjał na rzecz generowania wiedzy oraz innowacyjnych rozwiązań; (2) potencjał na rzecz upowszechniania wyników prowadzonych badań; (3) potencjał dla łączenia sfery akademickiej z biznesem poprzez m. in. współtworzenie innowacyjnych rozwiązań w przedsiębiorstwach i komercjalizację wyników badań naukowych oraz (4) potencjał dla prowadzenia aktywności gospodarczej w sektorach uznanych za innowacyjne. Na potrzeby analizy zgromadzono dane dla wszystkich gmin miejskich w Polsce w okresie 2013–2016 (łącznie dla 306 miast). Na podstawie

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zgromadzonych danych opracowano rankingi miast w oparciu o uśrednioną wartość wskaźnika potencjału innowacyjnego dla lat 2013 – 2016. W trzeciej części artykułu omówiono m. in. zróżnicowanie potencjałów innowacyjnych miast w poszczególnych województwach jak również w podziale na różne klasy wielkości. W ostatniej części artykułu omówione zostały również wyniki analizy istotności poszczególnych czynników kształtujących potencjał innowacyjny miast.

SŁOWA KLUCZOWE: miasta, potencjał rozwojowy, wiedza, innowacje

1. Introduction

The concept of territorial capital is the starting point for this article. Camagni and Capello (2013: 1387) described 'territory' as a system which is composed of:

1. localised externalities of pecuniary as well as technological nature;
2. spatially localised actions and traditions which are related to production activities and the skills and know-how required for these activities;
3. spatially localised relationships and dependencies of socio-psychological or, indeed, political nature, which increase the productivity of locally available production factors;
4. locally existing values and other cultural elements which determine local identity and serve as development potential either on their own or as catalysts for more efficient usage of other resources;
5. the system of principles and practices which the local governance model consists of.

Based on this definition of 'territory', the same authors (Camagni, Capello 2013: 1387-1390) defined the concept of 'territorial capital', using the criteria of rivalry and materiality. The first of these criteria may be linked to rivalry and excludability which are used in the theory of public finance (Stiglitz 2004: 150-151) in order to differentiate between public goods and private goods. Camagni and Capello used the criterion of rivalry to differentiate between public goods, private goods and mixed goods, also referred to as club goods or imperfect public goods. The second of these criteria (materiality) is used in order to differentiate between material goods, immaterial goods and mixed goods.

Similarly as some other papers (Camagni, Capello 2013; Fratesi, Perucca 2018; Russ, Bansal, Parrillo 2015), this article concentrates solely on a selected fragment of broadly defined territorial capital, the innovation-based potential for development of cities which will be referred to as 'innovation potential'.

The ability to generate various types of knowledge and to disseminate it, and ensure its absorption by business entities and other types of organisations is one of the more frequently raised aspects of innovativeness (Knight 1995). The role played by innovations in the development of cities requires specific attention – hence it became the main area of interest for the author of this article.

Marszał (2012) defined innovativeness of cities as the capacity to implement new solutions, relative to the currently used ones, in various spheres of socio-economic activities. A similar approach to innovativeness of cities is shown by Montgomery

(2007: 29) who emphasises that the development may occur in cities through a number of possible actions, such as implementation of new production processes or new services, creation of new economic sectors and professions, leading to a new division of labour. It needs to be emphasised that cities are places where innovative processes are concentrated – mostly due to a high concentration of highly skilled people and numerous economic entities. Multiple opportunities for networking and interaction between these economic actors result in a particularly fast pace of dissemination of innovative solutions (Glaeser 2011: 8).

The role which cities play in the process of generating and disseminating innovations is not always of the same nature. The social and economic conditions of various cities have a lasting impact on the perspectives for the inhabitants as well as on the cities' ability to create and maintain an environment which supports innovativeness. In other words, different cities have a different capacity to attract and keep highly qualified employees, to create institutions and to support economic entities, including those which base their activity on innovations (Katz, Bradley 2013). Such differences are visible in particular between the metropolitan cities and smaller cities, a circumstance which comes about as a result of the fact that various types of innovations – and related activities – require a different scale and scope of interactions and a different density of the network which exists between local economic actors (Gertler, Wolfe 2016: 11).

Taking into account the above considerations, the main aim of the article was formulated as putting forward a method for measuring the innovation potential of cities. It is assumed that the innovation potential is one of the main drivers – alongside education and culture – of the cities' development potential (Orankiewicz, Turała 2019). The main assumptions behind the method of measurement are briefly described in the second part of the article. A set of rankings of Polish cities based on their innovation potential between 2013 and 2016 is then presented – the third part of the article discusses the differentiation of innovation potentials of cities by region as well as in different classes in terms of city size. The final part of the article concentrates on the significance of various drivers of the innovation potential of cities.

2. Innovation potential of cities – method of measurement

One of the most recent approaches to measurements of the innovation potential of cities was put forward by Siłka (2018: 111-112), whose method is based on 21 partial indicators which relate to the scientific sector, the research and development sector, enterprises and support institutions, industrial enterprises and the structure of enterprises in terms of R&D intensity.

The method which is discussed in this article is also based on indicators which relate to the scientific as well as business sectors, although it uses far fewer indicators. The synthetic measure of the innovation potential which is put forward in this article employs 8 indicators which represent four factors (drivers) of innovation potential. These are: (1) potential of higher education institutions in various cities to conduct award-winning

research and generate knowledge and innovative solutions; (2) potential for disseminating research results combined with creating cooperation networks and relational capital; (3) potential for bridging the gap between academia and business by means of co-creating innovative solutions and commercialisation of research results; (4) potential for running businesses in the sectors generally perceived as innovative – related to computerisation, communication and scientific and research activities. The schematic construction of the city innovative potential index (CIP index) is presented in Figure 1.

Fig. 1. Factors of the City Innovation Potential index (CIP index)

Source: prepared by the author.

Such an approach to the measurement of innovation potential in cities is determined, on the one hand, by the limitations in access to data, especially with regards to smaller cities and, on the other hand, by a drive to create a relatively straightforward measure which would still remain consistent with the literature on the nature of innovativeness, as discussed in the introductory part of the article.

The first group of factors which describe the analysed phenomenon relates directly to the scientific sector where knowledge is generated. The CIP index uses data on the number of international awards for: (1) research institutions, (2) research teams and (3) individual researchers. Each of the received awards is included in the CIP index of the city where the awarded institution is located or with which the awarded researchers are affiliated.

The second set of data used for constructing the CIP index relates to the activities which are, to a degree, responsible for generating knowledge and innovations, but more for dissemination of innovative solutions. The construction of the CIP index uses the data on the number of international scientific conferences as well as the number of local scientific conferences organised by research institutions located in various cities. In this approach, the conferences, and thus the cities themselves, are perceived as nodes for an exchange of thoughts and ideas which affect the development of innovations.

The third dimension which the CIP index reflects relates to the creation of new solutions which are generated in a given city and are subject to a successful patent application by a research institution or another entity. This approach is based on a sim-

plifying assumption as this aspect of innovation potential is without a doubt linked with an increased efficiency of economic processes also beyond the place where the innovation is generated – once published, the new knowledge becomes part of public domain (Lever 2001: 866). However, including this indicator in the construction of the CIP index allows capturing the bridge between academia and business.

The last factor attempts to determine the innovation potential of cities by means of the number of functioning as well as the number of newly-established economic entities in the sectors of the economy which are related to computerisation, communication as well as scientific and research activities. The analysis is based on a number of economic entities classified in the following sections of the Polish Classification of Activities: J-61, J-62, J-63, M-71, M-72.

Table 1 presents all the categories of data used for determining the city innovation potential index for Polish urban communes,[1] together with information on their weights. The ensuing analysis is based on the data for the period between 2013 and 2016. The data in the first, second and third groups of indicators were taken from the Integrated System of Information on Science and Higher Education (POL-on), while the data for the fourth group were taken from the Local Data Bank of Statistics Poland. All partial indicators were quoted relative to the number of inhabitants of cities and subsequently unitarized in order to facilitate interpretation (Becla, Zielińska 2003: 146-147).

Table 1

Factors and partial indicators of the City Innovation Potential Index

	Factor	Partial indicator	Weight
City innovation potemtial index	GENERATION of knowledge and innovative solutions	number of international awards for research institutions	0.100
		number of international awards for research teams	0.100
		number of international awards for individual researchers	0.050
	DISSEMINATION of research results	number of international scientific conferences	0.100
		number of local scientific conferences	0.150
	COMMERCIALISATION of research results	number of successful patent applications	0.250
	BUSINESS Innovative business entities	number of economic entities (sections according to Polish Classification of Activities: J-61, J-62, J-63, M-71, M-72)	0.125
		number of newly established economic entities (sections according to Polish Classification of Activities: J-61, J-62, J-63, M-71, M-72)	0.125

Source: prepared by the author.

[1] This study concentrates on Polish communes which have the status of urban communes (i.e. the city is at the same time a commune). There are also cities which are part of the so-called urban-rural communes which consist of a city as well as a number of rural settlements and areas. They are not included in this study.

Based on the data which were collected for all Polish urban communes (306 cities), rankings were created in accordance with an average value of the CIP index for the period between 2013 and 2016. Using the average value of the CIP index over a four-year period reduces the impact of excessive volatility and is also assumed to be in line with long term impacts which the innovation potential generates for city development. The rankings include 303 cities, 3 territorial units were excluded as they changed their status to urban-rural communes during the period covered by the research: Czarna Woda (on 1 January 2014), Władysławowo (on 1 January 2015) as well as Pieszyce (on 1 January 2016).

3. Innovation potential of cities – analysis by regions

The first of the conducted analyses looks at the differentiation of innovation potentials of Polish cities by region. Table 2 presents the values of the CIP index (averaged out for the period between 2013 and 2016 – $CIP_{2013\text{-}2016}$) for top 3 cities in each of the regions. Table 2 as well as Figure 2 also present information on the median value as well as the average of the CIP index for all cities in each of the regions weighed by the number of cities' inhabitants.

Fig. 2. Innovation potential of cities in Poland by region (weighed average of $CIP_{2013\text{-}2016}$)

Source: prepared by the author.

The analysed indicator reaches the highest values in cities located in Mazowieckie (Masovia) and Małopolskie (Lesser Poland) regions. The cities from Wielkopolskie (Greater Poland), Łódzkie (Łodz), Dolnośląskie (Lower Silesia), Opolskie (Opole) and Lubelskie (Lublin) regions follow, each achieving similar values of the CIP index. These results are consistent with the academic potential of higher learning institutions which operate in each of the regions and thus indicate where the leading academic centres are located in Poland.

Table 2

Innovation potential of cities in Poland by region

Region (capital city)	Rank	City	$CIP_{2013-2016}$	No. of inhabitants on 30 June 2016	$CIP_{2013-2016}$ regional median value	$CIP_{2013-2016}$ regional average weighed by the number of cities' inhabitants
Dolnośląskie (Wrocław)	1	Wrocław	0.3179	637 075	0.0213	0.1408
	2	Szczawno-Zdrój	0.0446	5 680		
	3	Oława	0.0405	32 674		
Kujawsko-Pomorskie (Bydgoszcz, Toruń)	1	Toruń	0.1798	202 591	0.0198	0.0812
	2	Bydgoszcz	0.1008	354 990		
	3	Golub-Dobrzyń	0.0240	12 830		
Lubelskie (Lublin)	1	Puławy	0.2430	48 526	0.0296	0.1245
	2	Lublin	0.2347	340 745		
	3	Biała Podlaska	0.0628	57 389		
Lubuskie (Gorzów Wlkp., Zielona Góra)	1	Zielona Góra	0.1172	138 898	0.0177	0.0590
	2	Gorzów Wielkopolski	0.0419	123 911		
	3	Żary	0.0204	38 197		
Łódzkie (Łódź)	1	Łódź	0.2631	698 688	0.0278	0.1490
	2	Skierniewice	0.0761	48 304		
	3	Konstantynów Łódzki	0.0452	17 868		
Małopolskie (Kraków)	1	Kraków	0.3421	762 448	0.0353	0.2360
	2	Sucha Beskidzka	0.0743	9 388		
	3	Nowy Sącz	0.0423	83 829		
Mazowieckie (Warszawa)	1	Józefów	0.3751	20 294	0.0340	0.2192
	2	Warszawa	0.3301	1 748 916		
	3	Zielonka	0.1513	17 508		
Opolskie (Opole)	1	Opole	0.1696	118 938	0.1362	0.1368
	2	Kędzierzyn-Koźle	0.1362	62 193		
	3	Brzeg	0.0302	36 381		

Table 1 contd.

Region (capital city)	Rank	City	$CIP_{2013-2016}$	No. of inhabitants on 30 June 2016	$CIP_{2013-2016}$ regional median value	$CIP_{2013-2016}$ regional average weighed by the number of cities' inhabitants
Podkarpackie (Rzeszów)	1	Rzeszów	0.1709	187 027	0.0311	0.0687
	2	Krosno	0.0399	46 695		
	3	Łańcut	0.0363	17 794		
Podlaskie (Białystok)	1	Białystok	0.1116	296 310	0.0241	0.0688
	2	Wysokie Mazowieckie	0.0327	9 427		
	3	Suwałki	0.0323	69 543		
Pomorskie (Gdańsk)	1	Gdańsk	0.2183	462 996	0.0264	0.1019
	2	Sopot	0.0983	37 089		
	3	Gdynia	0.0844	247 329		
Śląskie (Katowice)	1	Gliwice	0.3375	182 969	0.0269	0.0768
	2	Katowice	0.2252	299 012		
	3	Częstochowa	0.1551	227 270		
Świętokrzyskie (Kielce)	1	Kielce	0.1233	197 724	0.0264	0.0744
	2	Sandomierz	0.0311	24 124		
	3	Skarżysko-Kamienna	0.0264	46 656		
Warmińsko-Mazurskie (Olsztyn)	1	Olsztyn	0.1769	173 599	0.0190	0.0648
	2	Szczytno	0.0412	23 901		
	3	Iława	0.0269	33 181		
Wielkopolskie (Poznań)	1	Poznań	0.2969	541 561	0.0289	0.1507
	2	Puszczykowo	0.0501	9 778		
	3	Luboń	0.0460	31 196		
Zachodniopomorskie (Szczecin)	1	Szczecin	0.1773	405 413	0.0268	0.1097
	2	Koszalin	0.0801	107 981		
	3	Wałcz	0.0341	25 801		

Source: prepared by the author.

The above set of results also indicates the existence of significant differentiation in terms of city innovation potential within regions and, in most cases, the dominant position of regional capitals. The smallest differentiation of innovation potentials between cities within a region may be observed in Podlaskie, Lubuskie, Podkarpackie, Warmińsko-Mazurskie and Świętokrzyskie regions.

4. Innovation potential of cities – analysis by size category

The second analysis which is described in this paper concentrates on the city innovation potential analysed separately for six categories of cities by size. Two sub-groups of cities are identified in each of the categories which are regularly outlined by the Polish Statistical Office – Table 3 presents the size categories which are used for the purpose of further analyses.

Table 3

The number of analysed cities by size category

Size categories by Statistics Poland	Size categories assumed for analysis	Number of cities
Small cities (0; 20,000)	(0; 10,000)	48
	[10,000; 20,000)	68
Medium-sized cities [20,000; 100,000)	[20,000; 50,000)	100
	[50,000; 100,000)	48
Large cities (100,000 and more)	[100,000; 250,000)	28
	[250,000; +∞)	11
	Total	303

Source: prepared by the author.

Table 4 presents the values of the City Innovation Potential index averaged out for the period between 2013 and 2016 ($CIP_{2013\text{-}2016}$) for top 5 cities in each of the size classes. The table also highlights median values as well as average of the $CIP_{2013\text{-}2016}$ index weighed by the number of cities' inhabitants for all cities in each of the size categories. Figure 3 shows the dependence between the number of inhabitants of cities and their innovation potential – it includes all the cities apart from Warsaw which scores one of the highest values of the $CIP_{2013\text{-}2016}$ index and has close to 1.75 million inhabitants.

The results indicate that there exists a positive dependence between city size and innovation potential. There are, however, various exceptions from this general principle – some average-sized cities, such as Józefów or Puławy, achieve the City Innovation Potential index scores which are comparable or even higher than the largest of Polish cities. There are also some small cities whose innovation potential exceeds average values of CIP index for all cities – i.e. Zielonka, Sulejówek, Sucha Beskidzka. These cities may be considered to be case studies for future research.

Table 4

City Innovation Potential index in Polish cities by size category

Size category	Rank	City	$CIP_{2013-2016}$	$CIP_{2013-2016}$ median value per size category	$CIP_{2013-2016}$ average weighed by the number of inhabitants per size category
Large cities sub-group: [250,000; +∞)	1	Kraków	0.3421	0.2347	0.2710
	2	Warszawa	0.3301		
	3	Wrocław	0.3179		
	4	Poznań	0.2969		
	5	Łódź	0.2631		
Large cities sub-group: [100,000; 250,000)	1	Gliwice	0.3375	0.0406	0.0916
	2	Toruń	0.1798		
	3	Olsztyn	0.1769		
	4	Rzeszów	0.1709		
	5	Opole	0.1696		
Medium-sized cities sub-group: [50,000; 100,000)	1	Kędzierzyn-Koźle	0.1362	0.0296	0.0341
	2	Siedlce	0.0947		
	3	Biała Podlaska	0.0628		
	4	Słupsk	0.0581		
	5	Pruszków	0.0542		
Medium-sized cities sub-group: [20,000; 50,000)	1	Józefów	0.3751	0.0269	0.0364
	2	Puławy	0.2430		
	3	Otwock	0.1326		
	4	Sopot	0.0983		
	5	Skierniewice	0.0761		
Small cities sub-group: [10,000; 20,000)	1	Zielonka	0.1513	0.0221	0.0276
	2	Sulejówek	0.0950		
	3	Milanówek	0.0610		
	4	Konstantynów Łódzki	0.0452		
	5	Ustroń	0.0395		
Small cities sub-group: (0; 10,000)	1	Sucha Beskidzka	0.0743	0.0172	0.0225
	2	Podkowa Leśna	0.0553		
	3	Puszczykowo	0.0501		
	4	Szczawno-Zdrój	0.0446		
	5	Jordanów	0.0389		

Source: prepared by the author.

Fig. 3. City size and city innovation potential

Source: prepared by the author.

Once the general positive dependence between city size and innovation potential has been identified, the role of each of the factors (i.e. generation, dissemination, commercialisation and business) may be considered, especially for cities of different sizes. Figures 4, 5 and 6 show how significant each of the factors is in determining innovation potentials of cities ranked in the top 5 in each of the analysed size categories. Studying these results provides insights into the sources of competitive advantage of differently sized cities.

Fig. 4. Factors of city innovation potential per size category – small cities

Source: prepared by the author.

As expected, a change in the size of the analysed cities leads to a change in the impact of different factors. The innovation potential of the smallest of the cities (up to 10,000 inhabitants) is based almost entirely on the economic entities which operate in the fields perceived as innovative – here the business factor is the leading determinant. In the slightly larger cities (up to 20,000 inhabitants) the business factor is supplemented

by the factor of generating innovations, although its significance is not large enough to treat it as more than just supporting. The innovation potential of both these groups is visibly smaller than in the case of medium-sized or large cities which is in part caused by the fact that few scientific events (conferences) are organised in such cities and few academic institutions are based there.

Fig. 5. Factors of city innovation potential per size category – medium-sized cities

Source: prepared by the author.

The situation of medium-sized cities (up to 50,000 inhabitants) is somewhat different. The innovation potential is in this case based mostly on the generating factor – two of the used indicators, namely the number of international awards for research teams and the number of international awards for research institutions achieve particularly high values. The innovation potential of medium-sized cities (up to 100,000 inhabitants) is determined mostly by the commercialisation factor and, to a much lesser degree, on the factor of generating innovations.

It is also worth emphasising that the top 5 cities with the population of up to 50,000 achieve considerably higher scores that their slightly larger counterparts. This is caused mainly by the extraordinary performance of Józefów which achieves the highest score for international awards for institutions (per number of inhabitants) in Poland, Otwock which ranks the 5th in Poland with regard to international awards for researchers (per number of inhabitants) and Puławy wich ranks the 1st in Poland insofar as international awards for research teams (per number of inhabitants) are concerned. These cities may be referred to as engines of development which manage to attract and retain considerable research activities. The analysis of individual cases goes beyond the scope of this paper but the causes for success of all three cities will be further researched.

As for the large cities (up to 250,000 inhabitants), the innovation potential is determined mostly by the generating factor and the commercialisation factor. The largest

Fig. 6. Factors of city innovation potential per size class

Source: prepared by the author.

cities (250,000 and more) are the most coherent and balanced in terms of how the innovation potential is created. They achieve high scores in terms of the dissemination factor, commercialisation factor and business factor. Only the scores with respect to the generating factor are diversified, although even in this dimension the largest cities tend to dominate over their smaller counterparts.

5. Conclusions and future research

The analyses described in this paper indicate the existence of significant differentiation of innovation potential in cities across regions as well as within regions. There is also a clearly visible positive dependence between city size and the innovation potential of a city, although it needs to be emphasised that cities of varying sizes have different characteristics in terms of sources of their competitive advantages with regard to innovation potential.

Future research will aim at combining the characteristics of cities in terms of their innovation potential with measures for the culture-based and education-based potentials which are currently being developed. In the next step an analysis will be made of the role that each of these potentials plays in the development of cities (as measured by mostly economic indicators, such as *per capita* tax base).

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SELECTED BIG CITIES OF POLAND AS REGIONAL GROWTH POLES

WYBRANE DUŻE MIASTA POLSKI JAKO REGIONALNE BIEGUNY WZROSTU

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ABSTRACT: The concept of growth poles is well-established in regional economics. It can be considered in different scales, and big cities are one of them. In Poland, these cities are developing relatively fast. One of the questions that appear in this context is, if this growth can be connected with the growth of their regions, i.e. if they can be regarded as regional growth poles. To address it, the aim of the paper is to test if some selected big metropolitan areas of Poland work as poles of growth for their regions. This is performed using the Granger-causality test, which is one of the methods used to explore, at least in its specific sense, the causal relations between variables. The study shows, that Poznań, Rzeszów and Wrocław (out of fifteen big Polish cities) can be considered the growth poles for their regions. The results are useful to grasp the contemporary understanding of the concept, as well as the specific conditions of Polish regional growth.

KEY WORDS: growth poles, Perroux, metropolises, metropolitan growth poles, Granger-causality test

STRESZCZENIE: Idea biegunów wzrostu jest dobrze zakorzeniona w literaturze regionalistycznej. Bieguny mogą być różnie rozumiane, między innymi jako centralne obszary metropolitalne. Miasta tworzące takie obszary w Polsce rozwijają się szybko i można zadać pytanie, czy są one biegunami wzrostu dla swoich regionów. Aby się do niego odnieść, celem artykułu jest prezentacja rezultatów badania powiązań pomiędzy wzrostem gospodarczym miast i ich regionów. W badaniu wykorzystano test Grangera, który jest uważany za metodę przydatną w rozważaniach nad przyczynowością, przynajmniej w wąskim sensie, do jakiego się odnosi. Rezultaty badania pokazują, że Poznań, Rzeszów i Wrocław (spośród piętnastu dużych polskich miast) mogą być uważane za regionalne bieguny wzrostu. Wyniki mogą być przydatne w pogłębieniu zrozumienia zarówno badanego zjawiska, jak i specyficznych warunków współczesnej polskiej gospodarki regionalnej.

SŁOWA KLUCZOWE: bieguny wzrostu, Perroux, metropolie, metropolitalne bieguny wzrostu, test przyczynowości Grangera

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Introduction

The concept of growth poles, originally introduced by Francois Perroux in the 1950s, is still popular with regional economics. Understanding of the poles of growth has undergone an evolution over the years to finally include big metropolitan areas as one of their forms. Some relatively recent papers undertake the task of empirical research on the way how the poles influence their surroundings. This study also focuses on this task and the aim of it is to test if big metropolitan areas of Poland work as poles of growth for their regions. First, a review of the relevant literature on the subject is carried out and the evolution of the concept under consideration is shown. Then, the methods used and obtained results are described, with a discussion and conclusions following in the end. The hypothesis tested is as follows: Economically vivid metropolitan areas of Poland with strong connections to their neighbourhoods can be considered to be the growth poles for their regions. In the discussion section, conditions necessary for an area to become a growth pole are suggested.

Literature overview

Many concepts used in social studies, including economics, have their roots in other branches of knowledge, especially in natural sciences. Such was the case with Francois Perroux's idea of growth poles, which was a result of his perception of space. On the one hand, his works did recall the German location school, with such authors as J. von Thunen and W. Christaller. For the representatives of this school, space was a geographical dimension, and the distance between places was one of the main factors determining their thinking. On the other hand, Perroux seemed to be fascinated with the understanding of space that came from modern mathematics and, especially, physics. Space was for him like a force field (*champ de forces*), and this field, in order to exist, needed its poles. The poles generated the field and attracted factors from outside, which was much more than just the closest neighbourhood. This way they could strengthen the process of growth in their surroundings, working as growth poles. An important thing is that for the author space was something more than geographic or administrative area. He referred to his kind of space with a mathematical term "banal", i.e. trivial. To capture all the forces that were important for economic analysis, other "spaces" should be included, such as the space of prices, etc. (Piętak 2014: 185-205).

The main notion deriving from the concept of growth poles is that economic growth does not appear everywhere with the same intensity. For Perroux, the growth poles (or growth points) are the places, where the growth starts (Olejniczak 2003: 55-77). In his original concept, such poles were big individual production companies or industrial complexes formed of groups of firms. In those poles, the "momentum of development" is focused, so it allows to spread influence to surrounding territories. For Perroux, a growth pole is a structure which is capable of promoting growth in other structures (Pysar 2017: 72-85). Growth poles have their impact on other branches and the overall

performance of the national economy. The leading industries dominate and form the poles of growth because they are able to introduce innovations, as they were understood by J. Schumpeter (Piętak 2014: 185-205). They also react to the changes in demand in a fast way (Churski 2011: 9-43). Thus, in other words, the growth poles are innovative and dynamic industries that dominate their surroundings and can be the sources of growth for them.

The concept of growth poles does not describe any state of equilibrium, as by definition it portrays dynamic forces. The leading industries are not dominant forever, and innovations appear in new and constantly changing branches. The growth poles can be then described as the main promising sectors of the regional economy (Stryabkova et al. 2018: 433-442), that have their impact through their expansion. Some other works on this subject matter point to agglomeration effects, as the already existing companies may attract new businesses, which in turn reinforces the pole (Kireeva & Tsoi 2018: 212-224).

Some authors argue, that Perroux was one of the economists to introduce the concept of space (Couzon 2003: 81–102). It is true, that for Perroux this was crucial and he used the term in an explicit way. On the other hand, his analysis is regarded by many authors as aspatial, i.e. actually abstracting from geographical dimension (Churski 2011: 9-43). G. Myrdal, in contrast, is regarded as the first author to have elaborated the theory of growth poles as a fully spatial phenomenon. J. Boudeville and A.O. Hirschman also saw growth poles as spatial phenomena, as they believed that industrial polarization leads to regional polarization. Agglomerations emerge in places, where location conditions are favourable and become well-developed centres, while the rest of the region cannot grow that fast (Dorożyński 2009: 179-199). It is worth noting that this spatial version of the concept is regarded as a theory of polarisation also by other authors. It is in contrast to classical theories, where a tendency towards spatial convergence should prevail. In the latter view, the growth spreads to achieve optimal, i.e. equal distribution of activity. In the conceptual framework of growth poles, they are the points that grow much faster than the rest of the space under consideration (Dyjach 2013: 49-59). Therefore, even the literal meaning of the term "polarisation" can be in this way derived from the concept of growth poles. Yet, polarisation is a side effect, not the primary object of interest in the growth poles theory. First of all, as Perroux indicated, the idea of poles is that they can work as the driving forces for their surroundings.

Contemporary understanding of growth poles also underlines the capability of them to enhance the economic performance of their regions. The basic idea is often connected with other theories of regional growth, which improves or even changes the growth poles theory to a great extent. An example of such an attempt is to consider industrial clusters as potential growth poles (Sengupta, Kannan & Srivastava, 2007: 217-230). As clusters are often seen as innovative and flexible economic entities, this approach may be fruitful.

Economically vivid big metropolitan areas are also regarded as modern growth poles. Due to urban agglomeration effects, they are capable of hosting "propulsive" indus-

tries, i.e. those that can improve the economic performance of a region or a country (Wojnicka-Sycz 2013: 17-33). What is worth noting is the fact that besides the production industry, also service industry, especially business–oriented, can be propulsive and lead to the formation of a growth pole (McKee & McKee 2001: 171-184).

The growth poles theory has been popular with policymakers since the 1960s. It was adopted enthusiastically by them (Sandretto 2009: 57-68) as it was mainly perceived as a way to improve economic conditions in backward regions. It seemed to provide a tool to attain this aim. It was used as a microeconomic effort to improve macroeconomic performance. By artificially creating growth poles, the regional planner could expect the whole region to grow faster. The actual results turned out to be, however, less satisfactory than the assumptions. One of the examples of such a policy is the case of Spain, where it was implemented between 1964-1975. The attempts did not bring expected results, as the artificial poles lost competition with the natural ones (Piętak 2014: 185-205).

Nevertheless, modern concepts of using growth poles as development policy tools are often recommended nowadays, especially for developing economies. Some of such recommendations refer to countries in the Middle East and North Africa (Morad & Panahi 2017: 765-787), Kazakhstan (Kireeva & Tsoi 2018: 212-224), Ukraine (Komarovsky 2013: 31-42). Except for explicit recommendations, some authors point at the fact that the idea of growth poles is included in regional policies of particular countries. This was the case with the EU supported policy in Romania (Benedek 2016: 285-290) and Hungary (Csete & Szabó 2014: 40-60 and Csomós 2012: 599-618), where major metropolitan areas where supported on these bases.

Besides policy analyses, research studies based on empirical data can also be found in the most recent literature. These papers deal mainly with big metropolitan areas and the effect they have on the surrounding regions. One of them shows, that Beijing and Shanghai can be regarded as growth poles. The results of the study show that those cities can be called "engines of metropolitan regions". An interesting point is that in the case of those cities both effects ascribed to growth poles were captured. The cities have a positive impact on those of their suburbs that are at a medium level of development. So it can be stated that the growth spreads from the poles. However, those cities have also a backwash effect on the suburbs that are at a low level of development. The effect of polarisation appears in a sense that the central cities just attract and use the development factors remaining in the suburbs (Chiang 2018: 1-14). Also, a study by Lan et al. (2019: 1-20) shows that urban agglomerations have become the growth poles for their surroundings.

The theoretical literature on growth poles is rich and the topic has been described by many authors. The subject has evolved and is still present in the academic discourse, having found many policy implications. The empirical considerations on the topic are relatively rare but are worthy of a mention here. One of such attempts employs a method based on Wikinomics, so the Internet–based activity is the source of data. In this case, an assessment of the websites of municipal administrative authorities was

used to determine, which municipalities can become growth poles for the region under consideration. The main assumption behind this method is that websites provide the first and an important way of promoting the area and attracting investors to it (Jakimowicz & Rzeczkowski 2018: 1362-1370). Although the results may be interesting, this approach does not track either actual economic activity or relations between the centres and other areas. Another approach can be found in Godlewska-Majkowska et al. (2016: 189-212). This study uses structural factors to determine the most dynamic areas of the region under consideration. The data are dynamic and allow pointing to the growth poles understood as highly dynamic areas. Still, it does not indicate any influence of those areas over their surroundings. The same can be said about another study (Strat & Stefan 2017: 456-473) which uses data for Romania. In this research, the growth poles are those areas that are structurally superior to the rest of the country and no transmitting mechanism is determined.

However, papers employing methods which remain closer to the idea of growth poles can also be found. Hughes & Holland (1994: 364-377) used the data for the state of Washington and checked if a negative shock from the core of the state was transmitted to the periphery. They used multiplayer analyses and got results showing that no strong connections between the core and periphery exist, which suggests that the core region is not a growth pole for the rest of the state. Sang-arun (2013: 160-171) used regression analysis and data for Thailand to check whether the structural variables of the centres can explain the growth of their regions. This approach seems to be also close to the idea of growth poles, as it shows how important the centre is for the performance of the whole region. Nevertheless, this procedure does not show any mechanism of spreading development from the centre to the neighbourhood nor does it indicate if the growth of the centre is in any way correlated to the growth of the periphery. Finally, in the above–mentioned work, Chiang (2018: 1-14) uses the ECM model and weak exogeneity test to determine if Beijing and Shanghai can be regarded as growth poles. This approach, based on a kind of causality test, seems to be highly suitable to deal with the growth poles theory.

Methods

Also in this study, an attempt to determine whether the central areas (core) have an impact on their surroundings (periphery) is made. This potential impact is analysed on the GDP growth level, so a test was designed to check it. A simple correlation is not suitable in this case, though. Despite the fact that it may seem that if the dynamics of growth of both core and periphery are positively related, it proves they influence each other, in case of an economic growth, the role of external factors (as the changes in aggregate demand) is so obvious that this would be a textbook example of a pseudo-relation.

In this study, a causality test proposed by C. Granger (1969) is used, which seems to be more appropriate for the purpose. The idea of the test is simple and seems to suit the aim of the paper. In intuitive terms, it can be presented this way: there are two

variables – Y (dependent) and X (independent) that are represented by time series. If a regression that includes the past values of X explains the values of Y better than just an autoregression of Y, then there is a causative relation between X and Y. The key difference between correlation and this approach is that here the past values of the independent variable are taken into account, so the assumption is that they imply changes in the dependent variable. Simply, it would be even possible to say that X "causes" Y, but the very concept of causality is being widely argued about from an epistemological point of view, and some clarification of it must be made here. Leaving aside the broad topic, it is necessary to determine what can be expected from the test. First of all, the results do not show the "total causation", but indicate, that "some" causative relation may appear. So they usually do not explain the changes in Y to the full extent, but just show if X plays a role in them. Moreover, there are authors pointing to limitations of the Granger test, especially arguing that it cannot be used without prior theoretical knowledge of the phenomena under research (Maziarz 2015: 86-105). Therefore, many scholars often use the term of "Granger causality" or say that X "Granger-causes" Y, if they want to emphasise the character of relations that they present. Nevertheless, in the opinion of the author, this test can be useful to attain the aim of this paper.

Formally, the autoregression for the variable Y can be stated as:

$$Y_t = \sum_{j=1}^{m} a_j Y_{t-j} + \varepsilon_t \tag{1}$$

The Granger causation function to check whether X causes Y can be stated this way:

$$Y_t = \sum_{j=1}^{m} a_j Y_{t-j} + \sum_{j=1}^{m} b_j X_{t-j} + \varepsilon_t \tag{2}$$

There are 15 objects of the study, which are all but one Polish regions. All of those were divided into big metropolitan areas (cores) and their regional surroundings (peripheries). As this division was not possible for the Lubuskie region, this region was not taken into consideration. The GDP growth data for NUTS-3 areas are used, and the time series range from 2000 to 2016, as this kind of data were available from the National Statistical Office (GUS). In each case, the core is either the biggest city (or cities taken together, as in the case of Gdańsk, Sopot and Gdynia – Tricity) or the city with its close surrounding, which depended on the NUTS unit delimitation.

The procedure of determining the Granger causality demands at first to estimate the autoregression model for each object, which was done as in Equation (1). Then, the augmented regression model for each model was estimated, which includes the X variables with time lags, as in Equation (2). In the estimation, two years long lag period was used. It means that the impact of the growth rate in the core area on the surrounding areas a year and two years before were taken into account. Finally, the adjusted R^2 was calculated for each type of the model and compared for each object. If the adjusted R^2 for the augmented regression model is better than for the simple autoregression, then it proves the Granger causation between X and Y. The important

detail is that R^2 is in the adjusted form because it allows comparing models with a different number of variables.

Results and discussion

The results of the estimation in terms of adjusted R^2 for autoregression (A) and augmented "Granger-type" regression model (G) are shown in Table 1.

Table 1

R^2 for autoregression and augmented model

Core area	Białystok	Bydgoszcz and Toruń	Katowice	Kielce	Krakow	Lublin	Łódź	Olsztyn
R^2 A	–0.16	–0.08	–0.14	–0.13	–0.01	–0.16	–0.11	–0.12
R^2 G	–0.36	–0.28	–0.19	–0.34	–0.02	–0.03	–0.20	–0.24
Core area	Opole	Poznań	Rzeszów	Szczecin	Trój-miasto	Warsaw	Wrocław	—
R^2 A	–0.14	0.25	–0.14	–0.01	–0.01	–0.12	–0.09	—
R^2 G	–0.35	0.51	0.28	–0.08	–0.20	–0.07	0.21	—

Source: own elaboration.

At first, it is necessary to explain, that in the light of the growth poles theory, only positive values of R^2 for the augmented model can be interpreted. If they are higher than for the autoregression model, then the test result is positive. These values do not need to be close to 1 or even higher than 0.5, as in the case of many classical regression models. The absolute value does not matter, since the aim of the test is not to explain all the variance of the dependent variable, but just to show if there is "any" impact of the independent variable on it. Another thing is that when the R^2 for the augmented model returns a higher negative value, it does not validate the theory. Also when the R^2 for the augmented model is lower than for the basic one, the result is negative. According to this, there are three cases in which the test yielded positive results. These are Poznań, Rzeszów and Wrocław.

On the one hand, the three cases show that the spread of economic growth from the central area to the rest of the region can be grasped using the Granger causality test. On the other hand, in most of the cases, it was not proven. There can be two different kinds of reasons for that. First, the cities under consideration do not actually perform the roles of growth poles for their regions. Second, the problem may be with the data based on the fact that the core regions were not statistically separated enough from the rest of their regions. Some regions, such as Opolskie or Świętokrzyskie, are divided only into two NUTS-3 units, which means that half of the region had to be taken as a core of it. Probably other limitations of the statistical units had their impact on the results.

Besides statistical reasons, the more interesting thing is to consider, even briefly, which cities under consideration have the potential to be urban growth poles. This can be done by checking their growth rates and GDP per capita. The data is shown in Table 2.

Table 2

GDP growth and GDP per capita in the city areas

City area	GDP growth 2000–2016	Average GDP *per capita* 2000–2016 [PLN]
Białystok	5.57%	28 390
Bydgoszcz i Toruń	5.26%	36 116
Katowice	4.89%	46 216
Kielce	5.32%	27 457
Krakow	6.41%	52 501
Lublin	6.03%	30 013
Łódź	5.48%	40 212
Olsztyn	5.33%	27 404
Opole	5.37%	30 884
Poznań	5.47%	65 701
Rzeszów	6.94%	27 927
Szczecin	4.26%	41 336
Trójmiasto	5.87%	47 446
Warsaw	6.46%	95 897
Wrocław	6.72%	51 019

Source: own elaboration.

The average GDP growth rates for Rzeszów and Wrocław are, respectively, the highest and the second highest amongst all the cities. Only Poznań, the third city verified as a growth pole, is characterized by a relatively moderate growth rate. The two biggest cities in Poland – Warsaw and Krakow – also have a high rate of growth, close to 6.5%, and were not verified as growth poles. But another interesting fact is that the data on the GDP per capita indicates Poznań as the second richest city in the country. Looking for the cities with this indicator above PLN 50 thousand, Warszawa, Kraków and Wrocław should be mentioned. So, all the three growth poles – Poznań, Rzeszów and Wrocław – are either relatively rich or economically dynamic. Most of the rest of the cities do not seem to have the economic potential and this seems to explain the fact that no growth pole effects were proven in their cases.

The question remains in the case of Warsaw and Krakow. Both are economically vivid and form the biggest urban economies in the country. One of the explanations

may be that these cities have become metropolitan to such an extent that their ties to the regional economies have become very loose. Strengthening connections to other international metropolises at the cost of intraregional relations is the very nature of this process. A fact supporting this statement is the high position of Krakow as a destination of business process outsourcing (Tholons 2017). Another are the leading position of Warsaw and Krakow by the number of business outsourcing centers and employment in this sector (PAIIZ 2016) and the role of Warsaw as the natural place for the headquarters of the international companies. Businesses of this kind are indeed more dependent on the international connections than local economies, except for supply of highly skilled human capital. Warsaw and Krakow meet their requirements, as the pools of university graduates are the biggest in these cities. The intensity of airplane connections also distinguishes Warsaw and Krakow from the rest of the cities, and this factor is still often used as an indicator of a metropolitan status. Other structural characteristics of these two cities are: a high number of professional, scientific and technical activities between businesses (section M of the Polish Classification of Activities), a relatively high share of hotels and restaurants and also the "leisure industry" amongst the businesses (accordingly, sections I and R). In particular, the number of R&D units per number of inhabitants is also the highest in Warsaw and Krakow (BDL 2019).

Conclusions

The positive result of the test for three out of fifteen cities still allows stating that the hypothesis put forward in the study has been positively verified. Some metropolitan areas can be considered the growth poles for their regions, yet some conditions need to be met. The central city needs to be economically vivid and, on the other hand, its links with the regional economy should be strong. As it was shown, some cities, in spite of being economically superior, seem to be oriented more onto "the world" than towards their surroundings.

An obvious limitation of the study is data availability. The way that the NUTS-2 regions are statistically divided into NUTS-3 areas is, in the case of this study, sometimes problematic. In future research projects, it could be fruitful both to investigate other objects – other metropolitan areas in other countries with a similar methodology. Also, some more detailed research, including case studies, on city–surrounding areas would bring more understanding to the concept of growth poles.

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URBAN ATTRIBUTES OF DEGRADED TOWNS – A CASE STUDY OF WEST POMERANIAN VOIVODESHIP

ATRYBUTY MIEJSKOŚCI ZDEGRADOWANYCH MIAST NA PRZYKŁADZIE WOJEWÓDZTWA ZACHODNIOPOMORSKIEGO

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ABSTRACT: The article presents degraded towns in West Pomeranian Voivodeship and a former urban-type settlement, which lost their urban status and became villages as a result. Five settlements, which today are seats of communes, were analysed in detail, as well as four that performed such a function in the post-war past. First of all, the origin of the emergence as well as the circumstances of the loss of the urban status were discussed. Then the current level of development of the features of urban centres was defined as regards the population, economic and spatial aspects. In addition to the number of population and the structure of the economy, particular attention was paid to the urban layout that co-creates the local cultural landscape. The summary presents the main reasons for the degradation of the discussed centres and highlights those that potentially have the greatest predisposition to regain the urban status.

KEY WORDS: urban attributes, degraded towns, West Pomeranian Voivodeship

ABSTRAKT: Artykuł przedstawia miasta zdegradowane w województwie zachodniopomorskim oraz byłe osiedle typu miejskiego, które obecnie utrzymują status wsi. Szczegółowej analizie poddano pięć miejscowości, które pełnią dziś rolę ośrodków gminnych, a także cztery, które sprawowały taką funkcję w powojennej przeszłości. W pierwszej kolejności omówiono genezę powstania, a także okoliczności utraty miejskiego statusu. Następnie przedstawiono współczesny stopień rozwoju cech miejskich ośrodków z uwzględnieniem aspektów ludnościowego, funkcjonalnego i przestrzennego. Oprócz liczby ludności i struktury gospodarki zwrócono również uwagę na pozostałości miejskich układów przestrzennych, które współtworzą miejscowy krajobraz kulturowy. W podsumowaniu przedstawiono główne przyczyny degradacji omawianych miast oraz wyróżniono spośród nich te ośrodki, które potencjalnie mają największe predyspozycje do odzyskania miejskiego statusu.

SŁOWA KLUCZOWE: atrybuty miejskości, miasta zdegradowane, województwo zachodniopomorskie.

Introduction

The article deals with the analysis of the level of development of urban features of degraded towns in West Pomeranian Voivodeship, which were defined in the title as

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attributes of urbanity. An attribute is, according to the definition of the Polish language dictionary (sjp.pwn.pl), "a feature of a thing, person or phenomenon that distinguishes them from others" and "the basic feature of the object without which it could not exist or would be unthinkable." Therefore aspects of urbanity are those features that distinguish urban settlements from other units, such as: "population, functions, morphology and physiognomy, degree centrality, historical past, lifestyle of residents, communication rank or infrastructure" (Szmytkie, Krzysztofik 2011).

The issues of degraded towns in Poland has been widely discussed by Krzysztofik and Dymitrow (2015). According to the authors, such a settlement is: "a town that in the past had city rights or officially granted urban status." At present, however, it remains, in formal terms, a village or has been incorporated into the borders of another settlement unit. In addition, the authors drew attention to the number of such centers, which they estimated at over 800. The research on degraded towns was also conducted by Drobek at the level of regions such as *Opolszczyzna* [Opole Region] (1986), *Śląsk* [Silesia] (1999) and by Sokołowski for the following voivodeships: *Kujawsko-pomorskie* (2011a), *Łódzkie* (2011b), *Podlaskie* (2013), *Świętokrzyskie* (2015), *Mazowieckie* (2016a), *Warmińsko-mazurskie* (2016b), *Podkarpackie* (2017), *Lubuskie* (2018). West Pomeranian Voivodeship, as one of the few, was not included in this type of analysis. Therefore the aim of the article is to fill the research gap, as well as to assess the level of development of urban features in the centers using various determinants of urbanity.

According to the Act of 8 March 1990 on the local self-government, obtaining status of a town "is carried out in a way that takes into account social and technical infrastructure as well as the urban layout and character of the built-up area." In turn, the Act of 29 August 2003 on official names of localities and physiographic objects in Poland introduces the distinction between the concept of a village and a city. According to it, an urban settlement is a "unit with dominant dense development and non-agricultural functions, which has municipal rights or the status of a town conferred in the procedure stipulated by separate provisions." However, these are not very precise definitions, which are not systematized by the Regulation of the Council of Ministers of 9 August 2001, concerning the procedure for submitting applications regarding granting the urban status and documents required in these matters. It merely specifies that the Commune Council as an applicant undertakes to submit a number of documents containing, among others: historical background, basic statistical data and the results of consultations with residents. In this article, guidelines have been examined in terms of available and comparable data.

First, the historical background, presenting the origins and conditions for establishment of towns, was discussed with the use of literature describing the history of urban settlements and the region of Pomerania. In the next part, the centres were examined in terms of the current level of development of urban features, as regards population, economic and spatial aspects. Desk research involved data from official documents of communes, such as development strategies, studies of conditions and

directions of spatial management, care monuments programs and environmental protection programs. Quantitative data regarding the number of population were obtained from relevant units of commune offices. The number of business entities within individual sections of PKD 2007 came from the Local Data Bank of the Central Statistical Office. These data were used to calculate Florence's local specialization indicators, the method used in quantitative research in socio-economic geography. In turn, the spatial aspect mainly concerned the state of preservation of the urban layout that directly affect the perception of particular centres and their cultural landscape. For this purpose, field studies were carried out in individual centres. Spatial structure of settlements was also defined with the help of road and aerial maps available via the Bing portal.

General characteristics of degraded towns

There are 16 degraded towns in West Pomeranian Voivodeship (Figure 1). They were elaborated on the basis of Najgrakowski's list of urban settlements (2009), containing information on dates of obtaining and losing city rights. Most of them are located in Gryfino County (five), Myślibórz and Stargard (four each). For the most part, they lost the original character of small towns, or played the role of urban centres only for a short time, that they did not develop features typical of such centres, which would indicate their distinctiveness to the rural surroundings. Five of the degraded towns, which today are seats of communes, were analysed in detail, as well as four that performed such a function in the post-war period. Nowadays the significant role as an administrative centre ensuring access to basic public services should be treated as a necessary condition for further discussion about regaining the urban status. On the national scale, there were only three examples of obtaining the urban status by centres that were not seats of communes (Szmytkie, Krzysztofik 2011).

Among the degraded towns in West Pomeranian Voivodeship, Banie is the earliest settlement mentioned as urban (Table 1). In 1234, Prince Barnim issued a document handing over the Bańska Land to the Templars, while allowing the organization of a free market in "civitate ipsorum Banen" (Kuhn 1974). The location of the town resulted from environmental conditions, the neighbourhood of marshes and river floodplains. It was an agricultural and trade centre at the intersection of roads to Gryfino, Myślibórz, Pyrzyce and Chojna. The importance of the town was confirmed by the name of the bridge in Gryfino "Banische Brugge" and the grain measure "Banensis mensure" (Rymar 1999). There are also remains of defensive walls preserved in Gryfino and Pyrzyce, both under the name of Bańska Gate. In August 1945, Banie was still considered a town. According to Rymar (1999), the loss of the status ensued "due to the remarkably agricultural character along with the hinterland, as well as the state of destruction and the lack of facilities typical of urban centres."

Another settlement – Stare Czarnowo – was referred to as an "oppidum" in the years 1274-1283. This category meant an incompletely shaped town that did not obtain

Fig. 1. Distribution of degraded towns in the area of the West Pomeranian Voivodeship

Source: author's own elaboration.

city rights, unlike "civitas". In 1283, Wełtyń and Widuchowa were also mentioned in the same way ("opidis Woltyn, Nienmarketh atque Videchove"), when Bogusław IV abolished the privilege of holding trade fairs in favor of the newly-founded Gryfino (Kuhn 1974). These centers have since lost their importance. Despite the slowdown in development and the dissolution of the Cistercian monastery during the Reformation, Wełtyń in 1647 was referred to as urban "Stadtlein" (Rymar 2005) and Stare Czarnowo maintained the privilege of holding fairs until the 19th century.

Table 1

Period of functioning of particular settlements as urban

Name	Recorded in documents as urban settlement for the first time		Recorded as urban settlement for the last time
	date	referred to as	
Banie	1234	civitas	1945
Stare Czarnowo	1274	oppidum	1283
Golenice	1276	civitas	1608
Wełtyń	1283	oppidum	1647
Widuchowa	1283	oppidum	1945
Wierzbno	1316	oppidum	2nd half of the 18th c.
Nowogródek Pomorski	1317	civitas	1st half of the 17th c.
Boleszkowice	1337	oppidum	31.12.1971
Trzebież	31.12.1959	urban-type settlement	31.12.1972

Source: author's own elaboration.

Photo 1. Banie (bird's eye view)

Source: banie.pl

Things were different in the case of Widuchowa. On 17 April 1347 it was granted city rights. This gord located on a bank of the Oder River (Photo 2) was on the trade route leading towards Banie and Pyrzyce, as well as on the way from Szczecin to Chojna. In the 19th century, the town was an important centre of processing reeds. During this period Upper, Lower and Old Town were distinguished. After the Second World War, the mayor became the head of the commune, therefore Widuchowa ceased to be treated as a town. This must have been influenced by "war damage, especially the slow pace of reconstruction and settlement process as well as geographic location" (Rymar 1997).

Photo 2. Widuchowa. A view from the Odra River
Source: author's own photo.

Golenice was mentioned in 1276 as "civitas Schiltberge". It was established as a local trade centre between Trzcińsko Zdrój and Myślibórz, along the road from Banie to Myślibórz. For the last time, as a small town – "Flecken", it was mentioned in 1608 (Rymar 2010a). According to Kuhn (1974), the term "opidi" for Wierzbno was used for the first time in 1316. Earlier – before 1307 – the urban character was emphasized only in relation to residents ("cives de Werben"). The town was created halfway between Pyrzyce and Stargard, to organize the market for the community living east of Lake Miedwie. In 1564, town privileges were confirmed by Prince Barnim IX, and Wierzbno lost its status only at the end of the 18th century (Rymar 2010b). Nowogródek Pomorski as a town ("civitas") appeared in documents in 1317, listed next to Gorzów and Barlinek (Rymar 1998). Nevertheless, in the following centuries it did not become a fully-fledged town, without any defensive walls. The centre began to lose its importance as a result of the decision in 1352 to change the course of the trade route from Szczecin to Gorzów. From that time the road was to lead through Myślibórz with the omission of Nowogródek Pomorski. The final development of the centre was stopped by the destruction that occurred during the Thirty Years' War (1618-1648), after which it began to be described as a village.

In turn, Boleszkowice appeared for the first time as an "opidum" in a list of one of the Neumark Books in 1337. According to Bütow (1930), there was no clarity in the past whether to perceive it as a town or only as a village, which was reflected in documents using both the name *oppidum* and *villa* (meaning a village). At the beginning of the 1930s, Boleszkowice belonged to the group of towns of the Kreis Königsberg, but according to the author (Bütow 1930) the form of the external appearance, as well as the occupational structure of the population, made a greater impression as a village than as an urban settlement. Despite this, after the Second World War, Boleszkowice maintained the urban status, abolished only by the Regulation of the Council of Ministers of 25 November 1971, which came into force on 1 January 1972.

Photo 3. Boleszkowice (bird's eye view)

Source: Nadzikiewicz Tomasz (2017: 7).

Among the studied centres, Trzebież is a special case, which for thirteen years had the status of an urban-type settlement, until the administrative reform introduced at the beginning of 1973. It was an intermediate category between a town and a village, given to units destined for workers and fishermen or spa resorts with at least 1000 inhabitants. Małachowski (1995) emphasized that such settlements were included in the statistics for towns, and as "degraded urban settlements" they could obtain urban status in the future, which was later confirmed by the case of Dziwnów.

Analysis

Population criterion is one of the most important when issuing decisions on granting the urban status. The number of 2,000 people, although informally, is considered as a population threshold (Drobek 2002; Szmytkie, Krzysztofik 2011; Sokołowski 2014). Recently, however, the urban status was regained by Wiślica and Józefów nad Wisłą in 2018, as well as Opatowiec and Koszyce in 2019, which had well below 1 thousand people. Among degraded towns in West Pomeranian Voivodeship only three had a population of over 1 thousand people in 2016 (Table 2). Each of them is the seat of commune and thus a local administrative centre providing access to basic services. The only village that is not the seat of commune, but also reached a significant number of inhabitants, is Trzebież, a former urban-type settlement. It is located in Police Commune, at the Szczecin Lagoon, and was the only one in the discussed group of centres that exceeded 2,000 people in 2016.

Table 2

The level of development of urban features – population and economic aspects

Name	Administrative function (the seat of commune)	Population in 2016	Local specialization in in 2016	
			dominant section	value of Florence indicator
Banie	+	1 912	–	–
Widuchowa	+	1 501	–	–
Boleszkowice	+	1 373	A	5.13
Stare Czarnowo	+	611	O	5.02
Nowogródek Pomorski	+	486	O	10.73
Trzebież	–	2 017	A	5.92
Golenice	–	857	–	–
Wełtyń	–	782	–	–
Wierzbno	–	340	O	5.92

A – Agriculture, forestry, hunting, fishing; O – Public administration, defence, compulsory social security.

Source: own elaboration based on data from commune offices and the Central Statistical Office.

Economic analysis was carried out using the Florence indicator of local specialisation as a quotient of the percentage share of individual sections in the structure of the economy in the centres, and a percentage share of the same feature in a hierarchically higher unit (Runge 2006), all small towns in West Pomeranian Voivodeship. In this way it was possible to compare prevailing economic activities in potential towns with current urban settlements. Against the background of small towns, the discussed centres are characterized by over-representativeness of the sections A and O. In Boleszkowice, the local specialization is associated with agriculture, forestry and hunting activities, and in Trzebież almost exclusively fishing (32 out of the 36 entities in the section). In turn, Nowogródek Pomorski, Stare Czarnowo and Wierzbno were characterized by expansion of public administration. In other centres, there was no domination of one section, they had a more diversified structure of the economy, resembling the structure of small towns.

Apart from the population and economic criteria, the settlement unit can be perceived and classified as urban based on the elements of morphology and physiognomy that make up its spatial structure (Szmytkie 2014). According to Koter (1994), the city's morphology includes its internal structure (layout), external (shape and physiognomy of buildings) as well as the origin and evolution of components. In the case of degraded towns of West Pomeranian Voivodeship, this aspect has been examined in terms of presence and state of preservation of the urban layout.

The location of the villages close to the existing urban settlements is unfavourable for a potential change of their status. The short distance from towns, including seats of counties, proves the lack of a real "self-empowerment". According to the assumptions

of Szmytkie and Krzysztofik (2016), who designated potential towns in the "non-urban areas", they should be located outside buffers with a radius of 1 and 2 miles (up to approx. 16 km), which refers to the medieval mile right, a privilege determining the extent of a city's trade impact. Villages that meet such a criterion the most are Banie, Widuchowa and Stare Czarnowo (Table 3).

Table 3

The level of development of urban features – spatial aspect

Name	Distance to the nearest town [km]	Urban layout
Banie	17	+
Widuchowa	17	+
Boleszkowice	10	+/–
Stare Czarnowo	17	–
Nowogródek Pomorski	12	+
Trzebież	14	–
Golenice	7	–
Wełtyń	6	+/–
Wierzbno	11	+/–

+ Means preserved urban layout with a market square and perpendicular streets; +/– partly preserved urban layout; – lack of urban layout.

Source: own study.

Nowogródek Pomorski has the most visible urban layout among the studied centres. In this village, there is the well-preserved form of a closed rectangle, with three streets of the east-west axis and four perpendicular ones intersecting with them. There is also the triangular market square (currently St. Florian's Square), where the fire-fighting pool is located. Groups of houses sited along the main streets are not typically compact, with examples of farm buildings around.

The urban layout has also been preserved in towns with a long urban history such as Banie and Widuchowa. Banie had a sequence of fortifications and a moat, and later also defensive walls with entry gates and towers, which, however, were mostly dismantled in the second half of the 18th century. The town was founded on a plan of an oval, with a network of perpendicular streets, which together with the market square (currently Jagielloński Square – Photo 5) have survived to this day. This area appears in the register of historic monuments as the old town. On the other hand, in the register of historic monuments of the commune, there are numerous residential complexes dating from the 18th and the 19th centuries. They have been preserved, although the total post-war destruction was estimated at 35% in 1945 (Rymar 1999). This area should, however, be revitalized with the buildings being renovated.

Photo 4. St. Florian's Square and the centre of Nowogródek Pomorski

Source: author's own photo.

Photo 5. Banie – Jagielloński Square with a monumental oak

Source: author's own photo.

Photo 6. Banie – square by the Tywa River in the area of the former mill

Source: author's own photo.

Photo 7. Widuchowa – a historic tenement house

Source: author's own photo.

Photo 8. Half-timbered houses at Grunwaldzka Street

Source: author's own photo.

Initially, Widuchowa had a linear form which was transformed into a multi-road village with the market square. During the Second World War, 80% of the town was destroyed. The register of historic monuments includes the area of the old town, which consists of, among others, buildings at Grunwaldzka Street (Photos 7 and 8), a church, a hillfort and remains of a castle. There are also seven barns listed in the register of historic monuments of the commune, concentrated in the area of the "barn district", which was described as "one of the largest and most valuable complexes of such buildings in Western Pomerania" (Rymar 1997). The presence of a complex of farm buildings affected the definition of the Widuchowa layout as urban-rural. To this day, the former market square (currently Mieszko I Square) has survived, but it does not fulfil its original function, being only an extension of the neighbouring park. This area should be revitalized; so should be the surrounding buildings with low aesthetic values, requiring numerous additions.

Photo 9. Bolesław Chrobry Square in Boleszkowice
Source: author's own photo.

Photo 10. Bolesław Chrobry Square in Boleszkowice
Source: author's own photo.

Three more villages have some fragments of the former urban layout, largely transformed or obliterated. In Boleszkowice, there is a market square (currently Bolesław Chrobry Square – Photos 9 and 10), with a two-storey tenement house, which was the former town hall. However, this town did not have defensive walls or an urban layout, and its significance was limited to the organization of trade fairs. Wełtyń has a preserved network of perpendicular streets, along with a built-up area in an oval-shaped form. The composition of triangular market square has become blurred. Wierzbno was located parallel to the shore of Lake Miedwie, within three streets leading from north to south, cut by perpendicular ones. Opposite the church there is a former market square (Photo 12).

Golenice, Stare Czarnowo and Trzebież do not have an urban layout. Golenice is a multi-road village with irregular organisation of its spatial structure. Stare Czarnowo has a large number of farm buildings – warehouses, cowsheds, barns, which are also on the list of the register of historic monuments of the commune. Trzebież

Photo 11. Buildings in Wełtyń

Source: author's own photo.

Photo 12. Area of the former market square in Wierzbno

Source: author's own photo.

consists of two parts: Wielka and Mała. The first one is a fork-shaped settlement, where the buildings are located within two main streets, which, forking, form a characteristic letter V.

Summary

Most of the centres considered in this article rightly maintain the status of villages, which results from the insufficient number of population, specialization of local economic activity in the field of agriculture and administration, and the different state or a lack of urban layout. A detailed analysis of degraded towns in West Pomeranian Voivodeship also allows finding out what caused the loss of their status. The main reasons for the degradation of towns in the past include: changes in the course of the main communication routes bypassing the given towns (Nowogródek Pomorski, Wierzbno), close proximity to larger centres, e.g. the seats of land counties (Golenice, Wełtyń), numerous fires and epidemics devastating the settlements, destruction during the Thirty Years' War (Nowogródek Pomorski) or World War II (Widuchowa, Banie). Nowadays they are related to the lack of developed functions of supralocal importance, local specialization in the agricultural sector (Boleszkowice) and population decline (Trzebież). The fact that these were often private towns managed by knights or religious orders caused them to experience a period of stagnation and a socio-economic crisis (Stare Czarnowo) after their collapse.

On the basis of the results obtained, the villages that meet the administrative, size, economic and spatial criteria the most are Banie and Widuchowa. Thus, it should be considered whether they should regain the status of towns. Both villages play the role of commune centres. According to data from commune offices, they were inhabited by more than 1.5 thousand people in 2016. They do not have a local specialization within one section, which proves a more diversified economic structure among the discussed villages. In addition, they are located furthest in relation to neighbouring cities. These

centres also have the preserved urban layout in the form of a network of perpendicular streets, remains of a market square and small-town buildings. Their formal change of the status, however, will depend to a large extent on the determination of respective local authorities and the consent of the residents.

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REVITALISATION AS A CONTEMPORARY PROCESS OF MODELLING URBANISING AREAS

REWITALIZACJA JAKO WSPÓŁCZESNY PROCES MODELOWANIA OBSZARÓW URBANIZUJĄCYCH SIĘ

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ABSTRACT: Nowadays revitalisation is treated as a process which is implemented in areas of a different character, the aim of which is to eliminate barriers that prevent or slow down their broadly understood economic invigoration. It is directed towards comprehensive problem solving. Revitalisation is one of the most important tasks for local policy and is perceived as area modelling (including areas going through the urbanisation process). In various regions of Europe, this process has been taking place for over three decades, while in Poland it is a relatively new one. In our country, revitalization has accelerated, among others, owing to availability of co-financing, provided by a greater access to dedicated EU funds as well as to legal and administrative regulations. Actions supporting the revitalisation process with the use of proven instruments are also on an increase in the countries that want to join the EU structures and/or enter the path of modelling their own economies, adapting them to contemporary socio-economic challenges within their own or available possibilities.

Based on the analysis of the course of revitalisation process, with a particular emphasis laid on areas being urbanized in selected EU countries, Poland and Georgia, some general regularities related to the studied actions and to their implementation are determined in the conclusions.

KEY WORDS: revitalisation, urbanizing areas, space modelling process, Georgia

ABSTRAKT: Współcześnie rewitalizacja jest traktowana jako proces podejmowany w przestrzeni o różnym charakterze, którego celem jest likwidacja barier uniemożliwiających lub spowalniających jej szeroko pojętą aktywizację gospodarczą. Ukierunkowana jest ona na kompleksowe rozwiązanie problemów. Rewitalizacja jest jednym z ważniejszych zadań w polityce lokalnej, które postrzegane jest jako modelowanie obszarów (w tym urbanizujących się). W różnych regionach Europy proces ten zachodzi już od ponad trzech dekad,

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natomiast w Polsce znacznie krócej. W kraju przyspieszony on został m.in. dzięki możliwościom współfinansowania działań w tym zakresie, jakie stwarza większa dostępność do funduszy unijnych dedykowanych na ten cel, oraz uregulowaniom prawno-administracyjnym. Działania w zakresie procesu rewitalizacji z wykorzystaniem sprawdzonego instrumentarium coraz częściej podejmowane są również w krajach pretendujących do struktur unijnych lub wkraczających na drogę modelowania własnej gospodarki poprzez dostosowywanie jej do współczesnych wyzwań społeczno-ekonomicznych w ramach własnych czy też dostępnych możliwości.

Na podstawie analizy przebiegu procesów rewitalizacyjnych ze szczególnym uwzględnieniem tzw. terenów urbanizujących się z wybranych krajów UE, Polski oraz Gruzji w konkluzji określono ogólne prawidłowości dotyczące badanych zjawisk oraz ich wdrażania.

SŁOWA KLUCZOWE: rewitalizacja, obszary urbanizujące się, proces modelowania przestrzeni, Gruzja

Introduction

Nowadays, revitalisation is treated as a process implemented in areas of a different character, the aim of which is to eliminate various barriers that stop or slow down their development. It is perceived as a very effective development activity, integrating various development goals (including those in areas going through the process of urbanisation) and focused on comprehensive problem solving. Revitalisation is one of the most important tasks financed from the EU funds in the years 2014-2020. It is understood as a process of spatial, technical, social and economic transformations aimed at the so-called "bringing back to life". The present study identifies revitalisation as a modern process of modelling areas being urbanised. It has been included in the Polish government policy and appears in various documents defining regional or local development.

Accordingly, the main purpose of the article is to analyse revitalisation in areas undergoing urbanisation. To achieve this goal, the authors examined literature and information from published sources or various documents available. To this end, their experience gained during the research conducted previously in rural areas also proved important. The research procedures used in the present work were initiated by an in-depth literature review which is a basic element of scientific cognition. This allowed acquiring knowledge about the studied phenomenon. An expert literature review method was applied. In addition, to achieve the aim of the study, various documents issued by local authorities were analysed.

In various regions of Europe, this process has been taking place for over thirty years. In Poland, it began with a delay and was accelerated, among others, owing to availability of co-financing provided by a greater access to dedicated EU funds as well as to legal and administrative regulations. Actions supporting revitalisation process with the use of proven instruments are also increasingly undertaken in countries that want to join the EU structures and/or enter the path of modelling their own economies, adapting them to contemporary socio-economic challenges within their own or available possibilities.

The basic feature of the European areas undergoing the urbanisation process is their diversity. A significant part of them are struggling with problems of a different nature. For this reason, the EU has started to engage in renewal and revitalisation issues. The

subject of research is revitalisation of the areas in question. The study is based on an analysis of the revitalisation processes, with a particular emphasis on the so-called areas undergoing urbanisation from selected EU countries, Poland and Georgia, and its conclusions outline the ways in which these processes are being implemented as well as the level of their accomplishment. In their paper, the authors focused on the time aspect of implementation of revitalisation activities, while they do not intend to compare the effects of revitalisation, which is difficult, among others, due to different development conditions and legal regulations. Interesting considerations in the literature devoted to this issue were presented by Kaczmarek (2015: 67-72). The main goal was achieved through specific objectives such as assessing the possibility of adapting European solutions from the field of revitalisation to Polish conditions and presenting revitalisation activities carried out so far. The following areas have been included among the urbanising ones:

– zones of intense social and economic development (mainly cities' hinterland);
– transition zones characterised by symptoms of growth;
– expanding peripheral zones of various types (national, regional, e.g. inter-agglomeration areas, or local, e.g. zones of poor transport accessibility in counties (*poviats*) and communes).

The basic method of scientific research that has been used so far to study revitalisation in Poland is the analysis of theoretical cognitive content. The processes examined in the present paper are difficult to measure. The study contains selected case studies based on the analysis of specific communes. The definition of revitalisation, which is currently binding in Poland, comes from the Act on Revitalisation adopted on 9 October 2015 (Journal of Laws 2015, item 1777). It indicates that it is "a comprehensive, coordinated, long-term process of spatial, social, economic or technical transformation carried out in a degraded area, initiated by a local government unit in order to lead it out of a crisis, mainly by giving it a new functional quality and creating conditions for its development, based on its characteristic endogenous conditions."

Revitalisation in selected European and non-European countries

The term "revitalisation" first appeared in the United States (Pałka-Łebek 2019: 165). The need for renewal occurred in American cities where problems among Afro-Americans who lived in poor neighbourhoods intensified (Heydrych 2008: 109-114). This situation revealed the need for reforms to overcome social divisions. Revitalisation seemed to be the answer to this problem. Over time, this process encompassed cities of all sizes as well as the peripheries.

In Europe, Germany is a country that was one of the first to start revitalisation. Its beginnings related to German cities and were initiated in the 1960s. They were referred to as the "framework of revitalisation" (Tallon 2010: 34-37). Revitalisation had been taking shape in this country for a long time before it acquired the contemporary character. What changed this process was German reunification. It transferred to

the federal government a part of the duties and responsibilities for the condition of the eastern states where revitalisation processes did not exist. Thus the scope and significance of the studied process evolved (Bamberg 2007: 15-19). An original path of revitalisation was found, combing both public (budget) and private funds, which began to give positive results. This solution was called the "German model of revitalisation" (Hamedinger 2004: 21-28). In Germany, the scope of revitalisation projects was constantly being expanded. In parallel, discussions were held concerning the legal interpretation of this process. They contributed to adding to the Constitution a provision on financial support for investments of a specific nature. Subsequently, in 1971, the proper Revitalisation Act was adopted which laid down the regulations for the preparation of revitalisation programmes and their financing (Durand 2003: 5-12). At the same time, the revitalisation processes were handed over to municipalities which initially developed programmes related mainly to the spatial planning and concerning small areas only. They usually refrained from spending revitalisation funds, saving them rather for more extensive projects. Over time, the projects also started to include social issues, playing an important role in revitalisation. The new concept of revitalisation in Germany, combining activities related to the spatial and social sphere, resulted from the evolution of the early German approach to revitalisation at the turn of the 1970s and the 1980s (Bassand 1986: 16-19). It was named the classic revitalisation model (Yin 2003: 197-209). After the reunification of Germany, in the 1990s, the classic revitalisation model was also applied in the former East Germany, where it was not so effective due to specific local conditions. Since the 1990s, attempts to take up social revitalisation have been widely initiated. Under German law, revitalisation is a process that is expected to solve problems through appropriately adopted programmes prepared and carried out in accordance with the public interest. It should be a permanent element of development policy (Hamedinger 2004: 21-28).

To sum up, it can be stated that the strategy of revitalisation in Germany is an example of a comprehensive approach to development (Fuá 1980: 28-33). It takes into account the interests of all participants of this process and uses available planning, legal and financial instruments. According to Böcher (2014: 31-39), the most important achievements of German revitalisation policy include: creation of stable legal regulations, spreading the knowledge on revitalisation through the dissemination of good practices, analysing positive and negative experiences from the implementation of revitalisation projects.

In Great Britain, in the early 1980s, the first revitalisation measures were initiated with the use of market mechanisms (Ray 2006: 280-289). During this period, the economic recession increased in the island. Thanks to revitalisation, it became possible to implement various projects, which helped to renew degraded areas and to improve the socio-economic situation (Gorton 2009: 1310-1315). All new initiatives and undertakings were supported by the government, especially when they took into account the requirements of environmental protection and when they were approved by the local

community. The revitalisation processes implemented in Great Britain were based on a specific regeneration model (property-led regeneration model) (Pałka-Łebek 2019: 163-171). It implied dynamic development of the private sector in the economy of the revitalised area and provided a driving force for development (Evans 1990: 66-71). Both scientists and practitioners were divided in assessing the role of this process. Some treated it as a "panacea", while others as a "placebo" for socio-economic development. The most important actor of revitalisation in this country is the government which takes decisions through the specialised agencies regarding the implementation of revitalisation projects and co-finances them (Varady 2015: 263-270). Local authorities are also considered to be important participants of this process. Great Britain has a competitive revitalisation financing system (Demesick 1987: 74-81). That is why local governments play the key role in all the implemented projects which are dedicated to them. Revitalisation processes in Great Britain are of a partnership nature. Voices of local communities are widely considered. Hence, revitalisation management is quite complicated (McElfish, Jr. 2007: 8-11).

As priorities for effective management of the revitalisation process, Carter (2006: 36-43) identified the following activities:

- to properly identify and equally involve all the relevant actors of the process;
- to create a correct revitalisation programme consulted with all the partners;
- to distribute duties and responsibilities among all the participants of the process;
- to provide proper successful leadership;
- to appoint a team of experts with appropriate qualifications;
- to constantly monitor and evaluate the revitalisation process.

Following Great Britain, in the next years, the phenomena of renewal and revitalisation came to other countries, e.g. Ireland, Belgium, the Netherlands, Portugal (Röling 1993: 21-27; Silva 2012: 500-507). A very similar policy was also implemented in other countries, e.g. Norway, Sweden or Finland (Gawell 2009: 1311-1315; Skalski 2009: 42-48).

France is also a country where revitalisation processes started relatively early (Fuá 1980: 28-33). Beginning in the post-war years, the French government, in cooperation with local governments, intervened in the socio-economic space, implementing a costly renewal programme (Colantonio, Dixon 2011: 32-39). France, as a country highly sensitive to the problems of social justice, directed state intervention towards the social and economic sphere already in the mid-1970s – therefore quite quickly (Douve 2003: 43-50). The revitalisation policy in France consists in significant investments (Liu & Laske 2010: 93-95). It aims to finance, often costly, programmes (Audubert 2010: 21-27). The country persuades others to undertake the necessary joint public and private remedial actions. Revitalisation programmes implemented in France since the turn of the 20th and the 21st centuries aim to accomplish several goals, the most important of which are – according to Donzelot and Mevel (2001: 16-20) – to achieve social diversity and revitalisation of rural areas. In France, apart from the cities, the results of revitalisation processes were visible at the earliest in the

areas located close to urban centres (Burgel 2006: 15-19). It is worth emphasising that in France there was a constant lack of staff qualified in drafting programmes devoted to revitalisation. In addition, the relevant act imposed an obligation to carry out systematic evaluation of revitalisation, taking into account the changing requirements related to the monitoring of this process (Skalski 2010: 42-48). Currently, in France, in line with the EU activities, an integrated approach and strong local partnership are supported. Pursuant to the Act on Spatial Planning and Development (LOADT) of 4 February 1995, Special Revitalisation Zones were created. They are designed to support development using financial resources. Specific provisions apply to them, and their main purpose is to direct state aid to projects that create jobs in the least populated areas affected by demographic and social problems and being at risk of an economic decline (Audubert 2010: 11-16).

The situation regarding revitalisation in Slovakia is more complicated than in Poland. The economic growth, which was observed in the country after its accession to the EU, caused significant migration. With a relatively low level of identity of local communities and the weakness of local government structures, many Slovak areas are experiencing regression and are even threatened with collapse (Birkle, Krewani 2016: 12-17).

Revitalisation in the Czech Republic is organised in a similar way as in Slovakia. However, there is a clearly higher level of financing of revitalisation projects, the scale of the process is greater, and the quality of projects is definitely higher. In addition, placing revitalisation projects among the regionally defined objectives of local development policy is a factor that favours the process (Pałka-Łebek 2019: 200-204).

The need to revitalise the areas staying under the influence of urban centres in Canada was emphasised by Lauzon et al. (2015: 76-83), whereas revitalisation processes in areas under urbanization in the USA were presented by Chinitz (1969: 21-26) and Box (1976: 791-799), in Japan – by Knight (1994: 634-646) and Kakluchi (2014: 1-12), and in Taiwan – by Liu (1990: 90-96).

Revitalisation measures are also implemented in other countries. An example of a country where – despite its lower level of the socio-economic development and a weak activity of local communities – the process of revitalisation has already been initiated is Georgia. The studied process has much shorter traditions there than in the countries mentioned above. Georgia is a country of many contrasts of different nature. Similarly to the previously discussed European regions, revitalisation projects in this country initially concerned cities, to be expanded later to areas of their influence. Activities related to this process have been included in the Regional Development Programme of Georgia for 2018-2021. Due to the fact that Georgian rich and diverse cultural heritage is well known all over the world, its protection has been defined as the overarching goal. At the same time, it has been recognised as a priority that could become a stimulus for invigorating the economy of the entire country. Another important task is to develop a new approach in the light of which public spaces are being changed. The first action of this nature was the revitalisation of numerous buildings in the old Tbilisi and in the historical district of the Georgian capital.

The role of revitalisation is also emphasised in Georgian policy at the central level. Georgia, as a former Soviet republic, is promoted as a newly discovered tourist destination. It is the only country in the world, where wine production methods introduced over 8,000 years ago are still used and are rated as the best in the world. Wine was invented in Georgian Tsinandaki, and Tbilisi was considered the centre of Georgian culture. According to the planning documents, they must be seen as the greatest stimulus for development that will lead to a revival of this region as the centre of Georgian cultural life. "Rebirth in the 21st century" is an initiative of public private partnership (PPP) which is called the Silk Road Group. The partnership hopes to strengthen Georgia's position and to create a European cultural centre (Regional… 2017). The estimated budget of the initiative is GEL 124 million. It is focused on the preservation of cultural heritage, infrastructure development, support of "small scale" architecture, protection of culture in particular regions, creation of public spaces (Regional… 2013). The authorities expect that these actions will result in, among others, an increase in the number of renovated historic buildings and the number of museums established, an increase in revenues from museum and exhibition activities, as well as an increase in the number of tourists.

At present, in Georgia, funds aimed at revitalisation come from various sources, both domestic and foreign. The authorities, in addition to their own funds, receive financial support from the following sources: the European Union (through bilateral programmes), the World Bank, Development Agencies, e.g. French, Swedish or Austrian, the European Investment Bank (EIB), the Council of Europe, the Asian Development Bank.

Summing up, it can be said that revitalisation measures implemented in Georgia currently contribute most often to the revitalisation of individual objects or groups of objects. Taking into account the observed shortage of funds allocated for this purpose, the principle of maximum mobilisation of financing sources should be adopted and alternative financing methods should be sought. Unfortunately, the period of implementation of revitalisation projects in Georgia is not yet long enough to determine whether the related development opportunity has been properly used.

Selected examples of successful revitalisation (case studies)

To identify successes in the sphere of revitalisation, this study uses specific examples that illustrate the beneficial effects of the process on local development. Firstly, it focuses on analysing examples from other countries. These are primarily Western European model examples.

In the countries being the homeland of village renewal, revitalisation of areas in the process of urbanising was also widely known. Initially, it took the simplest forms, e.g. objects or areas with original historical or architectural values, unused or neglected, were given new functions or – after proper preparation – their existing functions were maintained. This way, their values were strengthened. In Western European countries,

local residents were actively involved in revitalisation activities and experienced experts participated fully in almost every programme devoted to the process.

At first, revitalisation projects took the simplest organisational forms. The change of function sometimes contributed to the creation of objects or areas that did not exist before. Here a good example can be the widespread transformation of farm buildings in Germany (Rhineland-Palatinate) into residential buildings with the specific features of local rural buildings. A model example can be the revitalisation of urbanised space in the community of Konken (Germany), thanks to which, above all, the infrastructure has been modernised, the aesthetics of the areas has been improved, while their historical and architectural character has been preserved. An undeniable benefit was the creation of almost 300 jobs that were mainly taken by young people. State subsidies for the implementation of revitalisation projects amounted to about EUR 1.5 million, including EUR 285 thousand for private projects financing, and EUR 1.2 million for the implementation of local government projects (Böcher 2014). A significant number of projects and their large scope allowed comprehensive renewal of not only individual towns, but also of whole communes. The revitalised units received the so-called "new life" through the new functions of particular localities, which as a result contributed to the improvement of the quality of life of their residents (Chmielewska 2010: 24-29). An interesting illustration of the revitalisation process is the community of Vaterstetten-Baldham (Ebersberg District) in Germany, where preserving the identity was strictly watched. The dynamic development of the commune was associated with the construction of a railway line from Munich to Rosenheim (1871). Under the influence of the current development, villages were deprived of their dominant identity features. Typical town centres became blurred, public spaces lost their significance. The new plan for space usage developed in 2002 was thus put up for public discussion. Social participation influenced the decisions on revitalisation and spatial planning. Local government authorities, taking into account the will of the residents, withheld the binding decisions resulting from the municipal spatial development plan in force. As a result, new guidelines for shaping a development model based on the principles of sustainable development were established (Zimnicka & Czernik 2007: 11-17). It mainly postulated the following:

– elimination of cases when small locations would be developed through being integrated into the structure of surrounding units;

– development of particular locations in terms of functional diversity;

– support of specialisation that would give specific development impulses to localities;

– restraint on intensive development of housing.

The municipality of Vaterstetten-Baldham initiated, in accordance with the principles set out in the act, an effective cooperation in shaping a coherent planning. Within this cooperation, advanced centres have developed and while operating in a polarisation system, have been affecting the surrounding peripheries. A specific feature of the revitalisation process is the preservation of local identity. This is reflected in various

resolutions adopted by the municipality which secure the need to protect historical and cultural values as well as physiognomic features of the landscape. Revitalisation processes in the municipality of Vaterstetten-Baldham are also standardised by regulations being in force in Germany. According to them, units with unique resources of local identity develop revitalisation plans that incorporate special renewal principles.

The municipality of Orvault (department of Loire-Atlantique, region of Pays de la Loire in Brittany) in western France may serve as an example of development achieved under the influence of effective revitalisation and properly used suburbanisation. Until the 1950s, it had been a typical rural commune. It experienced its greatest development in the years 1962–1975 under the influence of the increased number of inhabitants (Zimnicka & Czernik 2007: 11-17). From the beginning of the 21st century, the commune was encompassed by suburbanisation processes, which involved a strong increase in investments. Town spaces were shaped under the influence of good transport accessibility and the nearby presence of the urban centre of Nantes. The current development of the municipality contributes to the positive evolution of the labour market and its independence from the closely located main centre. Changes in the labour market consist mainly in creating jobs in Orvault and neighbouring municipalities to free them from the dominant market of the urban centre. At their initial stage, investments in this area were located mainly along the roads that formed the development axes. As a result, new economic functions developed in the newly created housing areas. In addition, extensive building spaces have been created, founded on the so-called "old and new roots". They are separated by the valley of the Cens River (tributary of the Loire), which forms a green belt under protection. The ongoing investments contributed to the fact that the outermost regions merged, creating continuous spaces. The town of Orvault Bourg, which is the capital of the municipality, has also taken a specific revitalisation path. For several dozen years it had been developing as an important agricultural service centre. It also had commercial functions. The town expanded on the "old root". Orvault Bourg was developing qualitatively. New schools, roads, a health centre, a municipal office, community clubs, playgrounds and a library were built. Housing investments, however, were located in settlement units arising on the "new root". They were accompanied by transformations of existing buildings, e.g. adaptations of buildings for holiday homes, or expansion of road lines and public transport. New buildings blended into the existing space. The next stage of the investment began at the turn of the 20th and the 21st centuries and was focused on creating new settlement spaces. The approved Guidelines for Spatial Planning set apart an intensive development zone of 40 ha. A new unit called La Bougalliere was created – a successful government experiment offering a quality housing environment for low-income people who depended on social assistance. A new residential space was designed, located among greenery, with good transport connections and with nearby work places.

The revitalisation processes implemented in the municipality of Marden in Great Britain were also special. In the 1970s, along with the disappearance of agricultural functions, other functions, including industrial, storage and service ones, developed

in the area. In the 1980s, unfavourable processes of space degradation started. The old, historic core of the village was neglected. In the 1990s, the municipality started the revitalisation programme. It covered a number of villages and adjacent hamlets. This organised revitalisation project was called "Marden 2000 Programme" (Pałka-Łebek 2019: 186-188). Its overarching goal was to determine the characteristics of towns requiring transformation, to adopt the principles of revitalisation of resources and to prepare appropriate revitalisation programmes and a local plan. The "Marden 2000 Programme" was supported by the local government and Kent County authorities. The concept of spatial development was based on the observed principles of maintaining spatial order, preserving cultural values and sustainable development. Economic invigoration, mainly in the field of fruit and gardening functions, has contributed to an increase in employment opportunities in the commune and awakened social bonds among the inhabitants. Open areas adjacent to particular towns accentuated their character and strengthened the original appearance of their landscape. The tourist function was developed based on existing historical resources. An organised system of public spaces began to play an important role for social integration. All this resulted in positive changes in the spatial structure of the municipality.

Summing up, in the light of case studies, it may be stated that in the Western European countries the highest dynamics and advancement in urban revitalisation were observed in the communes in which earlier local development methods became popular, e.g. the concept of endogenous development, village renewal, social capital development, social initiatives, multifunctional development or development of local communities.

The present study also outlines selected cases of successful revitalisation in Poland. They refer to two regions of the country. First, there come two examples from Świętokrzyskie Voivodeship. These are the communes of Chęciny and Morawica which are located in the immediate vicinity of the city of Kielce and are subject to its influence. Currently, in Świętokrzyskie Voivodeship, the priority direction in rural development is the use of the wealth of nature and cultural heritage in tourism. The entire region has numerous and varied natural and landscape values, a rich historical and cultural heritage, and an unpolluted natural environment. These unique and original natural and cultural assets and the richness of tradition have become an inspiration to create specialised brand products for tourism. The possibilities of activating rural areas through tourism were described by Wojciechowska (2009: 145-169). The idea of creating brand tourist products has been developing in Świętokrzyskie Voivodeship for several years.

Chęciny is an urban-rural commune located 15 km away from Kielce. It covers an area with nationally unique natural, geological and cultural values. The vision of its development assumes that it is the most touristic place in the province. At the early stages of the revitalisation process, the focus was on renovation of many public buildings and spaces. The works were initiated in the old town within historic buildings of the urban layout. In the framework of the revitalisation projects implemented in Chęciny, the upper and lower markets and adjacent streets were modernised, the

urban space was tidied up, and the commune was adapted to properly serve tourists and residents. Revitalisation of the Chęciny castle began in 2013 and ended in 2016, and its cost amounted to over PLN 8 million (including PLN 6.5 million from the EU funding, and PLN 1.6 million of the commune's own contribution). The scale of the castle's revitalisation and its result were appreciated when Chęciny found itself among the winners of the Top Municipal Investments Competition of Eastern Poland 2016. Currently, it is one of the most visited facilities of this type in Poland. As part of revitalisation tasks, many historic buildings were renovated. However, examples of difficulties in conducting revitalisation works may also be indicated. An excellent example here would be the synagogue built in 1638. For several years the authorities had treated its renovation as a priority. Unregulated legal issues concerning the ownership of the synagogue stood in the way. In 2017, they were clarified through an agreement with the Jewish commune in the Katowice court, and the Commune Office in Chęciny drafted a project to revitalise the building. The commune in question is a good example, both nationally and regionally, of a proper perception of strict planning principles. Unrestricted landscape management and housing development were abandoned. The "green belt" principle is applied, i.e. buildings are surrounded with green zones and need to blend in well with the landscape. A model example of this is the hall called "Pod Basztami" which has recently been built in Chęciny and whose body has been significantly lowered so as not to spoil the view of Chęciny monuments. A significant investment in the commune was the Conference and Training Centre and the Leonardo da Vinci Educational Centre located in Podzamcze Chęcińskie. Since 2014 they have been included in the Regional Science and Technology Centre. The buildings were erected within the palace's grounds, i.e. in the court of the former Starosts of Chęciny. The da Vinci Centre is the second largest facility after the Nicolaus Copernicus Centre in Warsaw, which popularises learning through fun and with the use of modern teaching methods. There was also a biobank built, right next to the Centre. In Korzecko, a village near Chęciny, there is a nature reserve on Rzepka Mountain. Exploitation of rock resources has exposed its southern slope. In its immediate vicinity, the European Centre for Geological Education (ECGE) was set up, becoming a branch of the University of Warsaw. It is a complex of five facilities which was built on the site of the former Korzecko quarry, behind the slope of Rzepka Mountain, and constitutes a modern research institute and conference facility of the University of Warsaw. Currently, it is 90% renewables-powered. In an original way, it has become part of the landscape of a disused quarry and has been recognised, both nationally and internationally, as a unique "training area" for geological surveys. The ECGE performs didactic, R&D, conference and tourist functions. It was completed in autumn 2015 and was recognised as the best public building in Poland at the prestigious European Property Awards in London, owing to, among others, its extremely original architectural design. The total construction cost amounted to PLN 35 million (including PLN 28 million from the EU funds, over PLN 5 million from the subsidies of the Ministry of Science and Higher Education). In addition to its investments in tourism and sci-

ence, the Commune of Chęciny also implements a number of social projects. Activities of non-governmental organisations and informal groups are promoted. A University of the Third Age and a pro-health association have been established and have been organising interesting classes. There is also an initiative planned for the near future that should become a solution to many social problems. Near Chęciny, on an extensive parcel of community land, a large investment will be founded. Due to its good location, a huge logistics centre will be built, covering an area of 68 thousand m^2 and offering jobs to over 300 people.

The development success of Chęciny Commune, according to its residents, is owed not only to a high level of social capital, but is also the result of adopting the correct vision of development, of pursuing it constantly and of the efficient functioning of the local government services, especially of good work of specialists in the field of project preparation and in obtaining funds from various sources. Thus, the commune may be a model for others as to how, in an original and effective way, local resources can be used for intensive development.

To sum up, it can be stated that revitalisation process in Chęciny was initiated in the urban and architectural sphere. Over time, spatial, environmental, social and economic activities were added. And this seems to match the model of the revitalisation process set out by Pałka-Łebek (2019: 311-321).

Another example of effective revitalisation is Morawica. This urban-rural commune is located in the Kielce zone of influence. Transformations taking place in the area contributed to a change of its function: from typically agricultural or agri-industrial to residential and – to certain extent – the economic one, resulting from the influence of investment activities. Morawica Commune is distinguished by a large population increase (the highest population growth and migration balance in Kielce County). For many years, owing to the high quality of communal space, a significant influx of people has been observed here, mainly from urban areas. It is also a very attractive area for potential residents and investors. The commune has a wide access to cultural and sports facilities, school and pre-school education, health care as well as roads and railways. Along with folk culture, general cultural activities developed. The modern Local Government Centre, opened in 2013, provides extensive support, creates opportunities for meetings and organisation of cultural events. Moreover, the example of Morawica illustrates good functioning of civil society. In this commune, all areas of public life are developing very dynamically. The number of business entities is growing systematically, with a predominance of private companies. The leading areas of activity are trade, service and transport. There are also several large production and processing plants based on agriculture, forest resources and tourism. A wide investment offer is being prepared. Thanks to many undertakings aiming at sustainable development, since 1990 over 50% of the today's inhabitants have moved to settle here. Sustainable development has contributed to raising the standard of living, as evidenced by the constantly growing number of residents and investors. Future development plans assume further local development of the commune. As a result, the living conditions of

residents, the activities of companies and institutions located here continue to improve. This is possible, among others, due to the fact that Morawica Commune is one of the leaders in acquiring the EU funds, also on the national scale. Local authorities treat revitalisation as another way to achieve even more effective development. The Board of Morawica believe that as long as it is possible to obtain all development-oriented funds, they should be used to the maximum, so that, when they stop being accessible, the level of development is advanced enough for the commune to act as "accelerated self-propelling mechanism", with the appropriate level of social capital. To sum up, Morawica Commune may serve as a national and regional benchmark of effective applying for funds from various sources (incl. the funds for revitalisation) and of their effective usage. The attitude of the local authorities and that of the local community also add up to this success. Revitalisation is perceived here as a modern method of raising funds and using them for the benefit of the residents and for the development of the commune.

The present study also comprises model examples of urban revitalisation from Opole Region, despite the fact that this particular voivodeship was characterised by the lowest allocation of the EU and other funds for revitalisation projects. In this case, revitalisation was guided by very rich traditions of countryside renewal, which means that the process is likely to find fertile ground there. Some positive revitalisation actions were implemented, for example in the Communes of Gogolin, Nysa, Walce, Kluczbork and Olesno. The Commune of Kluczbork adopted a revitalisation programme for 2016–2023 which is a continuation of the actions taken by the authorities in the field of revitalisation of degraded areas, conducted successfully as part of the projects implemented in the years 2009–2015. The areas that have undergone this process are not randomly selected objects that require revitalisation or major refurbishment, but areas with a particular accumulation of socio-economic problems. Two key tasks were completed, i.e. renovation of the town hall and its surroundings, the park and the nearby residential buildings. The aim was to provide the residents, as well as the growing number of tourists, with an interesting way of spending free time, and to create opportunities for organising cultural events. In Olesno Commune, as in Kluczbork, owing to the organisation of public spaces, their aestheticisation and modernisation of the infrastructure, numerous events started to be organised, being extremely important to maintain cultural life and promote a healthy lifestyle. Revitalisation and enhancement of the attractiveness of the old town in Kluczbork have enriched the offer of cultural events and improved the look of the central space, which – in turn – has intensified the tourist flow. The public facilities and spaces in both communes started to perform new tourist and cultural functions. This enabled the inhabitants to actively participate in social and cultural life. The implementation of such extensive revitalisation projects in Kluczbork Commune brought about measurable results, for which the unit received the first prize as the Best Public Space of Opole Voivodeship in 2013.

Both in the Commune of Kluczbork and in the one of Olesno, the local authorities undertake actions aimed at attracting new investors. For this purpose, e.g. in the former, a sub-zone of the Wałbrzych Special Economic Zone Invest-Park was created, which has already been used by investors, and the authorities are preparing further areas for investment.

Demographic factors are also a priority issue in this region. As forecasts indicate, until 2023 the phenomenon of population aging will have had an adverse effect on the number of socially excluded people and the structure of this social group. Decreasing fertility, life span and decreasing labour resources cause an increase in social inequalities, poverty, homelessness, in the number of the disabled and of people living alone. In this respect, according to the commune authorities, the most important is to limit social exclusion, build social capital and support families. According to the assumptions, in 2023, the areas covered by Local Revitalisation Programmes of the Communes of Kluczbork and Olesno – through the implementation of revitalisation projects – will have become attractive in economic, spatial, functional, recreational, cultural and social terms. The renovated public space will become a meeting place for the residents and a place where important social projects aiming to counteract social exclusion will be implemented. The possibility of sharing the available attractions, as well as of participating in organised cultural and entertaining events is conducive to strengthening social ties. Integrative events organised in revitalised areas attract the residents, which promotes social integration and prevents social exclusion, in particular of the elderly and the disabled. Owing to revitalisation process, social cohesion is restored and strengthened, primarily by rebuilding neighbourhood relationships and organising meetings.

At the end of 2007, leading companies from the tourist industry of Opole Voivodeship, the Opole Science and Technology Park, the University of Opole, as well as the Counties of Kluczbork and Olesno, formed a tourist cluster named "Land Flowing with Milk and Honey". This cluster is a spatial and sectoral concentration of entities working for economic development and consisting of micro-, small and medium-sized enterprises operating in the neighbouring areas, in the same or related industries. They are connected by an extensive network of relationships of a formal or informal nature. Joint actions taken in the cluster contribute to improving the competitiveness of its members, stimulate their innovation, reduce operating costs, and above all – give the opportunity to apply for the EU funds for joint ventures.

To sum up the reflections on revitalisation in the areas outlined as the case studies, several mutually overlapping factors may be indicated, namely:

1. The presence of a leader who instils the idea of a change and activity in the local community and arouses enthusiasm for action in this area;

2. Openness and willingness of the residents to cooperate. Cooperation manifests itself both through their involvement in individual, small measures for the benefit of the village, as well as through implementation of strategic projects involving, e.g. participation in the drafting of a local revitalisation programme;

3. Active cooperation regarding local associations and organisations as well as other entities that actively apply for financing of specific activities.

Long-term coexistence of the above-mentioned factors gives a chance to the local community to implement a coherent development concept. In the long run, it gives the residents not only satisfaction but also material benefits, which triggers the process of spontaneous development.

The characteristic feature of revitalisation process observed in the areas described in the case studies is the exceptional activity of the residents, as well as skilful use of the results of actions taken earlier. Involvement of the local community was a favourable condition for the success of revitalisation, which is perceived as a multifaceted, long-term process of local development. Undoubtedly, a kind of "self-propelling mechanism" of development should be considered to be a very good practice. An important condition was the presence of strong local leaders who promoted the idea of renewal and activated the inhabitants.

Revitalisation as a modern concept of reviving urban areas. An attempt to make general observations in the light of the case studies

A significant role in undertaking revitalisation initiatives is played by funding opportunities as they condition project implementation. Therefore particular EU countries have worked out their own models of implementing and financing revitalisation programmes. The most important of these include:

– the English model which consists in a significant involvement of private partners in the form of public private partnership. In practice, it operates in such a way that special companies are created, consisting of the public sector entities and private investors, who are selected through a tender procedure and are responsible for obtaining financing;

– the Spanish model (it is also used in Portugal, Ireland, Greece) is based on a dominant share of the EU funds, while the contribution of the public sector is often supplemented by the participation of private investors;

– the German model is used primarily in the eastern states of the country and consists in financing programmes exclusively from the public funds. Very similar solutions are used in France.

A synthesis of the above considerations is presented in the model below, illustrating the division of the European countries on the ground of their experience in revitalisation and the directions of transposing these experiences in Europe. The countries were divided into three groups: Central, North-Western and Southern Europe (Figure 1). The main representatives of Central European countries include Germany and Austria. They are characterised by the fact that their process of revitalisation first started to be developed conceptually and organisationally, mainly on the basis of the idea of village renewal. For the other two groups, namely the countries of North-Western and Southern Europe, the common feature is the "young age" of revitalisation, as the

process developed with some delay. The above countries have disseminated the knowledge about revitalisation, and since the 1990s also the experience in this field to the countries of the collapsing socialist bloc, among which Poland was one of their first beneficiaries. In countries with a centrally planned economy, due to specific conditions and development mechanisms and the approach of local communities, experience in the field of rural revitalisation is smaller. The situation was completely different in the countries where there was always a market economy. For many years they have learnt to understand market requirements, and the rural population has worked out a positive attitude to the revitalisation process. At this point it is worth noting that it is difficult to compare revitalisation in the Western European and the Central and Eastern European countries, as the market economy in the latter has spread with a significant delay.

Fig. 1. A model illustrating differences among European countries regarding transportation of revitalisation experiences and directions of knowledge transfer

Source: based on Pałka-Łebek (2019).

The main benefit from assessing foreign experiences is the possibility of anticipating problems related to revitalisation that have occurred previously in the highly developed Western European countries. This may allow making optimal use of knowledge and avoiding threats in the revitalising countries of Central and Eastern Europe.

The group of former socialist countries is also diversified in terms of adaptation of the idea of revitalisation. Poland, the Czech Republic and Hungary as the countries in which transformations in agriculture were illustrated by Grykień (2005: 42-57) with a model of deep restructuring, required urgent revitalisation measures to solve or eliminate problems. These countries were characterised by great opportunities to initiate revitalisation, due to, among others, the importance of communal governments, the role of local communities and non-governmental organisations. On the other hand, transformations in agriculture in Bulgaria, Romania and the Baltic States were

described with the use of a shallow restructuring model, hence revitalisation in these areas is developing with some delay.

Summary and conclusions

Revitalisation, like other processes shaping the socio-economic space, takes place in specific conditions which constitute its reference frame. In modern times, in the areas of urban influence, both in Poland and in other countries, the processes of social, cultural, spatial and functional degradation occur with varying intensity. For this reason, the revitalisation process consisting of various corrective actions plays a very important role. Its correct implementation is a condition for the proper development of these areas.

The process studied in the present article indirectly serves to build social capital within the local community. It also helps to improve the well-being of the residents. Revitalisation should not be treated as a final goal in itself, but should be considered as a tool for achieving long-lasting and balanced development.

Based on the conducted research, the following conclusions may be drawn:

1. Revitalisation is not a goal in itself, but it makes sense as long as it is integrated into a wider scope of socio-economic projects. It creates special development opportunities for the peripheries.

2. The examined process, due to the costs and durability of its effects, is currently the most effective development-oriented activity integrating various development goals. The example of the Western European countries shows that revitalisation processes are very useful to start the internal development of local communities.

3. In Poland, the grassroots approach and revitalisation mechanisms are not yet functioning in a satisfactory way. Financed mainly from the EU and regional development funds, support instruments usually lead to the revitalisation of individual facilities or complexes of facilities.

4. Over the last 20 years revitalisation has been treated by the residents and local governments as an important factor conditioning the development and improvement of living conditions.

5. In Poland, there is a visible lack of funds to be allocated to revitalisation activities. It is advisable to combine different measures, including different types of partnership (e.g. PPP). Following the example of many Western countries, it is necessary to establish special government financial instruments for revitalisation, e.g. the national revitalisation fund, as well as to clearly specify the rules regulating the financing of revitalisation processes.

6. Actions that would mobilise funds for revitalisation are particularly recommended for local communities. For this reason, local authorities should initiate and develop partnerships in order to mobilise funds.

7. The EU regional policy programmes financed from the EU structural funds provide funds for revitalisation. However, these external financing sources cannot replace country's own contributions (from the government and local government level).

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THE LOCATIONS OF HOUSING INVESTMENTS IN LOWER SILESIA PROVINCE VERSUS CHANGES IN SPATIAL DISPROPORTIONS IN THE SOCIAL AND ECONOMIC DEVELOPMENT OF THE REGION

LOKALIZACJA INWESTYCJI MIESZKANIOWYCH W WOJEWÓDZTWIE DOLNOŚLĄSKIM A ZMIANY DYSPROPORCJI PRZESTRZENNYCH W ROZWOJU SPOŁECZNO-GOSPODARCZYM REGIONU

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ABSTRACT: The purpose of the paper is to present the locations of housing investments in Lower Silesia Province, with a special focus on cities/towns and suburban areas, and also to evaluate their potential impact on reducing spatial disproportions in the region's development. The study covers the territory of Lower Silesia Province, especially cities/towns which are leading with regard to housing investments locations, selected by the number of dwellings completed. The research period is 2011-2017. The paper presents the relations and feedbacks between a housing investment location and the social and economic development and growth.

KEY WORDS: housing investments, city/town, suburban area, population, socioeconomic development

ABSTRAKT: Celem artykułu jest omówienie lokalizacji inwestycji mieszkaniowych w przestrzeni województwa dolnośląskiego ze szczególnym uwzględnieniem miast i ich stref podmiejskich, a także ocena możliwego ich wpływu na zmniejszanie dysproporcji przestrzennych w rozwoju regionu. Badaniem objęto województwo dolnośląskie a szczególnie miasta wiodące w zakresie lokalizacji inwestycji mieszkaniowych, wybrane do analizy według liczby oddanych do użytkowania mieszkań. Okres badawczy to lata 2011–2017. W artykule wskazano zależności i sprzężenia zwrotne pomiędzy lokalizacją inwestycji mieszkaniowych a wzrostem i rozwojem społeczno-gospodarczym.

SŁOWA KLUCZOWE: inwestycje mieszkaniowe, miasto, strefa podmiejska, ludność, rozwój społeczno-gospodarczy

Introduction

The purpose of the paper is to present the locations of housing investments in Lower Silesia Province (Voivodeship), with a special focus on cities and suburban areas, and

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to evaluate their potential impact on reducing spatial disproportions in the region's development. The study covers the territory of Lower Silesia Province. A more in-depth analysis was carried out for selected cities/towns and suburban areas which are leading for housing investments locations, selected by the number of dwellings completed. The study period of the years 2011-2017 was determined by availability of comparable data from the Local Data Bank of the Statistics Poland. The applied methodology includes a descriptive method, comparative analysis and simple statistical methods.

Significant development disproportions can be observed in the Province of Lower Silesia. The term dichotomy is often mentioned in the context of the region's development. The division applies to the northern part (the subregions of the City of Wrocław, Wrocław suburban region and Legnica and Głogów) and the south-western area (subregions of Wałbrzych and Jelenia Góra). The south-western part is characterised by much lower social and economic growth indicators, and consequently its lower investment attractiveness (see more, e.g. Korenik 2017; Zakrzewska-Półtorak et al. 2018). The paper presents the relations and feedbacks between a housing investment location and the social and economic development and growth.

Housing investments according to districts (*poviats*)

An analysis of the number of dwellings completed in residential and non-residential buildings, both new and extended ones, in Lower Silesia Province according to districts (Figure 1) was carried out as an introduction to the study. Between 2011 and 2017, the highest number of dwellings were placed into service in the capital of the province – Wrocław.

What is more, the share of Wrocław (the city with district rights) in the number of dwellings completed in the province's scale increased from 35.6% in 2011 to nearly 52% in 2017. After including Wrocław administrative district (strongly functionally connected with Wrocław) the share amounted to 49.2% in 2011 and was going up continuously until 2016 (65.7%), while in 2017 it stood at 62.6%. After adding the data for the Commune of Miękinia (located in the District of Środa Śląska) bordering on Wrocław to the west (strongly functionally connected with Wrocław, too), which was leading for housing investments locations among all the communes in Lower Silesia Province – almost 1,500 dwellings completed between 2011 and 2017[1] – the share (of Wrocław with the suburban area) increased to over 50% in 2011, while in 2017 it amounted to around 65% in the scale of the region.

It suggests a fairly strong concentration of housing investments in Wrocław and its suburban area, mainly as a result of intensive influx of people. Between 2011 and 2017,

[1] For comparison, in the same period in the cities with district rights: Legnica approx. 1,600 and in Jelenia Góra a little over 1,100 dwellings were completed. There were 96 dwellings per 1,000 inhabitants completed in Miękinia in the years 2011-2017, while approx. 75.5 in Wrocław, approx. 16 in Legnica and about 14 in Jelenia Góra.

Fig. 1. Number of dwellings completed in residential and non-residential buildings, new and extended ones, between 2011 and 2017, according to districts in Lower Silesia Province

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

the population in the area (the City of Wrocław, the administrative district of Wrocław and the Commune of Miękinia altogether) increased by over 29,000, i.e. by about 3.8%, whereby only in the City of Wrocław the population number grew by over 1%, in the administrative district of Wrocław by over 16%, while in the Commune of Miękinia by nearly 15%.[2] In the case of residential investments in Wrocław and its suburban area, income (capital and/or current) determinants prevailed. It means people would buy another flat to earn on it. The influx of people, resulting from dynamically developing labour market was the factor which decided about the choice of the location.

In the scale of the region there are also other cities/towns which are fairly attractive for housing investments. They can partly compensate for the disproportions in the spatial development of Lower Silesia Province. It can be of even greater importance since housing investments not directly intended to bring profit remained outside the Wrocław impact area. In this case, flats or houses were purchased for people's own needs. Highly attractive tourist towns, such as Karpacz and Szklarska Poręba were the exceptions, where investment determinants prevailed. Buying a flat for oneself and connecting one's future with the particular area can greatly contribute to the development of these areas (development of entrepreneurship, higher attractiveness of the labour market, etc.). The investments made in the cities/towns analysed together with their suburban areas result in moderate dominance of the following districts: Oława, Oleśnica and Trzebnica (the total for the period 2011-2017) and the Districts of Jelenia Góra, Oława, Oleśnica and Świdnica (according to the data of 2017), besides the dominant Wrocław and the administrative district of Wrocław. The data are presented in Figure 1. Details of housing investments in the cities/towns and their suburban areas are presented in Item 3.

The dominance of Wrocław and its suburban area was a bit lower when the floor space and not the number of new dwellings were taken into account. The share of the capital of the province in the usable floor space of dwellings newly placed into service amounted to about 24% in 2011 and over 37% in 2017 in the scale of the region (see Figure 2). The share of Wrocław administrative district decreased then from 18% to 16.5%. Other districts with a fairly high share in 2017 included the City of Jelenia Góra with Jelenia Góra District, the districts of: Oleśnica, Świdnica, Bolesławiec, Oława and the City of Legnica with the District of Legnica; their individual shares ranged from 3 to 4% of the floor space of dwellings completed in the scale of the region. The Districts of Oleśnica, Lubin, Trzebnica and Oława were characterised by a fairly high share (of 4.5–5.3%) in 2011.

The size of the purchased floor space greatly depended on the price per 1 m^2 to be paid. Figure 3 presents the average prices per 1 m^2 of a dwelling, according to data from market transactions in the period 2015-2017, obtained from the Register of Property Prices and Values for different districts (the period was reduced due to the fact that comparable data were not available). Besides some exceptions on the primary market

[2] According to data from the Local Data Bank of the Statistics Poland.

Note: The data of 2013 instead of 2011 were given for Walbrzych City and Walbrzych District; in 2013 the City of Walbrzych regained its status of municipality with district rights.

Fig. 2. The share of floor space of dwellings newly completed in Lower Silesia Province according to districts in 2011 and 2017 (in %, Lower Silesia = 100%)

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

Fig. 3. Mean price per 1 m2 of a dwelling according to market transactions in 2015-2017 according to districts in Lower Silesia Province (in PLN)

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

in the Districts of Jelenia Góra and Kłodzko, the mean prices on the primary market (except for Wrocław and the administrative district of Wrocław) did not exceed PLN 4,000 per 1 m^2. In Wrocław's administrative district the average price on the primary market was slightly higher and amounted to a bit less than PLN 4,200, while in the City of Wrocław it was much higher and amounted to about PLN 5,900. The aforementioned

exceptions in the Districts of Kłodzko and Jelenia Góra applied to the sales of luxurious apartments in highly attractive tourist places. In the District of Kłodzko they were mainly apartments with areas up to 60 m^2, the same was true for the District of Jelenia Góra, but there were a few transactions for flats up to 80 m^2.[3]

The prices on the secondary market were much lower. The average price per 1 m^2 on the secondary market constituted about 64% of the mean price on the primary market. The most similar prices for the two market types were observed in the Districts of Wrocław (the average price on the secondary market amounted to 93% of the primary market price), Oława and Jawor (about 89%, respectively), while the biggest differences were observed in the Districts of Kłodzko (the average secondary price market was 29% of the primary market prices) and Jelenia Góra (37%).

The average prices per 1 m^2 ranged in Lower Silesia Province in the study period from PLN 1,500 in the Communes of Kamienna Góra and Lwówek Śląski to over PLN 5,400 in the City of Wrocław and nearly PLN 4,100 in Wrocław's administrative district. The paper, however, focuses on primary market transactions, i.e. the ones related to new housing investments.

Residential attractiveness of cities/towns and suburban areas

Location of housing investment is a testimony to residential and economic (as well as tourist) attractiveness of the area. Economic and social factors play the dominant role, followed by nature factors – their significance increases in cities/towns and suburban areas with tourist advantages (see e.g. Ledzion-Trojanowska 2005; Uhruska 2008; Foryś 2009). In the studied region, it mattered mainly for mountainous areas. Other important aspects analysed when making a decision on a housing investment (both on the supply and demand side) include the condition of local economy with a special consideration for the labour market, transport infrastructure, other technical infrastructure as well as social and institutional infrastructure.

Taking into account the residential attractiveness of the towns in Lower Silesia Province, except for the dominating Wrocław, the following towns including their suburban areas stand out in the region, according to the number of dwellings newly placed into service: Lubin, Legnica, Jelenia Góra, Oława, Głogów, Oleśnica, Trzebnica, Bolesławiec and Świdnica. Figure 4 includes the other two towns (with their suburban areas) located in the Wrocław's suburban area: Siechnice and Kąty Wrocławskie.

The accumulated number of dwellings placed into service in 2011-2017 in all the towns exceeded 1,300, while in Wrocław alone, it was nearly 48,200 dwellings. Siechnice ranked the first (being actually a suburban area of Wrocław), followed by the highly ranked towns of Lubin, Legnica, Jelenia Góra, Oława and Głogów which can become growth centres that will reduce spatial disproportions in the social and economic devel-

[3] According to data from the Local Data Bank of the Statistics Poland.

Fig. 4. Towns and their suburban areas, except Wrocław, leading for the number of dwellings completed in Lower Silesia Province (accumulated number for the period 2011-2017)

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

opment of the region. Lubin, Legnica and Głogów are the towns of the Legnica-Głogów Copper District located in the centre (Legnica) and to the north of the province (Lubin, Głogów). However, a negative balance of population migration in the towns, analysed together with their suburban areas is a worrying phenomenon. The towns of Oława, Oleśnica and Trzebnica partly remain in the impact area of Wrocław. Still, there are no strong centres in the south and west of the province (except Jelenia Góra, in which case the suburban area was more dominant than the city itself) demonstrating development trends. In Figure 4, only Bolesławiec and Świdnica are included for this part of the region, besides Jelenia Góra. The number of new dwellings placed into service in the towns and their suburban areas ranged from about 1,330 to about 1,450. Szklarska Poręba was fairly often chosen due to its tourist attractiveness. The accumulated number of flats exceeded 930, whereby the year 2017 dominated with over 400 flats placed into service in the town.[4]

Due to the fact that housing investment was too low therein, Figure 4 does not include the following cities/towns (analysed together with the suburban area): Wałbrzych (a population of 129,000 as of the end of 2017, and the accumulated value for the period 2011-2017 slightly over 700 new flats), Kłodzko (population of about 44,500 and about 550 new flats) and Dzierżoniów (population of about 42,800 and about 500 new flats). They are towns with a potential to become new growth centres in the future, but their impact in the near future will not be too strong due to fairly low residential attractiveness for the time being. The changes in the number of inhabitants presented in Item 4 are there to confirm it.[5]

[4] According to data from the Local Data Bank of the Statistics Poland.
[5] According to data from the Local Data Bank of the Statistics Poland.

When analysing the data for cities/towns, the significant share of suburban areas in the number of new dwellings placed into service needs to be emphasized. For Jelenia Góra it was over 50%, while for Oleśnica and Lubin over 40%. The share of suburban areas is presented in Table 1.

Table 1

The share of the suburban area in the number of dwellings newly placed into service in selected cities/towns of Lower Silesia Province in the period 2011-2017 (accumulated value, in%, city/town with the suburban area = 100%)

The city/town	Share of the suburban area
Jelenia Góra	53
Oleśnica	44
Lubin	43
Trzebnica	36
Świdnica	35
Bolesławiec	34
Głogów	33
Legnica	32
Oława	21

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

Rural communes perceived as most attractive to live in the scale of the province include the communes located in Wrocław suburban area, in Wrocław administrative district, especially the Communes of Czernica, Długołęka and Kobierzyce, and the District of Środa Śląska in the Commune of Miękinia. Between 2011 and 2017, the total number of new dwellings completed amounted to the following: in the Commune of Długołęka over 3,800, the Commune of Kobierzyce – almost 1,850, the Commune of Czernica – over 1,800, and nearly 1,500 in the Commune of Miękinia. The mean usable floor space in the communes was about 120 m^2. For comparison, in the Town of Siechnice, similarly to Wrocław, it was much lower – about 60 m^2.

Towns leading for housing investment locations versus population, unemployment and business activity

Changes in the population number are an important aspect. Due to a limited volume of the study, the balance of population migration (internal and foreign) in the years 2016-2017 was taken into account. The data are purposefully presented separately for cities/towns and their suburban areas (see Table 2). The towns with a definitely posi-

tive balance include Kąty Wrocławskie, Oława, Siechnice, Trzebnica and Bolesławiec, namely towns (except Bolesławiec) in the impact area of Wrocław. There were many more suburban areas with a positive population balance, but only in some cases the balance highly compensated for the situation in the town. The cases include the suburban areas of Oleśnica and partly Legnica and Lubin. There was also a separate category of rural communes situated close to the capital of the province, attractive for the coming population: Długołęka and Miękinia.

Table 2

Balance of population migration in 2016-2017 (number of people)

The city / the town / the suburban area	Internal		Foreign	
	2016	2017	2016	2017
Bolesławiec	36	23	5	10
Bolesławiec suburban area	38	106	4	6
Długołęka	844	962	0	10
Dzierżoniów	–56	–3	–43	–10
Dzierżoniów suburban area	5	8	–36	–13
Głogów	–412	–315	4	4
Głogów suburban area	120	71	6	5
Jelenia Góra	–4	69	–29	–36
Jelenia Góra suburban area	114	95	–5	7
Kąty Wrocławskie	56	104	0	1
Kąty Wrocławskie suburban area	288	513	10	7
Kłodzko	–80	–74	0	6
Kłodzko suburban area	44	36	–25	–6
Legnica	–169	–271	26	31
Legnica suburban area	188	141	3	–4
Lubin	–310	–310	19	7
Lubin suburban area	255	286	3	–17
Miękinia	285	428	–1	9
Oleśnica	–35	–55	9	10
Oleśnica suburban area	140	122	3	4
Oława	117	90	16	6
Oława suburban area	39	23	–7	3
Siechnice	234	209	10	9
Siechnice suburban area	257	211	7	11
Świdnica	–145	–150	–10	–59
Świdnica suburban area	53	90	–7	–16

Table 1 contd.

The city / the town / the suburban area	Internal		Foreign	
	2016	2017	2016	2017
Trzebnica	99	69	3	7
Trzebnica suburban area	155	123	5	4
Wałbrzych	–319	–271	4	7
Wałbrzych suburban area	57	25	9	1
Wrocław	1,063	1,029	425	357

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

Attractive areas were the ones characterised by a relatively low unemployment rate. In the Commune of Kąty Wrocławskie per 1,000 working age population there were about 14 unemployed, including fewer than 6 long-term unemployed, in the Commune of Siechnice – fewer than 15, including fewer than 6 long-term unemployed (Figure 5). Oława and Głogów close the ranking of the studied towns with suburban areas. In the case of these two towns, the total number of the unemployed per 1,000 working age population was over 3-times higher than in the leading communes and amounted to about 48-49 people, while the number of long-term unemployed was over 4 times higher (27-28 people).

In all of the studied towns, the share of working age population did not exceed 61% of the total population, except Siechnice (64%). It was much higher in the suburban areas – about 63-64%, while the highest (65.6%) in the rural Commune of Oleśnica.

The lowest number of the long-term unemployed against the number of working age population was reported in Siechnice and Kąty Wrocławskie, which confirms the attractiveness of residential locations in the Wrocław urban area. Other towns includ-

Fig. 5. The number of the unemployed per 1,000 of working age population in towns, including suburban areas in 2018 (ranked according to the long-term unemployed)

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

ing suburban areas with a fairly small share of the long-term unemployed and the unemployed in total included: Bolesławiec, Oleśnica, Lubin and Trzebnica. A fairly high share of the unemployed of both categories was observed in Oława and Głogów, which weakens the position of the towns within housing attractiveness in the years to come. In the case of Głogów one should remember the additional negative balance of population migration, which is not sufficiently compensated for with a positive balance in the suburban area, as it happened in the majority of the studied towns in the period 2016-2017 (see Table 2). A particularly unfavourable ratio of the long-term unemployed to the unemployed in total in 2018 was observed in Głogów (the ratio of about 60%), Oława, Legnica (over 50%) and Jelenia Góra (nearly 50%); for comparison – in Bolesławiec it was slightly over 32%, while in Oleśnica about 36%.

The last of the analysed variables was the gain in the number of newly-registered business entities between 2011 and 2018 per 1,000 inhabitants (Figure 6). Besides Wrocław, the highest index was observed in the following towns (including the suburban area): Siechnice (110), Kąty Wrocławskie and Jelenia Góra (about 94), while a higher index occurred in the rural Communes of Kobierzyce (119), Czernica (105) and Długołęka (102).

Fig. 6. Newly-registered business entities between 2011 and 2018 per 1,000 inhabitants

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

The residential attractiveness and the development status and potential of the cities and towns and their suburban areas are evaluated in Table 3. The first quarter of the table includes entities characterised by a high intensity of housing investments com-

pleted and a good social and economic condition. There are 4 towns of that kind. The second quarter of the table presents towns which are attractive as housing locations and which can develop in the near future based on their potential. This is the most numerous group. None of the towns was classified for the third quarter, while two towns with a fairly low housing attractiveness and low chances for development in the next few years can be found in the fourth quarter of the table.

Table 3

Studied towns and their suburban areas classified for their residential attractiveness and the current and potential development

1. High housing attractiveness and development	2. High housing attractiveness and development opportunities in the coming years
Siechnice Oława Kąty Wrocławskie Oleśnica	Jelenia Góra Lubin Bolesławiec Trzebnica Legnica Świdnica
3. Low housing attractiveness and development	4. Low housing attractiveness and low development opportunities in the coming years
—	Kłodzko Dzierżoniów

Source: own elaboration.

Głogów was not included in the classification – it is characterised by high residential attractiveness but a low development potential (population changes, unemployment, new registered business entities). Wałbrzych is the opposite – its residential attractiveness is low but the development potential relatively high (the weakness is the decline in the population). Finally, one should highlight high housing attractiveness and the development level and potential of the following rural communes: Długołęka, Czernica, Kobierzyce and Miękinia.

Conclusions

The purpose of the paper was to present location of housing investments in Lower Silesia Province, with a special consideration for cities/towns and their suburban areas, and evaluation of their potential impact on reducing spatial disproportions in the development of the region. In the region strongly dominated by Wrocław and with a dichotomous division into the northern and south-western parts, towns located outside the typical growth area find it hard to get better results. The typical growth area includes Wrocław and the Wrocław subregion. Moreover, the towns situated in the Legnica and Głogów subregion also reveal unfavourable trends re-

lated to population migration or unemployment. In the studied period they were characterised by a higher residential attractiveness than the current development potential, which does not mean the situation would not improve in the years to come (towns: Lubin, Głogów and Legnica). Jelenia Góra in the southern part of the region was in the same situation. Bolesławiec, in turn, had a higher development potential than residential attractiveness. The towns which may in future strengthen their position include: Świdnica, Wałbrzych, Dzierżoniów and Kłodzko. They can contribute to reduction in the spatial disproportions in the region. However, Jelenia Góra and Bolesławiec may play such a role in the near future owing to the development of housing investments.

According to the theory of polarisation, the occurrence of subsequent growth poles may contribute to the development of a region as a whole, simultaneously reducing spatial disproportions in the income and living conditions (Myrdal 1957). Some of the presented towns can play such a role owing to new areas attractive for housing. Still, a worrying phenomenon of urban sprawl can be observed – suburban areas attract the majority of investments and are the main places of population influx. Relating to the concept of endogenous development (Romer 1994), it needs to be stated that beside the areas in the direct vicinity of Wrocław, taking benefits of the so-called location rent, the areas with favourable endogenous factors (infrastructure, condition of local economy, culture and natural advantages, local policy, etc.) and having good prospects for maintaining the current economic growth rate were attractive from the housing point of view.

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FINANCIAL PROGRESS OF INTEGRATED TERRITORIAL INVESTMENTS – A CASE STUDY OF KIELCE FUNCTIONAL AREA

POSTĘP FINANSOWY ZINTEGROWANYCH INWESTYCJI TERYTORIALNYCH NA PRZYKŁADZIE KIELECKIEGO OBSZARU FUNKCJONALNEGO

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ABSTRACT: The level of spending of funds under the Integrated Territorial Investments of Kielce Functional Urban Area (KFA's ITIs) varies depending on the individual fund. The level of contracting of funds is higher under the European Regional Development Fund (ERDF), while in the case of their certification there is an advantage of the European Social Fund (ESF). The difference between the value of contracted and certified funds is evident. Financing projects from structural funds on the average exceeds 80% of the project value. The implementation of the instrument proceeds correctly from the point of view of spending the funds. The analysis of contracting of the funds in individual years indicates a delay in the implementation of programmes, which is not an exception in the entire Regional Operational Programme for Świętokrzyskie Voivodeship 2014-2020 (ROP SV 2014-2020). The author deals with the issue of financing the Integrated Territorial Investments (ITIs) in the EU perspective 2014-2020.

KEY WORDS: Integrated Territorial Investments, contracting, certification

ABSTRAKT: Poziom wydatkowania środków w ramach ZIT KOF jest zróżnicowany w zależności od funduszu. Poziom zakontraktowania środków jest wyższy w ramach EFRR, natomiast w przypadku ich certyfikacji występuje przewaga EFS. Widoczna jest różnica pomiędzy wartością środków zakontraktowanych i certyfikowanych. Finansowanie projektów z funduszy strukturalnych średnio przekracza 80% wartości projektu. Wdrażanie instrumentu przebiega prawidłowo z punktu widzenia wydatkowania środków. Analiza kontraktacji środków w poszczególnych latach wskazuje na opóźnienie względem rozpoczęcia realizacji programów, co nie jest wyjątkiem w skali całego RPO WŚ 2014-2020. Autor podejmuje problematykę finansowania ZIT w perspektywie unijnej 2014-2020.

SŁOWA KLUCZOWE: Zintegrowane Inwestycje Terytorialne, kontraktacja, certyfikacja

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Introduction

Integrated Territorial Investments (ITIs) emerged as a new instrument of the European Union's regional policy in the financial perspective 2014-2020. The functioning of this instrument will be continued under the next financial perspective of the Community, which is indicated by comments made during the work on the new budget. In the situation where the concept of not allocating resources in the whole area of a given region is well suited to supporting its development, ITIs are a tool supporting the main urban centre in the region together with its functional area. This – in turn – will positively influence the entire region. Structural funds in the form of the European Regional Development Fund and the European Social Fund make the main source of financing for the discussed instrument which is supplemented with funds from the state budget and own contribution.

The aim of this paper is to assess the level of spending funds under ITIs past the halfway point of the implementation of the financial perspective 2014-2020. The analysis covered two key financial indicators, namely the level of contracting of funds and the level of their certification. KFA's ITIs were accepted as a research area. The presented data illustrate the implementation status as of 31 December 2018.

The concept of Integrated Territorial Investments

In line with the territorial cohesion objective introduced by the Treaty of Lisbon, which recognizes the impossibility of achieving economic and social cohesion at European level without a stronger focus on the territorial impact of Community policies, the Common Provisions Regulation introduced new integration tools that could be used to implement territorial strategies in the field. ITIs are one of these tools linking thematic objectives defined in cooperation agreements and operational programs with territorial dimension (Cohesion Policy… 2014). ITIs belong to the instruments ensuring the substantive and territorial concentration of the intervention leading to its adaptation to the specificity of individual territories (Churski 2018). In accordance with the assumptions of the EU regional policy maintaining that cities and their networks are to become links in the socio-economic development of countries and regions, urban functional areas became the main recipients of ITIs (Szafranek 2017). Rise and further development of urban functional areas is related to the multifaceted interpenetration of the city and its surroundings (Dziekański… 2018). Poland is an example of the positive impact of territorial potentials on the course of social and economic development processes after accession to the European Union, despite the situation of growing interregional and regional differences (Szlachta 2018).

ITIs are of fundamental importance to the implementation of urban policy in Poland (Kuźnik 2015). They were focused on the functional areas of eighteen provincial cities, which forces a cooperation of territorial self-government units located in such areas both in the sphere of identification of joint projects and in the area of strategic develop-

ment programming (Szlachta 2018). The functioning of ITIs is based on a special allocation in each of the 16 Regional Operational Programs, and indirectly on the principle of complementarity of projects on the Infrastructure and Environment Operational Program (IE OP) (Serwis… 1a 2019) and the Eastern Poland Operational Program (EP OP) (Serwis… 1b 2019), which assumes the implementation of truly integrated projects financed from various sources (Zintegrowane… 2016). In practice, the level of support for a given Urban Functional Area (UFA) depends primarily on the number of its inhabitants (Kociuba 2018b).

The allocation for ITIs at the level of all ROPs in relation to the total allocation of individual funds for Poland is at least 5.2% of the allocation for the ERDF and 4% of that for the ESF 2.4%. ITIs are implemented obligatorily on the territory of voivodeship cities and areas related to them functionally (Programowanie… 2017). On the basis of decisions of voivodeship authorities, ITIs can also be implemented in regional and sub-regional centres (Kociuba 2018b). The objectives of the ITIs implementation in Poland are to promote a partnership model of cooperation between various administrative units in urban functional areas, increase the effectiveness of interventions through the implementation of integrated projects responding in a comprehensive manner to the needs and problems of cities and areas related to them functionally, and also to increase the impact of cities and related areas functionally in the form and manner of implementing activities supported on their territory under cohesion policy (Programowanie… 2017).

The launch of funds for the implementation of ITIs conditioned the need to establish an institutionalized form of partnership (establishment of the ITI Association) and prepare ITI Strategy. The establishment of the ITI unions was based mainly on two models of territorial management in ITIs implementation: the "in-term" model, usually in the form of an agreement and the "cooperation" model, usually in the form of an association. It is difficult to clearly determine which of the models is more effective. Considering the current contracting of ITIs under ROPs, the ITI unions functioning in the form of associations show better results (Kociuba 2018a).

ITI associations perform the function of a joint representation of city authorities and areas related to them functionally towards national and regional authorities. ITI Strategy is a basic document in the field of providing support from activities implemented in the ITIs concept under the ROP, defines integrated actions to solve economic, environmental, climate, demographic and social problems affecting urban areas (Kociuba 2017). The strategy is the basis for the participation of the ITI Association in the process of managing and implementing the ROP, to the extent agreed with the Managing Authority of the Regional Operational Program (MA ROP). It indicates the areas of intervention, under which it is planned to implement projects complementary to the activities provided for in the ITI concept, financed from other sources. The strategy prepared by the ITI Association also contains the principles for the selection of projects for the ITIs, verified with the objectives and principles of the program by the MA ROP. The

detailed scope of tasks performed by the ITI Association is concluded by an agreement between the ITI Association and the competent MA ROP (Programowanie… 2017).

Support for projects implemented under ITIs mainly includes (Zintegrowane… 2016):

– sustainable development, efficient transport linking the city and its functional area,
– restoring the socio-economic functions of degraded areas of the urban functional area,
– improvement of the natural environment in the functional area of the city,
– support for energy efficiency and promotion of low-carbon strategies,
– strengthening the development of symbolic functions building the international character and supra-regional importance of the urban functional area, and improving the accessibility and quality of public services in the entire functional area,
– strengthening research, technological development and innovation.

The final scope of thematic objectives and investment priorities for implementation with the use of ITIs may include a broader thematic catalogue, which is chosen by the ITI Association, deciding on at least two of the indicated directions of intervention (minimum two thematic objectives) (Programowanie… 2017). However, the analyses carried out in the scope of implementation of project types suggest the short-sightedness of ITI beneficiaries in terms of building a competitive advantage. This is manifested in the purchase of new buses and trams, covering public buildings in Styrofoam and purchase of new educational programs for pupils without investments in modern equipment and facilities in schools (Kociuba 2018a).

In the 2014-2020 programming perspective, the Integrated Territorial Investments in Poland are implemented in 24 functional areas, including 17 areas of voivodship cities and 7 functional areas of regional/sub-regional cities in four provinces (Zintegrowane… 2016).

Kielce Functional Area

The designation of Kielce Functional Area (KFA) took place at two stages. The first consisted in the analysis of indicators accepted by the Ministry of Regional Development (MRD). At the second one, construction traffic in communes was analyzed in detail, taking into account in particular the extent of suburbanization (Kociuba 2017b). The basis for the development of KFA's ITI Strategy was the agreement signed by the Marshal of Świętokrzyskie Voivodeship representing the MA of the ROP SV 2014-2020 and the Mayor of the City of Kielce representing IP ITI, finally specifying the number of units included in the ITI programme at the 12th Kielce Functional Area in connection with the above, they are formed by Kielce, the Town and Commune of Chęciny, the Town and Commune of Daleszyce, the Commune of Górno, the Commune of Masłów, the Commune of Miedziana Góra, the Town and Commune of Morawica, the Commune of Piekoszów, the Commune of Sitkówka-Nowiny, the Commune of Zagnańsk, the Commune of Strawczyn and the Town and Commune of Chmielnik.

The last two local government units were attached to KFA at the request of the City of Kielce and approved by a resolution of the Board of the Świętokrzyskie Voivodeship (Porozumienie w… 2015).

KFA belongs to the smaller functional areas in the country. In order to present the synthetic characteristics of the area, commonly presented data on the population, labor market and environmental protection were presented. Taking into account the population according to the actual place of residence, the population in KFA in 2012-2018 was stable. In 2012, the number of KFA residents was 340 177, and in 2018 it slightly decreased reaching 339,377 inhabitants.[1] This result should be interpreted positively against the background of a high negative migration balance in Świętokrzyskie Voivodeship (in 2012-2018, the population dropped by 32 449 people), the Functional Area of Kielce maintains a stable population, but it fails to attract new non-KFA residents, which in the long term may pose a threat to this area. The average level of unemployment for the voivodship amounted to 8.3% in 2018 (16.0% in 2012) and is at a level higher than the national average of 5.8% (13.4% in 2012). At the county (*poviat*) level, the unemployment rate was 5.4% (10.7% in 2012), which is relatively low and remains below the national average. However, in Kielce County, where other KFA communes lie, the unemployment rate is quite high, amounting to 10.9% (19.7% in 2012), which significantly exceeds the average level of unemployment in the voivodeship. When comparing the years 2012 and 2018, it can be concluded that the unemployment level has fallen, while the same proportions between the unemployment rate in the country, the region and KFA have not changed. The number of entities entered into the REGON register for 10,000 inhabitants on average in Poland in 2012 amounted to 1032, the average for Świętokrzyskie Voivodeship was 848. Within KFA, the entrepreneurship rate higher than the national average can be observed only in Kielce (1420), and higher than the average of the voivodeship in: Sitkówka-Nowiny, Masłów, Miedziana Góra and Morawica. Referring data for 2012 to those for 2018, it can be stated that the indicator has grown both on the national and provincial levels as well as on that of units composing KFA.[2] However, when analysing the relations between indicators, they have not changed in comparison with 2012. An exception here is the Commune of Daleszyce, which joined the group of communes whose index came above the provincial average in 2018. The entrepreneurship rate for KFA is low, which in connection with the high unemployment rate indicates significant problems of the economic development of the functional area. The situation of KFA municipalities in the scope of basic technical infrastructure is diversified. The situation is good in the area of the water supply network, where in 11 out of 12 communes, more than 94% (Poland – 92.1%, Świętokrzyskie – 91.4%) of the population use the water supply network, and in 3 communes, the index reached 99.9%. However, in relation to the

[1] According to data from the Local Data Bank.
[2] According to data from the Local Data Bank.

level of sewerage, the differences between the KFA municipalities are already very clear and range from 31.4% to 89.8% of the population using the sewage network (Poland – 70.8%, Świętokrzyskie – 59.0%).[3] The availability of Kielce with the use of different means of transport is different for all communes of the functional area (Strategia Zintegrowanych… 2016).

The greatest strategic challenge for KFA is economic development and increased competitiveness, which is an important element in connection with the research conducted in this area (Pawlik… 2017).

Areas of support and the state of using the KFA ITIs funds

The framework conditions covering the territorial shape of the area of cooperation should result from the diagnosis of real functional connections, and at the same time take into account the existing structures of cooperation (Janas… 2017). The main goal of ITIs is to improve the quality of life of residents and economic development of Kielce Functional Area. On the other hand, the following strategic objectives have been separated (Strategia Zintegrowanych… 2016):

– improving the conditions for the development of entrepreneurship and the creation of jobs,
– improving transport accessibility and road safety,
– developing health, social and educational offer, including improvement of teaching quality,
– increasing the tourist attractiveness of KFA,
– improving energy efficiency and investments in renewable energy sources.

As a result of signing a relevant agreement, the Intermediary Institution ITI was entrusted with the implementation of tasks related to ITIs, and included in the ROP 2014-2020, which covered the ERDF Priority Axis 6 and under the ESF, selected sub-Actions of Priority Axes 8, 9 and 10 (Porozumienie w… 2015). In each of the activities/sub-measures implemented under the ITIs, a national contribution is planned, its participation being diversified depending on the area of support (Regionalny Program… 2018).

Projects within the ROP SV 2014-2020 allocation for ITIs are implemented in competition mode (priority axes 8, 9, 10 and action 6.5) and non-competition mode (priority axis 6 except 6.5 action). The procedure for their selection has been specified in the Agreement and the ITI Strategy. The units participating in the appraisal and implementation process are Kielce Municipal Office acting as the Intermediate Institution on the part of ITIs and the departments of the Marshal's Office, involved in the implementation of the Program, and the Voivodeship Labour Office, acting as the Intermediate Institution for the 10 ROP axes.

[3] Data for 2017 according to the Local Data Bank.

Fig. 1. Contract status of ITIs voivodeship capitals in Poland as of 27 November 2018

Source: own study based on data from the Ministry of Investment and Development.

The choice of contracting period presented in Figure 1 determined the possibility of obtaining data. The data presented in it make a reference to a detailed contracting and certification analysis covering KFA's ITIs. As can be seen in the diagram, the level of Functional Urban Areas of Voivodeship Capital (FUA VC) contracting in the country is diverse. At KFA's ITIs, this level is among the highest in the country.

According to the data presented in Table 1, the largest number of contracts were signed under measure 6.2; however, the highest value belongs to contracts signed under 6.4, which also have the highest value of over PLN 127 million of two contracts. A higher average value is shown by contracts implemented under the ERDF, which results from the type of investments characterized by high capital intensity. Analysing the above table, one can also indicate a different level of use of individual activities/sub-measures. The lowest level of utilization in the 08.05.04 operation is the result of a very small value of contracts signed under one of the already announced competitions, while the competition for 2019 is planned to be announced in the entire remaining allocation (Harmonogram naborów… 2019). In the case of two sub-measures, contracts were signed for a value exceeding the planned allocation.

Table 2 shows the certification of expenses under KFA ITIs. There is a large diversity between the various activities/sub-measures. It is the result of different time of implemented projects and the method of spending funds. In the case of the ERDF, 17.23% of the funds were certified, much less than in the case of the ESF – 50.62%. It results from the method of expenditure settlement, where, in the case of ERDF, usually investment projects of payments are made as a refund after completion and settlement of the investment or after completion of a specific stage of investment implementation. On the other hand, the ESF functions in the form of an advance payment with regular expenses, as a rule, on a quarterly basis.

Table 1

Number and value of EU funds in contracts concluded under KFA's ITIs as of 31 December 2018 (in PLN thousand)

Action / Measure	Number of contracts	EU allocation*	EU co-financing in concluded contracts	% of use
06.01. Energy efficiency in the public sector	11	60 408.61	47 623.77	78.84
06.02. Promotion of low-emission strategies and sustainable urban mobility	18	49 017.61	44 917.87	91.64
06.03. Protection and use of valuable natural areas	8	43 151.90	24 100.70	55.85
06.04. Road infrastructure	2	111 471.81	108 286.53	97.14
06.06. Educational and training infrastructure	1	31 111.45	30 600.00	98.36
08.01.02 Increasing access to care for children under 3 years	3	2 115.04	1 779.88	84.15
08.02.03 Support for health prevention	3	9 466.16	4 898.42	51.75
08.03.06 Increase in the quality of general education	14	10 326.72	7 649.11	74.07
08.04.03 Improving the skills or qualifications of adults in the field of ICT and foreign languages through the implementation of bottom-up educational initiatives	12	6 454.20	5 767.37	89.36
08.05.04 Lifelong learning	4	6 454.20	1 719.08	26.64
09.02.02 Support for professional activity of people over 29 years of age who are unemployed	4	4 173.72	1 666.37	39.93
10.02.02 Support for professional activity of people over 29 years of age who are unemployed	9	10 757.00	12 709.36	118.15
10/04.02 Support for entrepreneurship development through the use of non-returnable instruments	3	11 617.56	14 176.02	122.02
Total ERDF	*40*	*295 161,38*	*255 528.87*	*86.57*
Total ESF	*52*	*61 364.60*	*50 365.60*	*82.08*
TOTAL	92	356 525.98	305 894.46	85.80

* The Euro rate used to convert the allocation: 4.3028 of January 2019, based on InforEuro.

Source: own study based on data from the Marshal's Office of Świętokrzyskie Voivodeship.

Analysing the spending of funds under ITIs, and hence the wider European resources, attention should be paid to two different categories, namely contracted and certified funds. We talk about contracted funds at the moment of signing the contract, while certified funds are already accounted for and transferred to the European Commission. Analysing the contracted means, we have a picture of funds that will be spent in the future, which gives us an idea of the funds available. Whereas certified expenses present completed and settled projects, also these expenses will be taken into account

Table 2

Value of certified expenses until 31 December 2018 (in EUR)

Action / Measure	UE allocation	EU certified expenditure	% of certification
06.01. Energy efficiency in the public sector	14 039 372	6 643 754	47.32
06.02. Promotion of low-emission strategies and sustainable urban mobility	11 392 027	2 398 322	21.05
06.03. Protection and use of valuable natural areas	10 028 794	1 227 380	12.24
06.04. Road infrastructure	25 906 807	1 527 981	5.90
06.06. Educational and training infrastructure	7 230 513	20 227	0.28
08.01.02 Increasing access to care for children under 3 years	491 550	63 135	12.84
08.02.03 Support for health prevention	2 200 000	644 971	29.32
08.03.06 Increase in the quality of general education	2 400 000	1 025 514	42.73
08.04.03 Improving the skills or qualifications of adults in the field of ICT and foreign languages through the implementation of bottom-up educational initiatives	1 500 000	48 513	3.23
08.05.04 Lifelong learning	1 500 000	47 664	3.18
09.02.02 Support for professional activity of people over 29 years of age who are unemployed	970 000	209 179	21.56
10.02.02 Support for professional activity of people over 29 years of age who are unemployed	2 500 000	2 249 184	89.97
10/04.02 Support for entrepreneurship development through the use of non-returnable instruments	2 700 000	2 930 840	108.55
Total ERDF	*68 597 513*	*11 817 664*	*17.23*
Total ESF	*14 261 550*	*7 219 001*	*50.62*
TOTAL	82 859 063	19 036 664	22.97

Source: own study based on data from the Marshal's Office of Świętokrzyskie Voivodeship.

in the final settlement of the financial perspective 2014-2020. It can be estimated that the time between signing a contract and its final settlement is about 2 years for projects co-financed by the ESF, whereas for ERDF the duration of a given project will depend on its specificity. Therefore, comparing Table 1 and Table 2, we see large discrepancies. It should also be emphasized that the end of 2018 was a measure of the financial perspective, and therefore certification should increase, while the scale of signed contracts decreased. It is not without significance the postponing of the commencement of spending, which was dictated by the late date of signing the ROP 2014-2020 and, consequently, delays in announcing competitions.[4] This shift is clearly visible in Figure 2.

[4] First competitions were announced in July 2015.

Fig. 2. Value of the EU funds in agreements signed under KFA's ITIs in the years 2014-2018 (in PLN million)
Source: own study based on data from the Marshal's Office of Świętokrzyskie Voivodeship.

As part of the ERDF, contracts were signed in 2017 and 2018, and in most cases virtually all available allocation was contracted. In the case of the ESF, the situation is more diverse. In the case of the X axis, funds exceeding the planned allocation were contracted. The lowest level of contracting was achieved in Sub-measure 08.05.04. It should be noted that in 2019, it was planned to publish competitions as part of KFA's ITIs for a total amount of co-financing from the ESF over PLN 12.6 million.[5] The above chart also graphically presents the value of ERDF and ESF funds allocated to the ITIs, in the proportion of which a large ERDF allocation can be seen.

Table 3

Financing structure for projects signed as part of KFA's ITIs until 31 Dec. 2018

Action/measure	Value of contracts (in thousands of PLN)	% of participation		
		UE funds	State budget	Own contribution
06.01. Energy efficiency in the public sector	57 058.24	83.47	4.84	11.69
06.02. Promotion of low-emission strategies and sustainable urban mobility	53 153.65	84.51	0.00	15.49
06.03. Protection and use of valuable natural areas	29 133.04	82.73	0.00	17.27
06.04. Road infrastructure	127 395.92	85.00	0.00	15.00
06.06. Educational and training infrastructure	36 000.00	85.00	7.98	7.02
08.01.02 Increasing access to care for children under 3 years	2 191.81	81.21	0.00	18.79
08.02.03 Support for health prevention	5 762.84	85.00	4.74	10.26
08.03.06 Increase in the quality of general education	9 044.91	84.57	1.12	14.32

[5] The amount has been calculated on the basis of the Schedule for the call for proposals under the competition procedure for 2019 for ROP SV 2014-2020

Table 3 contd.

Action/measure	Value of contracts (in thousands of PLN)	% of participation		
		UE funds	State budget	Own contribution
08.04.03 Improving the skills or qualifications of adults in the field of ICT and foreign languages through the implementation of bottom-up educational initiatives	6 785.14	85.00	4.99	10.01
08.05.04 Lifelong learning	2 022.44	85.00	5.77	9.23
09.02.02 Support for professional activity of people over 29 years of age who are unemployed	1 960.44	85.00	7.22	7.78
10.02.02 Support for professional activity of people over 29 years of age who are unemployed	15 869.02	80.09	7.42	12.49
10/04.02 Support for entrepreneurship development through the use of non-returnable instruments	16 677.67	85.00	12.16	2.84
Total ERDF	*302 740.85*	*84.41*	*1.86*	*13.73*
Total ESF	*60 314.27*	*83.51*	*6.92*	*9.57*
TOTAL	363 055.12	84.26	2.70	13.04

Source: own study based on data from the Marshal's Office of Świętokrzyskie Voivodeship.

Table 3 above presents the financing structure of concluded contracts. In all cases, the financing from the structural funds exceeds 80% of the project value, and in the case of 7 measures/sub-measures it is the maximum permissible amount of 85% (Pietrowski 2018). Despite the limited value of the co-financing projects from the state budget, it is worth paying attention to its higher value in projects co-financed under the ESF (almost 7%), with a value not exceeding 2% in ERDF projects.

Apart from ROP SV 2014-2020, as part of complementary investments for KFA ITIs, there were no projects under the Infrastructure and Environment Operational Program (IE OP), while projects implemented under the Eastern Poland Operational Program (EP OP) are presented in Table 4.

Table 4

Complementary projects for KFA's ITIs co-financed under the EP OP 2014-2020 (in PLN)

Beneficiary's name	Number of projects	The value of projects	ERDF co-financing
Kielce Commune	2	337 580 402.03	251 761 007.09
Kielce Commune / Kielce Technology Park	1	7 997 622.74	6 485 969.49
Świętokrzyskie Voivodeship	4	254 991 862.49	197 851 004.14
Total	7	600 569 887.26	456 097 980.72

Source: own study based on data from the www.mapadotacji.gov.pl

As part of the complementary projects, 6 concerned transport in the field of road development or urban transport development. Only the project implemented by Kielce Technology Park concerned support for business ideas.

Conclusions

The presented analysis shows that the financial progress of the instrument is good. Most of the funds have been contracted, the certification takes place with a time lag. Despite the postponement, there is no threat of not spending funds along with the year 2023 appearing on the horizon. The value of contracts signed until the end of 2018 and the allocation for contests planned to be announced in 2019 practically exhausted the established allocation. Possible measures remained from the savings created after the completion of projects. However, taking into account the author's professional experience, it can be said that they will be small and their distribution should not pose a problem.[6] One should also mention the influence of exchange rate fluctuations, which, according to the author, will have a small impact on the final settlement of available funds. This impact is the result of a broad period of time from the allocation planning to the competition, and the certification of expenditure from projects signed within this competition. Considering the contracting in other ITI VC, its level is high and classifies KFA's ITIs at the forefront of the country.

With the assessment presented, it should be added that the mere proper spending of the presented instrument is an element of its overall success. The result of incurring expenses are material effects that directly translate into economic development and improvement of the living conditions of a given area. Their progress is also subject to monitoring, while the timing of such monitoring should be relatively long due to the time shift of the effects of implemented projects (e.g. support for health prevention).

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STUDIA MIEJSKIE
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AN ATTEMPT TO INVESTIGATE THE IMPACT OF SELECTED INFRASTRUCTURE INVESTMENTS ON THE POTENTIAL DEVELOPMENT OF THE BIGGEST EUROPEAN CITIES. APPLICATION OF THE SHIFTING MODEL (INTERVENING OPPORTUNITIES MODEL TYPE)

PRÓBA BADANIA WPŁYWU WYBRANYCH INWESTYCJI INFRASTRUKTURALNYCH NA POTENCJALNY ROZWÓJ NAJWIĘKSZYCH MIAST EUROPEJSKICH. ZASTOSOWANIE MODELU PRZESUNIĘĆ (MODEL TYPU POŚREDNICH MOŻLIWOŚCI)

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ABSTRACT: The core of this article is a simulation of economic growth diffusion, based on the well-established Intervening Opportunities Model. The algorithm allowed detection of spatial distribution patterns of leading groups of beneficiaries from development of the Central Communication Port. The simulation experiments were conducted in two series: for predicting the impact of the Central Communication Port and the impact of both the Central Communication Port and Via Carpatia (also known as the New Amber Road) that is currently in development. The goal of this article is to answer the question: Which regions of Europe will benefit most from the development of the Central Communication Port? The results of the simulations confirm that European settlement and economic systems are inert in forming and conditioning zones of higher economic growth.

KEY WORDS: Shifting Model, Intervening Opportunities (model), Central Communication Port, Via Carpathia

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ABSTRAKT: Przedmiotem niniejszego artykułu jest symulacyjne badanie dyfuzji wzrostów gospodarczych, oparte na ugruntowanym modelu pośrednich możliwości. Użyty algorytm umożliwił detekcję wzorców rozkładu przestrzennego grup wiodących beneficjentów wymiany handlowej, realizowanej przez Centralny Port Komunikacyjny. Eksperymenty symulacyjne wykonano w dwóch seriach – dla prognozy wpływu działania Centralnego Portu Komunikacyjnego oraz dla działania CPK łącznie z budowaną jednocześnie Via Carpatia (czyli tzw. „Nowym Szlakiem Bursztynowym"). Celem niniejszego artykułu jest odpowiedź na pytanie: Które rejony Europy najwięcej zyskają na działaniu Centralnego Portu Komunikacyjnego? Osiągnięte przez nas wyniki eksperymentów symulacyjnych potwierdziły znaczną bezwładność systemu osadniczo-gospodarczego Europy w zakresie formowania i kondycji stref (klastrów) o najwyższym potencjale rozwojowym.

SŁOWA KLUCZOWE: Model Przesunięć, (model) Pośrednich Możliwości, Centralny Port Komunikacyjny, Via Carpatia

Introduction

In the relevant literature, it is possible to find many publications describing the impact of an airport on a city and regional economy (ACI Europe 2004; Huderek-Glapska 2012, 2017), as well as on an entire country (Hujer and Kokot 2001). Examples of modeling such issues can be found in the works by Huderek-Glapska et al. (2016) and Montalvo (1998). The topic of incorporating airports into intermodal transport networks can be found discussed in EUROSIL (2000), Huderek-Glapska (2010) and Laplace et al. (2004).

The announcement of plans concerning construction of the Central Communication Port (CCP) roused a lot of interest from public opinion, which should not be surprising, since the CCP expects to service one hundred million passengers a year – the number that can only be attributed to the airports in Atlanta (107.4 million) and Beijing (101 million), but none of the European airports has managed to reach this number so far.

In the first place, at the starting stage of the CCP's construction, it is supposed to service 45 million passengers a year. This would immediately place it as the fifth largest airport in Europe, right after Heathrow and Charles de Gaulle, which service around 60 million passengers every year, then Frankfurt (around 57 million) and Schiphol (around 51 million). It would be close to equal with Madrid's Bajras Airport (around 45 million) but larger than Munich's Airport (around 38 million).

In the European scale, however, it would have a large advantage: a possibility to grow and double its passenger flow. This is what makes the CCP such an extraordinary investment: a potential to become one of the largest airports in the world.

A transportation hub of such a magnitude, in Europe, is raising a lot of questions regarding preservation of the economic balance between member states of the European Union, and rightfully so. There are some who see a great chance in this (mainly Poland), but also countries like Germany – that perceive it as a powerful competitor in their own effort to develop Berlin's Airport.

All of the above chances and concerns would be put to rest if the plans for constructing the CCP were unrealistic. After all, we are not talking about an evolutionary

growth of the local, functioning establishment – but about creating a transportation hub of intercontinental importance in a very short period of time. In order for them to be realistic, a few very specific circumstances have to occur. Astonishingly, some of these (unlikely or even extreme) circumstances have already mateiralized. The Central Communication Port is planned as the intersection of the following two great international routes: New Silk Road and New Amber Road. Both mean to bind Chinese and European economies closer together. It would be difficult to find any reality for the CCP investment in Poland or Central Europe in general; however, if we consider it to be a terminal for the fast Chinese train route to Europe – our speculations about spatial diffusion of growth that may suddenly appear, might come out as a real, important, urgent and necessary subject.

Materials and methods

An outline of the concept of the Shifting Model by T. Zipser

The essence of this article is a study on diffusion of a change triggered by the impact of a large economic center like the CCP and on the creation of the New Amber Road infrastructure – currently being developed Via Carpathia motorway. If we approach the subject from this angle, the Shifting Model (S-Model), based on the "intervening opportunities" idea (De Grange et al. 2009; Stouffer 1940; CATS 1960; Zipser T. 1973, 1975, 1976; Zipser T. & Sławski 1988), becomes – in its Concentrating Diffusion Variant (Zipser T. 2009, 2012) – an accurate choice for the simulation model. It connects, in the simplest manner, three essential parameters of a settlement network, i.e.: development potential of the settlement nodes; distance estimated by travel difficulty; and a technological progress stage, reflecting the level of globalization (simplicity of economic contacts in contrast to the distance in space). Such a construct allows indicating the hierarchy of a certain economic center along with its respective nodes of even extensive settlement networks, with a relative ease. It must be mentioned, that the "intervening opportunities" approach was already used in research of an air transit (Long and Uris 1971).

While the "intervening opportunities" idea is currently almost a classic solution, the core of the Shifting Model – Concentrating Diffusion Variant (S-Model-CDV) does require some additional functional clarification.

In its initial iteration, a single node, regarded in the modeling procedure as a primary object of analysis, is assigned with the so-called "load of contacts". The other existing nodes are diversified by the amount of "load of contacts" they can receive (accept). The first iteration spreads the "load of contacts" upon the network (graph). This spread is being conducted according to the classic "intervening opportunities" procedure. The nodes receive different amounts of the "loads". In the following iterations, each portion of the "load" accumulated in each node, is distributed following the same principle (i.e. "intervening opportunities" approach).

A characteristic feature of the model's operation is that in the zero iteration the "load of contacts" is placed at one point (in our experiments it is the CCP). During the first few iterations the "load" is significantly dispersed. After the first major distribution-"diffusion", the modeling procedure spontaneously and very clearly endeavors to concentrate the "load of contacts" in a fewer and fewer number of nodes with each iteration. This means that the S-Model-CDV replicates the phenomenon of spontaneous production of clusters in the development process of the settlement network.

In economic studies, cluster is generally defined as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in a particular field that compete but also cooperate" (Porter 2000: 16). However, this definition is sometimes criticized (Martin and Sunley 2003: 5-35). There are also many other definitions of clusters (Doeringer and Terkla 1995: 225-237; Rosenfeld 1997: 3-23; Dijk 2003: 183-206; Fromhold-Eisebith and Eisebith 2005: 1250-1268).

It is crucial to define the specific term of a "cluster". By using it, we simply mean a spontaneous appearance of concentrations of the settlement system development. Concentrations, in which internal group relations (interdependence of direction and growth pace) and differences between groups (i.e. competition between the clusters), exhibited stability in all experiments and variants presented here. In this case, spatial potential of the cluster formation, is an emergent of settlement system activity – revealing itself in simulations as groups reacting to external, global changes in a combined, joint and simultaneous manner. In general clusters theory, this phenomenon can be a subject of further research – because it can prove an additional, useful and essential basis in predicting development of socio-economic clusters of different types and different levels of specialization. It is due to the fact that it indicates specific regions in settlement systems, in which spontaneous development of socio-economic clusters can be greatly simplified.

Entry data – graph of European agglomerations network

Preparation of entry data served mainly to determine the capabilities of local economies (regions, agglomerations, cities) to absorb the economic growth from the CCP region and reoccurring growth (appearing in further iterations) from centers that grew due to the contact with the CCP.

In order to maintain model coherence in continental scale, a simplified version of data preparation has been used. Economic potential of regions was described as region's population multiplied by (national) GDP (in order to represent the ability of local economies to participate in supply chains) and (national) purchasing power (in order to represent local potential for consumption). Regional potential, determined in such a way, is assigned to main regional economic center, typically understood as Functional Urban Area of the regional capital. Transport connections have been treated as weighs of the graph's edges and selectivity parameter ("choosiness", mathematically

linked to probability of contact satisfaction in closer regions) was predetermined as even for the entire model (local differences were expressed by weighing the nodes by purchasing power parity).

One of the essential assumptions was to keep initial potential of nodes set on the constant level. This allows further iteration to spread the entirety of economic growth potential over the graph. The result is presented as growth in percentages, tracing its source to the researched origin point. Experiment prepared in such a way allows us to simultaneously predict long term effects of a specific node – indicating self-stabilizing diffusion dispersions along the selected graph.

Nodes: Functional Urban Area (FUA). As a graphic localization we took geographic position of the FUA over one million inhabitants. The potential of surrounding regions was added up to FUA as a population count. In order to indicate region's economic potential, the number of inhabitants was multiplied by (national) GDP and purchasing power parity (average value from countries).

Transportation network – with weighed lengths. A single edge of a graph is not directly understood as a single physical road – be it a railroad or a roadway. It reflects a sum of all known connections served by different transport modalities. A railroad is added to roadways as edge weight reduction. It is not considered a separate edge on the graph. On a single edge connecting two cities, it is possible (and frequent) to have different weights assigned to specific segments of the edge. It reflects more precise data, indicating that, for example, lower weights apply only to the fragments of the connections and note entire routes connecting regional capitals. Thanks to that it is possible to add information about finished freeways and other rapid transit routes.

During the simulation, the concise weight of the road segments connecting every two nodes reflects difficulty of transit on that specific road. It is not only a measure of distance in a spatial understanding, but also infrastructural and multimodal. The less weight is attributed to the edge, the greater the connection there is between two nodes.

Definition, diffusion, simulation role and picking criteria of the selectivity parameter

The main goal of the S-Model is to study spatial distribution of the civilization phenomena, including those of socio-economic origins. The level of economic growth is defined by the selectivity parameter value general preference (general for all parts of the model and referring to every individual experiment) and reflects the economy's character profile (development stage) in a highly aggregated manner.

So far the only type of economy, studied by means of the S-Model, has been an industrial economy (Szromnik 1992: 229; Zipser T. et al. 1990) – for different spatial variants and development phases. In the case of presented experiments, selectivity was assigned with a value based on industrial economies, more specifically for industrial economy dominated by low processed production, technologically advanced economy and industrial-services economy.

Experiments, presented here, served as an indicator of European economy's dynamics, including possibility of its growth in a quality dimension, meaning an increased influence of the service-information sector.

In the case of presented model, "development potential diffusion" is a derivative phenomenon. It is not a given parameter, but instead, a result of modeling. A connection of selectivity with simplicity of the goods spread seems to be unmistakably matched (the greater the selectivity, the further is the diffusion's spread).

In an alternative approach, such as the gravity model approach, similar phenomena are modeled using friction parameter as an analogue to the selectivity parameter and gravity attraction as an analogue to the possibility of finding destination on further, intervening nodes of the graph.

Experiment Variants

The experiment was conducted in two infrastructural variants, each for three types of economy, adding up to a total of six simulations.

Variant 1: The CCP. A study of growth diffusion brought about by the Central Communication Port

The goal of this experiment was to determine the diffusion of the CCP alone as a great transshipment port, a place of significant goods circulation and with a unique solitary nature that contrasts the linear nature of routes like Via Carpathia. The experiment was supposed to underline the significance of the difference between a fast construction of an airport and a great scale.

Variant 2: CCP + VC. A study of growth diffusion brought about by the Central Communication Port and distributed by Via Carpathia

The goal of this experiment was to study the influence of Via Carpathia construction on the distribution of results of growth diffusion brought about by the CCP. Choosing this route as the only correction to the previous modeling was influenced by the fact that it is directly connected with the plans of the CCP construction as a Central-European terminal, it is also the greatest road investment in this part of Europe and as a part of the New Amber Road, it is supported by the Chinese Government as an inter-European goods distribution canal, being a core of the Chinese European-bound trade.

Rules of interpreting the results

The simulation algorithm that was used, serves mainly to determine the settlement system's answer to the newly-appearing growth. It is not a prognosis indicating how the entire system will look like in the far future. The simulation solely indicates how

settlement system will divide the change among its nodes, a phenomenon whose effects we are trying to study.

The correct functioning of the S-Model-DCV requires some initial generalizations, such as: simplification of companies' conditions and social aspects of the economy (represented as a single node of the graph) and the local wealth level, consumer potential of the individual households and purchasing power of the different sectors of the economy – to name a few of the economic subsystems characterized by those with autonomic dynamics. Similarly, individual cities and industrial centers can exhibit significant sector specialization (such as cities and regions basing their economy on some natural resource – mining operations, specialized production – energy, petroleum, shipyard or military). Such places can exhibit significant autonomy as a reaction to simplified economic changes (such as growth/decline of GDP, demographic changes, currency rate); however, they can be influenced by conditions of internal, narrow sectors – such as governmental purchase orders, new technologies, etc. For this kind of special sectors, the model must treat them as a representation of transregional interaction, in which these specific technologies are absorbed by greater transregional systems – and in this larger system's dynamics, the influence of this specialization can be grasped as simplified condition of the economy, one that relies more now on joint dynamics.

In practice, it is crucial to assume that the simulation algorithm which we are using, allows us to detect macro-spatial templates, in which there exists a heightened potential for developing interdisciplinary economic clusters.

Level of trust in the results

The S-Model has a long implementation tradition. Pioneering attempts to use it in the form of a computer simulation application date back to 1965 (Zipser T. 1973, 1976) and it has been used and developed to this day by research teams of Wrocław University of Science and Technology (Zipser T. 2016). The model was also successfully introduced into the field of archaeology as a tool for settlement process reconstruction (Zipser J. 2014). The S-Model (regarded as an intervening opportunities model type) is one of the two properly tested simulation approaches for the settlement systems modeling (the second one represents the diverse gravity models).

The S-Model-DCV works best on the network (graph), in which modeled connections reflect existing network of transport routes and nodes (being always some kind of aggregation and generalisation of regional economies) – a real distribution of settlement accumulations. It works best in continental scale then; however, it does bring a lot of problems in simulating transit distribution inside large cities, where the distribution of buildings is nearly even and regional division (and secondary determination of centroids for this region) has an arbitrary character. Additionally, transport connections between arbitrary centroids have an arbitrary character as well.

Based on the experience from the previous attempts of using the S-Model-DCV, it is clear that we need to apply the following distrust of our results:

Firstly, the model does properly represent the functioning of most important networks – transregional and intercontinental. The presented scale of the simulation corresponds to the best area of efficiency of the model.

Secondly, the model does not precisely determine single points of settlement concentrations (and more precisely – can indicate "best localization" of a large city situatied 30 kilometers away from the actually existing one). It does, however, properly indicate "a sum of the potential" of the cities creating neighbouring economic clusters. For isolated economies (where, for example, the country's border was considered a barrier, it was possible for the model to make mistakes if the isolation power of such a border was not somehow implemented into simulated economic contacts).

The same characteristic (disruptive for predicting European economy in the times of iron curtain) – seems very useful for simulating the same area (Europe) after the Cold War period and fast economic integration of the European Union.

In view of the above statement, the experiment was designed in a way to use the S-Model in an exemplary manner – both in the selection of scale and distribution of nodes, as well as in the interpretation of results. We use this model to analyse the distribution of large-scale clusters, defined as spontaneously appearing groups of cities and regions linked to each other in such a way that global changes react in a convergent manner (at the same time they show increases or lack in increases). However, we draw attention to the limited confidence in the results obtained as development forecasts for individual cities.

Results

Variant 1 – the CCP as a single point node

The core of the experiment is to study the modelled influence of the singular goods distribution center. An influence understood as a spatial growth distribution. It answers the question: how growths originating from a single point will be absorbed by specific nodes of the network. Henceforth it does determine the growth proportion between the beneficiary.

Each variant should be treated as hypothetical, because the type of the modeled economy does not match with the type of goods transported via airplanes. However, the indirect workings (understood as, for example, technological modernization of resource economy) indicate here the change in economy's structure and is covered in Figure 2.

Despite its hypothetical character, the vivid central-European cluster in Leipzig and Hamburg deserves our attention. It stretches from there to the East, all the way up to Krakow (Figure 1).

The influence of the CCP as a single center, in conditions of industrial economy, is distributed completely asymmetrically – a single consumption point reaching furthest to the East is Warsaw – basically the CCP itself (Figure 2).

Fig. 1. The spatial distribution of growths spread from the CCP in conditions of the resource and industrial economy. Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

Fig. 2. The spatial distribution of growths spread from the CCP in conditions of the industrial economy. Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

The central European cluster that we mentioned is much less potent compared to the "resource" economy variant. This cluster shows only Leipzig and Hamburg, still clinging to the possibility of growth – this positions them more in the western European cluster. In the area of central European cluster, the predicted growth is much closer to the ones predicted in the area of France – which can be surprising.

For a variant of the CCP as a singular point, for high tech economy, growth potentials generated by the Central Communication Port will mostly be consumed by the western European cluster.

The share of central European cluster, if we do not include the area of Germany, is nearly nonexistent (Figure 3).

Figure 3. The spatial distribution of growths spread from the CCP in conditions of the industrial and service economy. Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by the circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

Variant 2 – Joint endeavour of the CCP and Via Carpathia

Via Carpathia, the new European transport corridor (Helsinki – Tallinn – CCP – Thessaloniki), currently developed intensively as a highway. Some countries lying on the path of Via Carpathia (like, for example, Slovakia) have already completed the construction of their segments. It is then crucial to note that despite the grand scale of this investment – it is not a completely hypothetical plan, but the CCP functionality along Via Carpathia is the most probable outcome.

It is also possible to notice the attractive or even ground-breaking idea of plans to construct fast railway servicing the CCP; nevertheless, these plans are being greatly modified today, which makes the future course of new railways not possible to predict today.

The spatial distribution presented in Figure 4 is hypothetical (the type of key resource is different from the type provided via air traffic). It was meant to highlight the general thesis that the road development, even along the eastern border of the EU, supports not only these areas, but also (mainly) the central European cluster, leaving Berlin in the lead.

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Fig. 5. The spatial distribution of growths spread from the CCP + VC in conditions of the industrial economy. Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by the circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

Fig. 6. The spatial distribution of growths spread from the CCP + VC in conditions of the industrial and service economy. Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by the circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

Discussion

The presented variants of modeling the industrial economy are not forecasts or suggestions of forecasts. They were presented to highlight the processes of economy changes which are sensitive to the level of economic advancement. The singular goods distribution center and the East European cluster transport network variants are only a presentation of trends (in range of the selectivity parameter). The reason for their presentation is the reference to the prognostic stereotype, which assumes that the consumption of growth appears only in the immediate vicinity of the distribution node.

We presented the origin of this stereotype – modeling of types of low-processed economy, in which the high transportation cost is the dominant parameter limiting the distribution of goods, in fact confirms this phenomenon. This modeling also indicates that this type of goods is not distributed by air, so its distribution should not be modeled with selectivity corresponding to the dynamics of the distribution of low-processed materials. And this is what our modeling has shown: it overthrew the stereotype of the construction of the Central European hub as a support only for the development of Central Europe.

Another important phenomenon which our simulations have shown is the almost complete asymmetry of the final distribution. Despite the fact that the modeling area was the entire European continent (with, for example, Moscow, Kazan and Samara), the region of accumulation of growths is Western Europe. The agglomerations east of CCP accept a small amount of distribution.

Development of Via Carpathia transport corridor definitely strengthens the Central European cluster – the distribution of growths of both clusters is divided into approximately equal parts (Figure 7). The phenomenon of growth of non-junction points of

Fig. 7. The Impact of Via Carpathia (left) on reducing regional differences in the rate of economic growth of the intermediate economy. On the right, the distribution of diffusion of the CCP growth consumption operating pointwise (without expanding the transport network). Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by the circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

Via Carpathia itself, but the parallel route Gdańsk-Poznań-Wrocław-Brno-Vienna and (to a lesser extent) Warsaw-Kraków-Košice is also noteworthy. In this distribution, the growths in eastern Germany are almost the same as for the variant without Via Carpathia – this means that growths in central Europe are taking place at a cost of growths in western Europe (but not the former East Germany).

An additional aspect which can be traced is the stability of the transition of the European economy from the industrial-service to the service-information phase. In our experiment (in terms of confidence in the results) we can conclude that the proportions of the development distribution contributed by the CCP + VC look very similar to the industrial and service economy. This also means, that due to the creation of the CCP and VC, this region of Europe will develop more evenly, without excessive discrimination of the fringe and less developed economies. This natural European tendency to smoothly nurture maturing local economies to the requirements of the service-information economy is either preserved or boosted, but surely not disturbed, by the CCP and VC (Figure 8).

Fig. 8. The European service and information centers under the operating conditions of the CCP + Via Carpathia (on the left) are created from the even transformation of industrial and service centers (on the right). The spatial distribution of the European economy is preserved despite thorough transformations of the economic structure. Land areas are marked in green. Roadways, railroads and sea routes are marked in gray. Functional urban areas are represented by the circles marked in blue. The higher the growth absorbed by specific functional urban areas, the larger the size of the circle.

Source: own calculations.

Conclusions

In this article we were attempting to answer the question: which parts of Europe will benefit most from the influence of the Central Communication Port. The answer that we found was a little surprising: launching a new air traffic node in central Europe will contribute mostly to the development of western European cluster, which can lead to a rise in the disproportions in regional economic development levels. However, the details of our modeling, revealed a possibility to maintain balance between central and western Europe development pace – which would go in accordance with the EU cohe-

sion policy. Hence, such is our approach to the result interpretation: equal growth of both European clusters is in the best interest of the European Union, because excessive dominance of one cluster might turn into a cause of lasting discontent among European citizens – which could fuel movement of separatist nature, laying groundwork for dissolution of the EU. So the best answer to the question "who will gain the most from the construction of the CCP" is "Europe as a whole".

Results of our experiments suggest a great numbness of Europe's economic systems to the formation of centers and clusters. The results we provided fully confirmed the phenomenon of supporting the growth of the most developed clusters – even after creation of solitary distribution centers of the peripheral edges of the EU.

We also confirmed the thesis that construction of a very efficient transport corridor on the eastern border of the EU, can have a limited impact on the empowerment of the central European cluster in these sectors of economy that are highly advanced (knowledge based). Construction of Via Carpatia can lay the foundation for the growth of central European cluster, mostly in those sectors of the economy that are averagely advanced – so specifically the same type in which this region currently specializes. However, the experiments were able to show limitations in that regard as well – because in this variant we can only talk about equalizing the growth potentials of the western European and central European clusters (growths distribute themselves nearly equally and this is the most optimistic variant for central Europe).

The Central Communication Port can be understood as a chance for developing the region of central Europe – but keeping in mind that it is only a tool for potentially soothing rapidly intensifying growth potential disproportions between central and western Europe, without encroaching on balance systems which base on economic dominance of western Europe over eastern Europe. Such "soothing" is an element of the cohesion policy and can be treated as a chance for Europe as a whole. A final conclusion remains as a statement that in a long-term perspective, the greatest threat for western European economy is intensification of disproportions – leading to the conclusion that the lack of the CCP is a greater threat than its construction and development.

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DYNAMICS OF CHANGES IN THE LEVEL OF COMPETITIVENESS OF MANUFACTURING IN POLAND

DYNAMIKA ZMIAN POZIOMU KONKURENCYJNOŚCI PRODUKCJI W POLSCE

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ABSTRACT: The development of modern economies is inseparably connected with the phenomenon of competition and competitiveness of business entities. Issues in the field of competitiveness of economies, sectors and enterprises have become the subject of intensive analyses worldwide. In Poland, there is also an urgent need to conduct research on various aspects of competitiveness, which should thoroughly diagnose the situation in this respect and indicate the development of adequate instruments of economic policy that are capable of stimulating the growth of competitiveness. This article is a response to this need. The main aim of the study is to assess and compare selected aspects of competitiveness of enterprises from manufacturing divisions. Therefore, the analysis covered manufacturing enterprises (Section C) at the two-digit level of aggregation, i.e. at the level of divisions in this Section. To assess competitiveness in the years 2010-2016, the following measures were used: export/import ratio, intra-industrial trade index (IIT), sold production, labour productivity, and total factor productivity (TFP). The research proceedings were based on data published by the Central Statistical Office (Statistics Poland).

KEY WORDS: manufacturing divisions, measures of competitiveness, measures of efficiency and effectiveness of enterprises, number of manufacturing entities in urban municipalities.

ABSTRAKT: Rozwój współczesnych gospodarek nierozerwalnie związany jest ze zjawiskiem konkurencji i konkurencyjności rywalizujących podmiotów. Zagadnienia z zakresu konkurencyjności gospodarek, ich sektorów oraz przedsiębiorstw stały się przedmiotem intensywnych analiz na całym świecie. W Polsce również istnieje pilna potrzeba prowadzenia badań nad różnymi aspektami konkurencyjności, które powinny rzetelnie diagnozować sytuację w tym względzie i wskazywać rozwój adekwatnych instrumentów polityki gospodarczej, stymulujących wzrost konkurencyjności. Niniejszy artykuł wpisuje się w to zapotrzebowanie. Głównym celem badania jest ocena i porównanie wybranych aspektów konkurencyjności przedsiębiorstw z działów przetwórstwa przemysłowego. Analizą objęto więc przedsiębiorstwa przetwórstwa przemysłowego (sekcja C) na dwucyfrowym poziomie agregacji, czyli na poziomie działów tej sekcji. Do oceny konkurencyjności w latach 2010–2016 wykorzystano: stopę eksportu, wskaźnik *Intra-Industry Trade* (IIT), dynamikę

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produkcji sprzedanej, dynamikę wydajności pracy oraz łączną produktywność czynników produkcji (TFP). Postępowanie badawcze oparto na danych publikowanych przez Główny Urząd Statystyczny.

SŁOWA KLUCZOWE: działy przetwórstwa przemysłowego, mierniki konkurencyjności, wskaźniki efektywności, liczba podmiotów gospodarczych przetwórstwa przemysłowego w gminach miejskich.

Introduction

European integration and progressing globalisation increase the possibility of the Polish economy functioning in the international space. This is a positive phenomenon, but it should be remembered that alongside development-conducive opportunities, there are also a number of real threats. The competitiveness of the Polish economy determines whether Poland will actually benefit from internationalisation.

Accepting M. Porter's view (1990, 1994) that there is no competitive economy without competitive industrial enterprises, an attempt was made to assess the competitiveness of manufacturing enterprises. In this study, due to the lack of individual data, the Polish Classification of Activity (PKD) 2007 was taken into account. The analysis covered manufacturing enterprises (Section C) at the two-digit level of aggregation, i.e. at the level of divisions in this Section. This level of information aggregation was considered sufficiently detailed and appropriate to assess the competitiveness of manufacturing enterprises. Thus, the objects (units) of the study are 24 manufacturing divisions (Section C). The Central Statistical Office (CSO) grouped enterprises using PKD 2007, which is in line with the Statistical Classification of Economic Activities in the European Union (NACE Rev2). According to PKD 2007, 24 divisions are distinguished under Manufacturing (Section C). A detailed list is included in Appendix 1 – Table 1. It is worth noting that *de facto* the subjects of the analysis are manufacturing enterprises, i.e. entities conducting business activity in the above-mentioned manufacturing divisions. From the point of view of practice, it is important to recognise and understand what determinants and factors affect the competitiveness of enterprises, taking into account various aspects and specificities of individual manufacturing divisions.

The main aim of the study is to assess selected aspects of competitiveness of manufacturing divisions in the years 2010-2016 and to develop rankings of divisions according to the values of certain competitiveness indicators. The first three measures of competitiveness relate to the international market (export rate, export/import ratio, intra-industrial trade (IIT) index), while the other measures characterise the efficiency and effectiveness of the enterprise (sold production, labour productivity and total factor productivity). The research procedure was based on data published by the Central Statistical Office. *Statistical Yearbooks of Industry*, covering the period of analysis, i.e. the years 2010-2016, were particularly useful. They provided information on exports, imports, gross wages, sold production, employment volume, and gross value of fixed assets.

Competitiveness as an economic phenomenon

By joining the European Union, Poland agreed to the free movement of goods, services and labour between the Member States. The elimination, as a result of European integration and progressing globalisation, of institutional barriers forced economic entities to compete not only in the domestic market, but also in the Single European Market and the international market. The task of the State is to create the most favourable conditions for conducting broadly understood economic activity so that domestic enterprises could increase their competitiveness, which translates into an increase in the well-being of society. Due to its importance, the subject of competitiveness and factors determining competitiveness is often taken up in economic and social research (Kamerschen, McKenzie, Nardinelli 1991; Hund, Morgan 1995; Hallin, Marnburg 2008; *Polska. Raport o konkurecyjności…* 2018). The issue of competitiveness of national economies, sectors, divisions, and entities operating in them has been an important element of economic policy in recent years.

The literature lacks a uniform definition of competitiveness of the economy, which may be due to the high complexity of this issue and a large number of criteria necessary to describe it. The achievements of M.E. Porter are highly appreciated in the literature. He proposed his own concept of international competitiveness, which is the result of many years of research (Porter 2001). According to M.E. Porter, the country's competitiveness depends on the efficiency and effectiveness of the use of resources such as labour and capital. Porter believes that companies compete with one another, and whether an enterprise achieves high efficiency or not depends on the environment and conditions in the economy. He also believes that sources of competitiveness change with the development of the economy, and maintenance of a steady economic growth is determined by increasing the competitive advantage of existing sectors, basing it on increasingly advanced factors of competitiveness, as well as by creating competitive advantages in new sectors of the economy. He also draws attention to trade as an important element in the economies of highly developed countries that export goods produced by more developed sectors of the economy, and import those that require less advanced factors of production (Borowski 2015).

A different approach to competitiveness was proposed by: J.D. Sachs and G.L. Stone (2000), World Bank experts (Radło 2008; Krugman 1994). The achievements of Polish researchers are also worth noting. The results of their research on competitiveness can be found in the following works: (Gorynia 1998), (Misala, Młynarzewska, Misztal, Siek. 2007), (Misala 2011), (Borowski 2015), (Wesołowska 2015), (Wosiek 2016). The following largest international institutions dealing with cyclical research on competitiveness of national economies also propose their own approach to competitiveness: The Organisation for Economic Cooperation and Development (OECD) (*The World Competitiveness Report* 1994), The World Economic Forum (WEF), The International Institute for Management Development (IMD), and The Irish National Competitiveness Council.

Competitiveness is a relative phenomenon, not an absolute one, hence we indicate its significance by referring to other related objects. Therefore, one cannot speak of competitiveness at all levels of economic systems. Competitiveness can be discussed in the case of micro-micro, micro, meso and macro levels, because the competitiveness of entities from individual levels can be compared to other objects at the same level or to some standard of comparison (Gorynia 1998).

Manufacturing in Poland

Due to continuous investments, some of the manufacturing sectors in Poland are currently achieving results similar to, or even better than, those located in Western Europe. In addition, the role of Polish companies in foreign markets is constantly growing. The direct effect of this process is a relatively high – compared to Europe – share of industry in the creation of Polish GDP.

Manufacturing is a sector of the economy characterised by relatively high labour productivity. According to the data presented by the Central Statistical Office, its contribution to the economy is higher than to employment (*Rocznik Statystyczny Przemysłu* 2018). It also results from strong competition and environmental requirements that force investments in modern, efficient technologies. Since 2011, capital expenditure has been characterised by an upward trend. Investment outlays in industry increased by 30.1% between 2009 and 2017.

Fig. 1. Dynamics of the share of the manufacturing sector in the national economy in terms of gross value added, sold production, investment outlays and employment

Source: own elaboration based on statistical tables, GUS 2018, *Rocznik Statystyczny Przemysłu*, Warszawa and Local Data Bank, www.stat.gov.pl.

High labour productivity is also reflected in labour costs. In 2017, average earnings in manufacturing in Poland were higher by approx. 2.2 percent than the average monthly gross wages in the national economy. This confirms that manufacturing industries require highly qualified staff – engineers and specialists with technical education.

Over the years, the number of manufacturing enterprises in Poland has been growing – it has risen on average by 6% compared to 2010. There were more than 21,500 manufacturing business entities in Poland in 2017 than in 2010. In the analysed period, the number of manufacturing enterprises increased the most in Podkarpackie Voivodship (13.1%), Małopolskie Voivodship (10.1%) and Pomorskie Voivodship (9.8%). Apart from Podkarpackie Voivodship, where in 2017 the share of manufacturing entities in the total number of enterprises was at the level of 4.3%, Małopolskie and Pomorskie Voivodships had – and still have – relatively large clusters of manufacturing entities. The observed upward trend in Pomorskie Voivodeship, in comparison with the downward trend in Łódź Voivodeship, meant that in 2017, in terms of the number of entities operating in manufacturing, Pomorskie Voivodeship overtook Łódź Voivodeship in the ranking. Over the years, invariably, the dominant share of manufacturing entities in the total number of enterprises is recorded in Mazowieckie (15.9%), Śląskie (11.8%) and Wielkopolskie (10.5%) Voivodships.

The summary of the data in Table 1 confirms the propensity to locate manufacturing entities in urban areas, which have more relevant facilities at their disposal. The share of manufacturing entities in the total number of enterprises is the largest in voivodships characterised by developed infrastructure, a comprehensive offer of academic centres, and the presence of large urban centres. Table 2 presents more detailed data on the share of manufacturing entities in towns with county (*poviat*) rights and in urban municipalities. In the era of post-industrialisation, retaining industry in cities plays an important social role. It favours reconciliation of work and private life, facilitates creation of bonds between the employer and employees, and has a positive effect on the relationship between public administration and residents. Locating industry not in the periphery, but in the city centre, also plays an educational role, as it makes residents aware of the importance of human work, the strength of technology's impact on the environment, and the need for appropriate waste management.

Table 2 presents more detailed data on the share of manufacturing entities in towns with county rights and in urban municipalities. Urban centres attract manufacturing enterprises. In Poland, an average of 52.4% of all the manufacturing entities are located in urban municipalities or in towns with county (*poviat*) status. The factors affecting dispersion of manufacturing enterprises in individual voivodships include: (1) a lack of a strong/main urban centre acting as an incubator for industrial activities (e.g. Opolskie Voivodship), or (2) the presence of several important urban centres within one voivodship (e.g. Wielkopolskie Voivodship). From the point of view of the share of manufacturing entities located in urban municipalities and towns with county rights in the total number of enterprises, voivodships in Poland can be divided into four groups. (1) Voivodships with a very strong concentration of/with a very strong

Table 1

Manufacturing enterprises in Poland – comparison between 2010 and 2017

Voivodship	2010	2017	Share in 2010 [%]	Share in 2017 [%]	Difference $D_{2017/2010}$	$i_{2017/2010}$ [%]
Dolnośląskie	25 571	27 353	7.1	7.2	1 782	107.0
Kujawsko-pomorskie	17 027	17 746	4.7	4.6	719	104.2
Lubelskie	13 166	14 028	3.7	3.7	862	106.5
Lubuskie	8 323	8 744	2.3	2.3	421	105.1
Łódzkie	29 014	28 390	8.1	7.4	–624	97.8
Małopolskie	33 180	36 536	9.2	9.6	3 356	110.1
Mazowieckie	57 421	60 365	15.9	15.8	2 944	105.1
Opolskie	8 599	9 079	2.4	2.4	480	105.6
Podkarpackie	14 674	16 589	4.1	4.3	1 915	113.1
Podlaskie	7 802	8 204	2.2	2.1	402	105.2
Pomorskie	28 084	30 823	7.8	8.1	2 739	109.8
Śląskie	42 425	44 779	11.8	11.7	2 354	105.5
Świętokrzyskie	9 865	10 527	2.7	2.8	662	106.7
Warmińsko-mazurskie	9 759	10 290	2.7	2.7	531	105.4
Wielkopolskie	37 772	40 036	10.5	10.5	2 264	106.0
Zachodniopomorskie	17 408	18 172	4.8	4.8	764	104.4
Poland	362 100	383 678	X	X	21 578	106.0

Source: own elaboration based on statistical tables, GUS 2018, *Rocznik Statystyczny Przemysłu*, Warszawa and Local Data Bank, www.stat.gov.pl.

propensity to locate industry in their urban centres, where the share of entities located in urban municipalities or in towns with the *poviat* status is not lower than 60%. Here, examples include Śląskie, Mazowieckie, Pomorskie and Łódzkie Voivodships. Then there is a group of voivodships with a strong concentration of industry in urban centres, where the share of entities located in urban municipalities or in towns with county rights is below 60%, but at the same time exceeds 50%. These are Dolnośląskie, Podlaskie, Zachodniopomorskie and Kujawsko-Pomorskie Voivodships. Voivodships with a moderate concentration of manufacturing entities in urban municipalities include: Lubelskie, Warmińsko-Mazurskie and Lubuskie Voivodships. In their case, the share of entities operating in urban municipalities or in towns with the *poviat* status remains within the range between 40% and 50%. The last group characterised by a low concentration/propensity appears to be the most diverse, and the share of entities conducting activity in urban municipalities is below 40%. The following voivodships belong to this group: Małopolskie, Wielkopolskie, Podkarpackie, Świętokrzyskie and Opolskie Voivodships.

Table 2

Manufacturing enterprises in individual voivodships in Poland

Voivodship	Total number of enterprises	Number of manufacturing entities in urban municipalities and towns with the *poviat* status	Number of manufacturing entities in towns with the *poviat* status	Share of manufacturing entities in urban municipalities and towns with the *poviat* status [%]	Share of manufacturing entities in towns with the *poviat* status [%]
Dolnośląskie	27 353	15 462	9 638	56.5	35.2
Kujawsko-pomorskie	17 746	8 915	7 121	50.2	40.1
Lubelskie	14 028	6 965	4 312	49.7	30.7
Lubuskie	8 744	3 909	2 722	44.7	31.1
Łódzkie	28 390	17 046	10 956	60.0	38.6
Małopolskie	36 536	13 491	11 148	36.9	30.5
Mazowieckie	60 365	38 642	29 911	64.0	49.6
Opolskie	9 079	2 460	1 510	27.1	16.6
Podkarpackie	16 589	6 091	2 904	36.7	17.5
Podlaskie	8 204	4 583	3 284	55.9	40.0
Pomorskie	30 823	19 238	12 985	62.4	42.1
Śląskie	44 779	30 059	15 109	67.1	33.7
Świętokrzyskie	10 527	3 840	2 090	36.5	19.9
Warmińsko-mazurskie	10 290	4 819	2 471	46.8	24.0
Wielkopolskie	40 036	14 735	10 045	36.8	25.1
Zachodniopomorskie	18 172	9 706	7 444	53.4	41.0
Poland	381 661	199 961	133 650	52.4	35.0

Source: own elaboration based on statistical tables, GUS 2018, *Rocznik Statystyczny Przemysłu*, Warszawa and Local Data Bank, www.stat.gov.pl.

Research methods and tools

Conducting an assessment of competitiveness of manufacturing divisions requires using certain measures. There are many suggestions in the literature in this respect. They were presented in a synthetic way by W. Jakóbik (2000), who – in the set of mesoeconomic measures of competitiveness – distinguishes several indicators:

- domestic production import penetration rate,
- cost index of domestic factors of production,
- revealed comparative advantage index,
- intra-industry trade index (*IIT*).

Another set of competitiveness indicators used in mesoeconomic level analyses was prepared by A. Zielińska-Głębocka (*Konkurencyjność przemysłowa*… 2000):

– export competitiveness index,
– technological and innovative competitiveness index,
– regional competitiveness index.

The further part of the article will present only those measures that will be used in the empirical assessment of competitiveness of manufacturing divisions. The assessment of competitiveness was based on six measures. The first three measures relate to foreign trade.

The first indicator is the export rate. This indicator determines the attractiveness of the examined division and it is the relation of the export of the i-th division to the production volume in the i-th division (*Konkurencyjność przemysłowa…* 2000):

$$W_i = \frac{X_{it}}{P_{it}},$$

where:
P_i – sold production in the i-th division,
X_i – export in the i-th division,
t – time period of analysis.

Another indicator that will be used to assess the competitiveness of the division is the export/import ratio (*Konkurencyjność przemysłowa…* 2000):

$$R_i = \frac{X_{it}}{M_{it}},$$

where:
X_i – export in the i-th division,
M_i– import in the i-th division,
t – time period of analysis.

The competitiveness of a given division cannot be evidenced solely by a positive trade balance in relation to certain goods. It is necessary to determine the intensity of simultaneous export and import in a given industry. If the volumes of exports and imports are similar, then one can speak of the so-called "partner competitiveness" (*Wpływ bezpośrednich inwestycji…* 2009). Thus understood competitiveness is measured by another index. It is an index of specialisation, otherwise known as the intra-industry trade index (IIT) of the i-th division, which is simultaneously an index of export and import of products of the i-th division. This index is also called the Grubel-Lloyd index and it is determined according to the following formula (Jankowska 2005):

$$IIT_{it} = 1 - \frac{|X_{it} - M_{it}|}{X_{it} + M_{it}},$$

where:
X_i – export in the i-th division,
M_i– import in the i-th division,
t – time period of analysis.

The competitiveness indicators presented so far relate to the international market. Thus, it can be said that they can be used to assess the international competitiveness of manufacturing divisions. However, in a study of the competitiveness of a given division, one cannot stop at examining foreign trade relations. An important role in assessing competitiveness is also played by measures characterising efficiency and effectiveness of operations. According to M. Porter, divisions of a given economic sector develop thanks to the introduction of innovations in enterprises, which allows companies to gain competitive advantages over domestic and foreign rivals. Therefore, improvement of a company's competitiveness is reflected in a short-term increase in sold production, and in the long-term – in an increase in the total factor productivity. Popular measures used for this type of competitiveness assessment are (*Konkurencyjność przemysłowa…* 2000):

- employment growth rate,
- sold production and/or its growth rate,
- labour productivity and/or its growth rate,
- efficiency/productivity of resources used to manufacture sold production,
- total factor productivity index (*TFP).*

The index measuring the efficiency (productivity) of resources used to manufacture sold production can be written as follows (Jankowska 2005):

$$W_i = \frac{P_{it}}{Z_{it}},$$

where:
P_i – sold production in the i-th division,
Z_i – resources used to manufacture production in the i-th division,
t – time period of analysis.

In order to examine total labour productivity and productivity of the resources used for manufacturing, total factor productivity (TFP) can be used. It is determined with the use of the following formula (Englander, Gurney 1994):

$$TFP_{it} = \frac{P_{it}}{P_{it-1}} - \left[\left(\frac{LP_{it}}{LP_{it-1}} \cdot 1 - \alpha\right) + \left(\frac{CP_{it}}{CP_{it-1}} \cdot \alpha\right)\right],$$

where:

$$\alpha_{it} = \frac{W_{it} + N_{it}}{W_{it} + N_{it} + C_{it}},$$

$$LP_{it} = \frac{P_{it}}{L_{it}},$$

$$CP_{it} = \frac{P_{it}}{C_{it}}.$$

P_i – sold production of the i-th division,

LP_{it} – labour productivity of the i-th division,
CP_{it} – productivity of fixed assets of the i-th division,
W_i – wages in the i-th division,
N_i – salary overheads in the i-th division,
C_i – fixed assets of the i-th division,
L_i – employment in the i-th division,
$1-\alpha$ – coefficient informing about the share of labour in the income from factors of production,
t – time period of analysis.

The measures presented above can be considered synthetic measures, used to assess the competitiveness of divisions of a given section. They are based on aggregated data on exports, imports and production volumes of the analysed manufacturing divisions. In the procedure of assessing the competitiveness of divisions, one can still use the so-called partial measures, which are estimated based on data from individual enterprises operating in the said divisions (Jankowska 2005).

Competitiveness of manufacturing divisions – research results

The competitiveness of 24 manufacturing divisions in Poland in the years 2010-2016 was assessed based on the values of six measures. First, focus was on assessing the competitiveness of selected aspects of foreign trade. Three measures were used for this purpose: the export rate, the export/import ratio and the IIT index. Then the competitiveness related to the efficiency of the production process in enterprises was assessed. Changes in sold production, labour productivity and total factor productivity were analysed.

As part of the assessment of competitiveness of production relating to the international market, export rates W_i, export/import ratios R_i and intra-industry trade indices IIT_i were calculated. Due to the significant differences in the values, obtained in the conducted analyses, it was decided to average the values of these measures. Table 3 summarises the average annual values of these three competitiveness indices calculated for the years 2010-2016 and individual manufacturing divisions.

The value of the average annual export rate calculated for the years 2010-2016 ranged from 0.081 (*Manufacture of beverages*) to 0.925 (*Manufacture of electrical equipment*). It can be observed that the share of exports in sold production in the *Manufacture of beverages* division in the analysed years was small, which proves the domestic market orientation of this division. A relatively large share of exports in sold production occurred in the *Manufacture of electrical equipment* division, which means that products of this division are attractive in terms of price and quality to foreign customers. The conducted analyses and the results presented in Table 3 entitle us to state that half of the manufacturing divisions achieved a result of 0.407, which means that in these divisions export accounts for at least 41% of sold production.

Table 3

Average annual export rate, export/import ratio and IIT index in manufacturing divisions in the years 2010-2016

Division	Export rate	Export/ import ratio	IIT index	Division	Export rate	Export/ import ratio	IIT index
Div. 10	0.226	1.468	0.81	Div. 22	0.435	1.309	0.866
Div. 11	0.081	0.604	0.753	Div. 23	0.236	1.511	0.796
Div. 12	0.316	0.727	0.841	Div. 24	0.407	1.828	0.707
Div. 13	0.520	1.318	0.863	Div. 25	0.359	1.687	0.743
Div. 14	0.387	1.953	0.677	Div. 26	0.597	0.684	0.812
Div. 15	0.474	1.626	0.761	Div. 27	0.925	2.145	0.601
Div. 16	0.307	2.649	0.548	Div. 28	0.446	1.895	0.691
Div. 17	0.372	1.334	0.857	Div. 29	0.801	1.597	0.770
Div. 18	NDA	1.425	0.757	Div. 30	0.881	1.437	0.819
Div. 19	0.206	0.299	0.459	Div. 31	0.588	4.191	0.385
Div. 20	0.392	1.397	0.834	Div. 32	0.491	1.657	0.752
Div. 21	0.416	0.741	0.849	Div. 33	0.347	0.969	0.957

Source: own calculations based on GUS, *Rocznik Statystyczny Przemysłu*, Warszawa, 2010-2017 respectively, www.stat.gov.pl.

A high share of exports is achieved not only by *Manufacture of electrical equipment* (92%), but also by *Manufacture of other transport equipment* (88%) *and Manufacture of motor vehicles, trailers and semi-trailers, excluding motorcycles* (80%). The divisions occupying the first three places in the ranking clearly dominate in terms of export rate over other divisions. The following divisions were characterised by an average share of exports: *Manufacture of furniture* (58%) and *Manufacture of textiles* (52%) as well as *Manufacture of leather and related products* (47.4%). A relatively high value of the export rate for the *Manufacture of furniture* division is the result of a significant improvement in the competitiveness of enterprises in this division. In 2016, Poland was ranked as the sixth largest producer and exporter of furniture in the world, with a 6.3% share of global furniture exports. Polish furniture enjoys a strong reputation and recognition around the world. In the divisions characterised by a large share of exports in sold production, a significant increase in the export growth rate has been recorded in recent years.

Export, taking into account the unused production potential of manufacturing enterprises and the base of raw materials, is an important factor determining the development of the Polish economy. The importance of export in the development of the entire manufacturing is evidenced by its growing share in the value of total sold production.

Another indicator used to assess the competitiveness of manufacturing divisions in Poland in the context of the international market is the export/import ratio. The aver-

age annual value of this indicator in the years 2010–2016 for individual manufacturing divisions (see Table 3) is characterised by high volatility, as its value ranged from 0.299 (*Manufacture and processing of coke and refined petroleum products*) to 4.919 (*Manufacture of furniture*). In the next ranking, *Manufacture of furniture* achieves significant values. In recent years, the Polish furniture industry has been conquering not only European, but also global markets. Polish furniture is very popular with and valued by foreign customers. The international competitiveness of this division is determined by a high quality of the furniture and its relatively low price. On the other hand, the division of *Manufacture and processing of coke and refined petroleum products* had a low share of exports in imports – this is caused by a high level of import of this type of raw materials, among others, due to the determinants of natural resources in Poland.

In 18 manufacturing divisions, the value of the export/import ratio was greater than one, which means that exports exceeded imports. In Division 16 (*Manufacture of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials*) and 25 (*Manufacture of electrical equipment*), exports were more than twice as large as imports. In the *Manufacture of furniture* Division (4.191), i.e. in the division which ranked first, exports exceeded imports more than four times. If we compare the conducted competitiveness assessment with the previous one, which was based on the export rate, it can be observed that *Manufacture of beverages* (11) and *Manufacture and processing of coke and refined petroleum products* (19) were characterised by the lowest level of competitiveness, while *Manufacture of electrical equipment* (27) and *Manufacture of furniture* (31) were characterised by the highest level. *Manufacture of electrical equipment*, which according to the export rate was the most competitive, currently ranks third. In addition, it can be seen that according to the export rate, in the first ranking, *Manufacture of beverages* took the last position, while according to the export/import ratio – its competitive position improved by one position.

When conducting comparative analyses of this type, it should be emphasised – as discussed earlier – that competitiveness is an extremely complex and multidimensional phenomenon and one cannot draw too far-reaching conclusions based on individual measures.

The intra-industry trade index (the Grubel Lloyd index) is the third measure used to assess the competitiveness of manufacturing divisions in Poland in the framework of the international market. Table 3 presents manufacturing divisions according to the value of the IIT index. One can notice that *Repair, maintenance and installation of machinery and equipment* (33) is the most competitive, as it reaches the highest IIT value of 0.957. *Manufacture of furniture* (31) holds the last position in this ranking, with an index value of 0.385. A spectacular decrease in the competitive position of this division can be observed in comparison to previous analyses – this situation indicates large disproportions of exports to imports in this division. The lowest values of the IIT index were recorded for: *Manufacture and processing of coke and refined petroleum products* (19), as well as *Manufacture of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials* (16) – 0.459 and 0.548, respectively. On the

other hand, the divisions occupying top positions in the ranking, for which the IIT index is relatively high, are characterised by high intensity of both exports and imports. In the division of *Repair, maintenance and installation of machinery and equipment* (33), the IIT index is very high and exceeds 0.9. The value of the IIT index exceeding 0.8 is accompanied by the occurrence of partner competitiveness (Jankowska 2005), which means that the scale of both exports and imports is similar and indicates developed intra-industry trade.

The analysis of competitiveness of manufacturing divisions requires consideration of other – apart from international trade relations – aspects of competitiveness. The competitiveness of divisions is primarily the result of the competitiveness of enterprises operating in a given industry. Competition between manufacturing companies in the domestic and foreign market forces them to improve efficiency, which can be achieved through product, process, organisational, and marketing innovations. Innovative activity of enterprises may be manifested by an increase in sold production, labour productivity and total factor productivity, and thus an increase in the competitiveness of enterprises. For a more complete illustration of competitiveness of manufacturing divisions, average annual rates of change in sold production and labour productivity calculated on the basis of data from the years 2010-2016 are presented in Table 4.

Table 4

Annual average rates of change in sold production and labour productivity in the years 2010–2016

Division	Sold production	Labour productivity	Total factor productivity	Division	Sold production	Labour productivity	Total factor productivity
Div. 10	5.664	5.902	4.815	Div. 22	7.984	4.403	6.878
Div. 11	0.829	3.540	0.904	Div. 23	3.800	3.688	3.463
Div. 12	7.396	8.026	6.013	Div. 24	3.740	2.068	4.738
Div. 13	9.627	8.388	2.779	Div. 25	8.038	4.697	7.256
Div. 14	4.214	8.954	–1.707	Div. 26	–0.664	0.956	1.123
Div. 15	8.569	9.342	3.504	Div. 27	5.789	3.928	5.748
Div. 16	5.965	6.029	4.078	Div. 28	3.660	4.787	1.477
Div. 17	7.961	6.259	6.109	Div. 29	7.197	3.047	7.167
Div. 18	6.482	3.141	2.337	Div. 30	9.780	8.960	4.692
Div. 19	–1.521	0.634	4.794	Div. 31	8.760	6.571	6.407
Div. 20	4.965	3.870	4.788	Div. 32	7.776	5.599	6.904
Div. 21	3.343	3.491	2.113	Div. 33	7.002	4.499	4.807

Source: own calculations based on GUS, *Rocznik Statystyczny Przemysłu*, Warszawa, 2010-2017 respectively, www.stat.gov.pl.

The analysis of the dynamics of sold production proves that only in two manufacturing divisions, i.e. *Manufacture and processing of coke and refined petroleum products*

(19) and *Manufacture of computer, electronic and optical products* (26), these values deteriorated. The average annual growth rate of sold production in other manufacturing divisions varied and ranged from 0.83% in *Manufacture of beverages* to 9.78% in *Manufacture of other transport equipment* (see Table 4). *Manufacture of other transport equipment* proved to be the most competitive in this ranking with a value of 9.78%. *Manufacture of textiles* ranked second in terms of the growth rate of sold production – 9.63%. *Manufacture and processing of coke and refined petroleum products* (19) ranked last. It achieved a negative value of –1.52%, which indicates a decrease in sold production in this division. A significant increase in sold production is also noticeable in *Manufacture of furniture*, *Manufacture of leather and leather products* and *Manufacture of fabricated metal products, except machinery and equipment*, as it was respectively: 8.76%, 8.57% and 8.04%.

When assessing the competitiveness of divisions by means of changes in the level of sold production, it is worth noting a very positive phenomenon. In all manufacturing divisions, an increase in sold production was accompanied by an increase in labour productivity, which indicates technical progress and an increasingly better use of factors of production in the examined areas of economic activity. An average annual decrease in labour productivity, measured by production sold per 1 employee, was not recorded in any division. In the years 2010 to 2016, in all manufacturing divisions, labour productivity increased on average from year to year, from 0.63 (*Manufacture and processing of coke and refined petroleum products*) to 9.34 (*Manufacture of leather and related goods*).

The assessment of competitiveness of manufacturing divisions carried out by analysing total factor productivity (TFP) indicates to what extent the increase in sold production results from changes in productivity of factors of production. Table 4 illustrates the situation of individual manufacturing divisions in terms of the average TFP value in the years 2010-2016. Only in one division – *Manufacture of wearing apparel* (14) – the average TFP value was negative. Analysing the situation in the enterprises of this division, it can be concluded that an increase in sold production was accompanied only by an increase in labour productivity, while the productivity of fixed assets did not increase. Low values of total factor productivity were obtained for the following divisions: *Manufacture of beverages* (11), *Manufacture of computer, electronic and optical products* (26), *Manufacture of machinery and equipment not elsewhere classified* (28). The fastest average annual TFP growth rate was recorded in the following divisions: *Manufacture of fabricated metal products, except machinery and equipment* (25) and *Manufacture of motor vehicles, trailers and semi-trailers excluding motorcycles* (29) – these divisions achieved a value of more than 7. The TFP growth rate throughout the entire period considered is the higher, the higher the level of technological advancement of Section C is. Quite high TFP values were also obtained by: *Other manufacturing* (32), *Manufacture of rubber and plastic products* (22) and *Manufacture of furniture* (31) – their values exceeding 6. Productivity changes played a significant role in the growth of sold production in manufacturing. In most

divisions, TFP was an important source of growth in sold production. The improvement in productivity was a consequence of the investment revival in manufacturing in the period of integration with the European Union, which was associated with the need to adapt plants to EU standards. Current investment activity results from the necessity of continuous modernisation of production potential in order to improve the competitiveness of enterprises as well as from the need to build solid foundations for increasing production.

Table 5

Summary of competitiveness rankings

Division	Sold production	Labour productivity	Total factor productivity	Export rate	Export/ import ratio	IIT	Range
Div. 10	15	9	9	21	12	10	12
Div. 11	22	18	23	23	23	15	8
Div. 12	9	5	7	18	21	6	16
Div. 13	2	4	18	6	17	3	16
Div. 14	17	3	24	14	4	20	21
Div. 15	4	1	16	8	9	13	15
Div. 16	13	8	15	19	2	22	20
Div. 17	7	7	6	15	16	4	12
Div. 18	12	20	19	24	14	14	12
Div. 19	24	24	11	22	24	23	13
Div. 20	16	16	12	13	15	7	9
Div. 21	21	19	20	11	20	5	16
Div. 22	6	14	4	10	18	2	16
Div. 23	18	17	17	20	11	11	9
Div. 24	19	22	13	12	6	18	16
Div. 25	5	12	1	16	7	17	16
Div. 26	23	23	22	4	22	9	19
Div. 27	14	15	8	1	3	21	20
Div. 28	20	11	21	9	5	19	16
Div. 29	10	21	2	3	10	12	19
Div. 30	1	2	14	2	13	8	13
Div. 31	3	6	5	5	1	24	23
Div. 32	8	10	3	7	8	16	13
Div. 33	11	13	10	17	19	1	18

Source: own calculations based on GUS, *Rocznik Statystyczny Przemysłu*, Warszawa, 2010-2017 respectively, www.stat.gov.pl.

Conclusions

The considerations carried out in the article confirm that competitiveness is a complex and difficult to measure phenomenon. Differences in the formulation of the definition of the term result from a different understanding of competitiveness. Competitiveness can be considered from the macroeconomic (i.e. of the entire economy), mesoeconomic (of a region, industry, or industry sector) and microeconomic (of an enterprise) perspective. In the article, the authors focused on the statistical assessment concerning the diversity in the level of competitiveness of manufacturing divisions. Based on the extensive literature, it can be assumed that competitiveness of economies is primarily their ability to maintain a sustainable economic growth, improve the standard of living of society and strengthen the country's position in foreign markets. The intensity of research conducted on competitiveness results in the dynamic development of theories and analytical methods related to this economic issue. New aspects of research on competitiveness include not only striving to improve the competitiveness of economies understood from the perspective of productivity growth, but also to achieve the so-called sustainable competitiveness, covering a number of areas that go beyond the economic results obtained.

Based on the empirical research carried out in this article which aims to assess the competitiveness of manufacturing enterprises, it can be concluded that the competitiveness of these enterprises is on average growing. This is evidenced by the increase in production, exports, labour productivity, and total factor productivity (TFP*)*. The constructed rankings allow us to state that particularly positive trends in terms of production growth rate were recorded in enterprises manufacturing beverages. The best results in foreign trade were recorded in the following divisions: *Manufacture of electrical equipment* (27), *Manufacture of other transport equipment* (30) and *Manufacture of motor vehicles, trailers and semi-trailers excluding motorcycles* (29). In the years 2010–2016, total factor productivity was negative in only one division – *Manufacture of wearing apparel* (14).

There are divisions that are thriving and have been constantly prospering in the market for many years. One can also observe manufacturing enterprises that are experiencing their revival and a huge improvement in competitiveness in a given market. These include the *Manufacture of furniture* (31) division, which has gained popularity in Europe and worldwide in recent years. Polish furniture is appreciated internationally due to its good quality and affordable price. Unfortunately, one can also see divisions whose competitiveness is very low, which can be caused by various factors, among others: too expensive production, a lack of innovation in production methods, shortage of specialised workforce, and many others. A high level of competitiveness is influenced by many interrelated factors that form a whole and translate into the performance of a given company. The empirical research carried out has confirmed that the competitiveness of manufacturing enterprises in Poland varies. The largest diversification of manufacturing enterprises is recorded in the sphere of sold production. The assessment

of competitiveness presented in this article does not exhaust the complexity of the issue but is just one way of measuring and assessing it.

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APPENDIX 1

Table 6

Manufacturing divisions according to the Polish Classification Activity (PKD) 2007

Polish Classification Activity (PKD) 2007	Section C – Manufacture
	Division
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture and processing of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical substances and medicines and other pharmaceutical products
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Manufacture of metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment not elsewhere classified
29	Manufacture of motor vehicles, trailers and semi-trailers excluding motorcycles
30	Manufacture of other transport equipment

Table 6 contd.

Polish Classification Activity (PKD) 2007	Section C – Manufacture
	Division
31	Manufacture of furniture
32	Other manufacturing
33	Repair, maintenance and installation of machinery and equipment

* Pursuant to the Act developed as part of "Operation 2007," the Polish Classification of Activity (PKD 2007) was introduced by the Regulation of the Council of Ministers of 24 December 2007 regarding the Polish Classification of Activity (PKD) (Journal of Laws 251, item 1885). PKD 2007 was developed on the basis of the Statistical Classification of Economic Activities NACE Rev2, introduced by Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 on the Statistical Classification of Economic Activities NACE Rev2, amending Council Regulation (EEC) No. 3037/90 and certain EC Regulations on specific statistical domains (EU Official Journal L 393/1 of 30.12.2006). Therefore, it maintains full methodological, conceptual, scope and code comparability with the NACE Rev2 classification. This classification is a conventionally accepted, hierarchically structured division of the set of types of socio-economic activities that entities pursue.

Source: own elaboration based on: *Działalność innowacyjna przedsiębiorstw przemysłowych w latach 2013–2015*, GUS i US w Szczecinie, Warszawa 2016, p. 20; *Nauka i technika w 2015 r.*, GUS i US w Szczecinie, Warszawa 2016, p. 195.

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