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CITIES IN THE POLARISED SOCIO-ECONOMIC SPACE OF POLAND¹

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

1. Introduction

Cities are special places in socio-economic space which perform 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 the 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

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(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 for 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 post-modernistic conditions for running business activity, characteristic of the current stage of cognitive capitalism development (Harvey 1990, Moulrier-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 indicated, 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 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 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) play an important role. 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 in character and these are heterogeneous areas where traditional (hierarchical) 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, 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.

In this context, an impact range of a growth and development pole becomes a particularly important issue. According to W. Gaczek (2013, p. 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 a time and spatial perspective) (Smętkowski 2011).

It is worth remembering that contemporary megatrends in socio-economic changes consolidated the polarised space of Poland to a significant extent. The socio-economic

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.

transformation along with post-modernistic processes activated in a globalising world and the integration of East-Central Europe with EU structures caused the Polish economy to open to market forces and global competition. This meant shock and a structural crisis for the Polish economy which at the end of the 1980s and the beginning of the 1990s was dying. 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 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 the differences in the situation in an 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, 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).

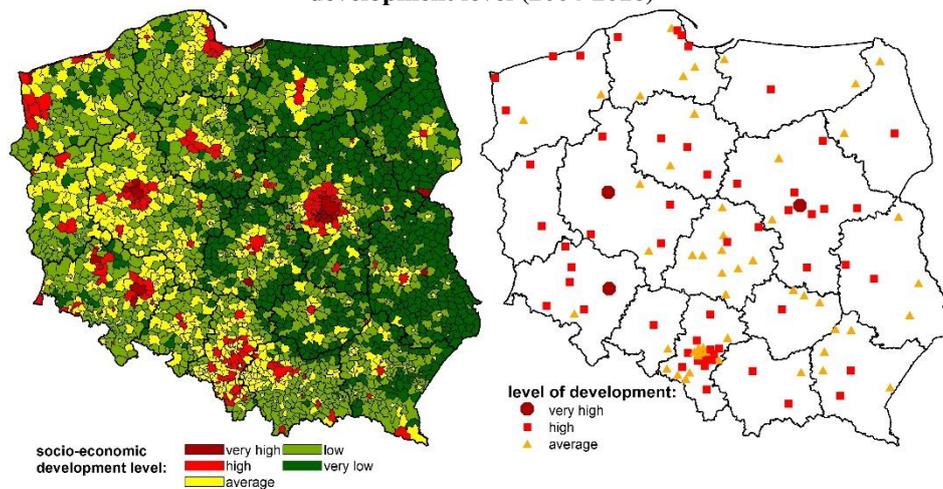
3. Socio-economic development level of the largest cities in Poland

The synthetic analysis and classification of spatial differences of the largest Polish cities carried out in terms of 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 (Fig. 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 to 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 socio-economic development level (2004-2016)

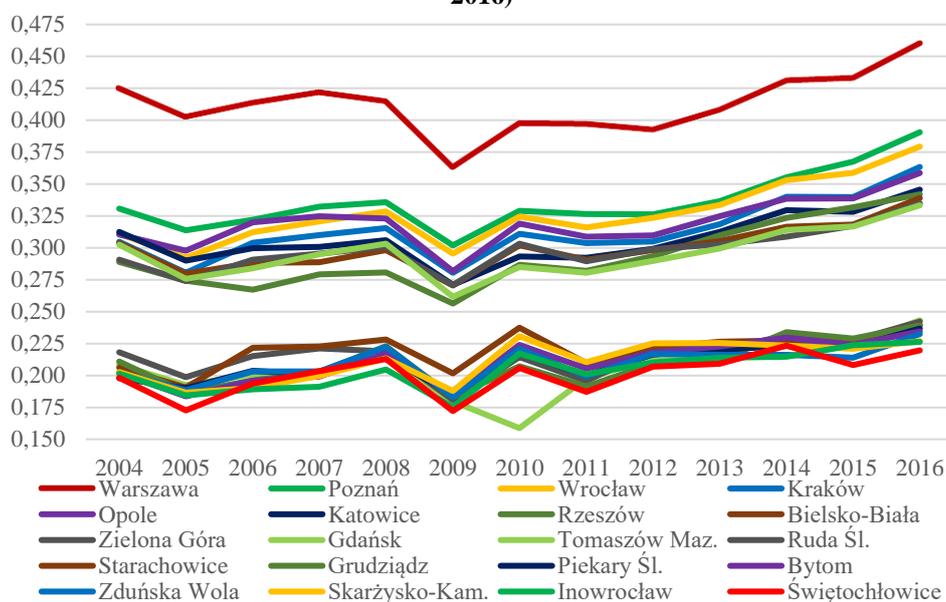


Source: own study.

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 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 from 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 “last ten” consists of, among others: Bytom with the population of 166,000 and Piekary Śląskie in Śląskie Voivodeship with 55,000 inhabitants (Fig. 2). The earlier research conducted by P. Śleszyński (2017) showed that in the

group of medium 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 dependency, because the matching function has the form of a second-degree polynomial, the graphic interpretation of which is a fragment 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.

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

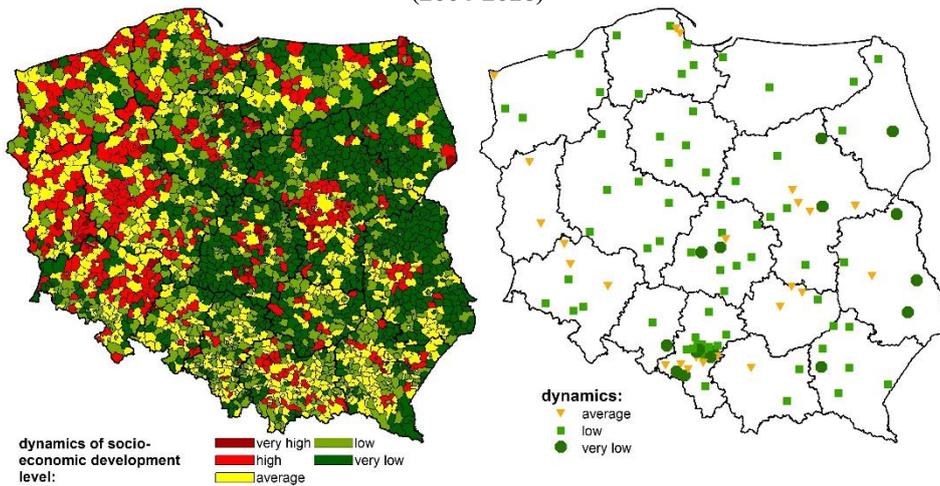


Source: own study.

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 (Fig. 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, analysis of the dynamics of the development level allows stating 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 socio-economic development dynamics and do not perform functions of growth poles in this regard (Fig. 3). In this case an impact of growth poles on development dynamics of their immediate surroundings is more noticeable.

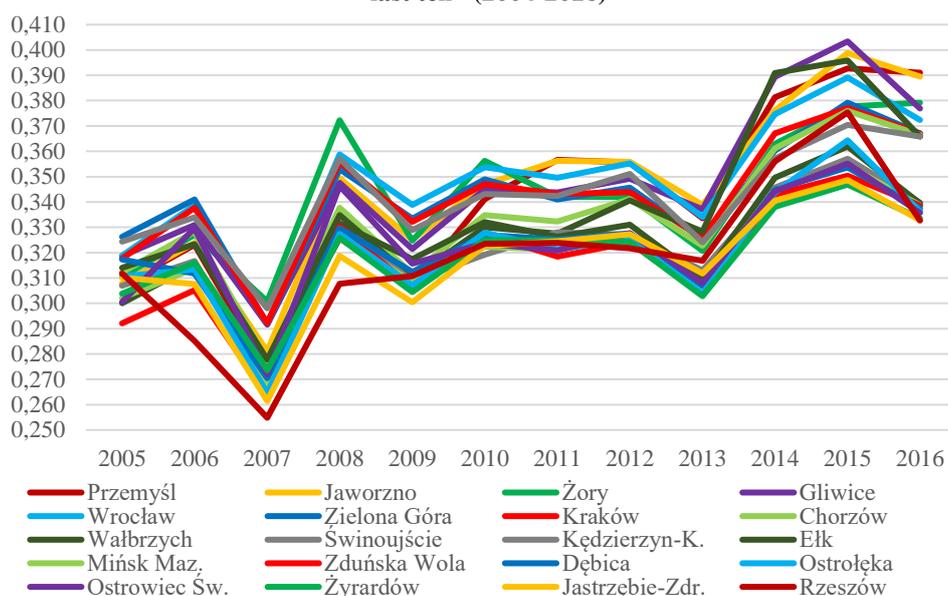
Fig. 3. Synthetic classification of communes in terms of dynamics of socio-economic development level (2004-2016)



Source: own study.

As regards the dynamics of the socio-economic development level, three classes of cities have been distinguished: with an average, low and very low dynamics of development. A total share of cities with a 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 a 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 proven by similar mean values of the synthetic indicator of the dynamics of the development level for the cities from the “first” and the “last ten” which were 0.342 and 0.320 respectively (Fig. 4). The lack of important mutual dependencies (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, what is noticeable is a minor decrease and a certain lack of changes until about 2012 and then an increase (Fig. 4). This situation should be also 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” and “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 dynamics³. The analysis was conducted concerning 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 centres⁴ (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, in a 35-km impact zone of regional centres, 20% of communes are characterised by a high or very high development level and 42% of communes – low or very low. 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 are in a much more favourable socio-economic situation. Certainly, not every regional centre has the same

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 W. Kisiała and B. Stepiński (2013).

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

impact on its surroundings (Figs 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).

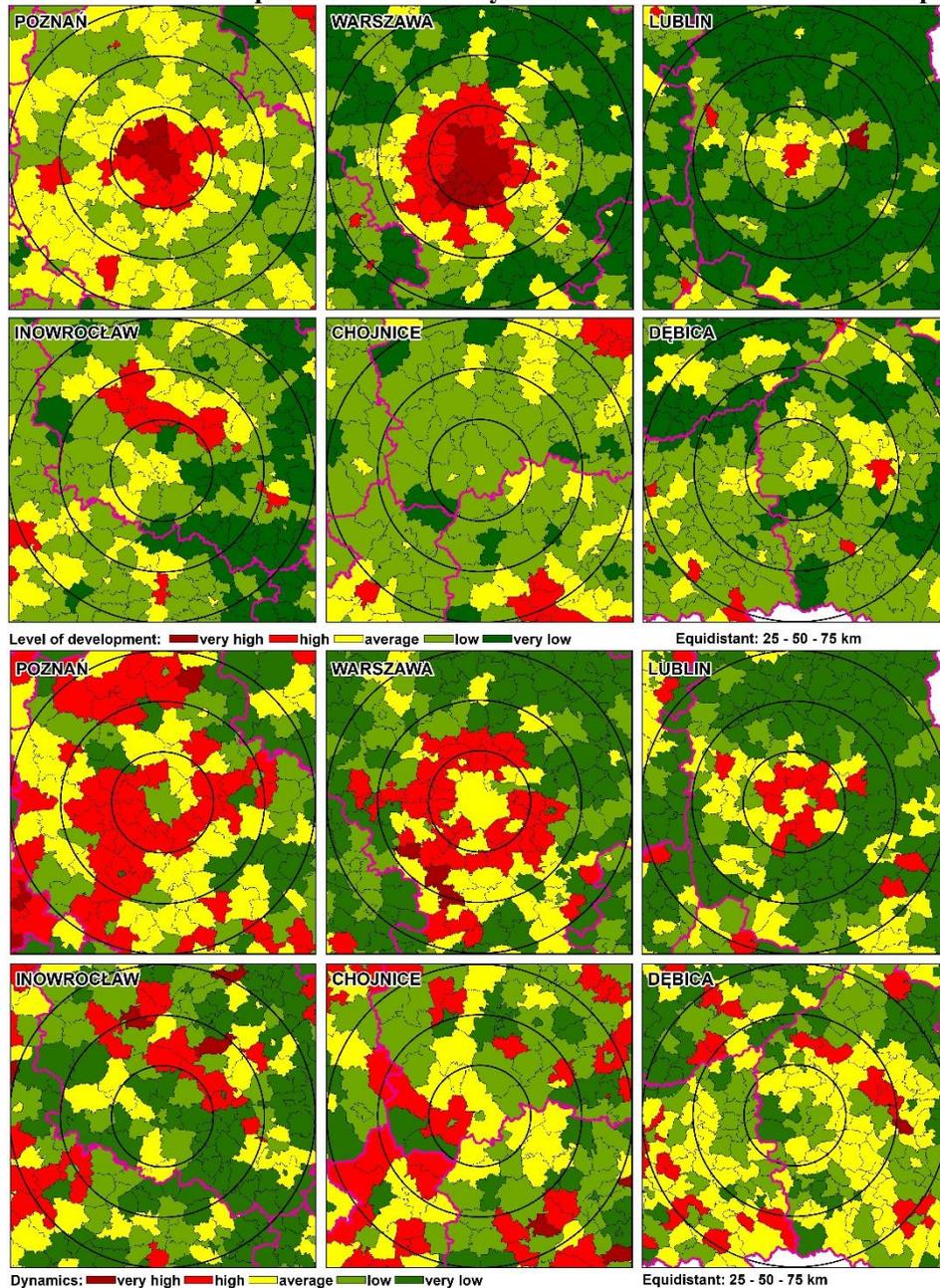
Table 1. Structure of communes in terms of development level (A) and its dynamics (B) depending on the distance from a voivodeship city (in %)

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
<i>generalisation *(very low + low) and **(very high + high)</i>										
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

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 communes in 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 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.

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



Source: own study.

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 may be 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 (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 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* (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 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 for 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 subregional 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 subregional centres should not consist in a simple redistribution of development factors (mainly financial capital) based on the compensatory model the efficiency of which has been already repeatedly questioned (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 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 cities 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, pp. 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 subregional centres before World War II, and large agglomerations – Lviv and Vilnius, which were 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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