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LINKAGES AND ITS
APPLIATION TO KEY
SPATIAL DEVELOPMENT
CHALLENGES IN POLAND**

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Jacek Zaucha*

Abstract

This article presents a synthesis of today's world economic knowledge and the results of the analyses concerning:

- a) the nature of spatial functional linkages, including network structures,*
- b) diversity of approaches concerning the application of spatial structures in the policies of encouraging the macro-level economic development of territorial units.*

This debate has been applied for discussing concrete dilemmas of spatial development of Poland i.e. the concept of polycentric metropolis. Such metropolis is a key part of the spatial development strategy for Poland i.e. Concept of National Spatial Development drawn up in 2008-2011 defining the objectives and priorities of the national spatial policy until 2030. Moreover, the article points to issues that require further research and deep analyses.

JEL classification: R11, R12, R58

Keywords: spatial concentration, agglomeration patterns, spatial development, spatial policy

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ECONOMIC DEBATE ON SPATIAL FUNCTIONAL LINKAGES AND ITS APPLIATION TO KEY SPATIAL DEVELOPMENT CHALLENGES IN POLAND

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1. Polish polycentric metropolis

Developed in 2008-2009 the *Experts' draft of the Concept of National Spatial Development – EPKPZK* (Korcelli *et al.* 2010), compared to the previous strategic documents, involves a significant change of emphasis, it departs from the concept of Polish territory as a bridge between eastern and western Europe in favour of stronger stress on the importance of spatial conditions for the use of endogenous capacities and growth factors. The emphasis is placed, as indicated by the new economic geography, on creating a critical mass of human and social capital, well-organized local space (labour markets, absence of congestion, high quality of life) and fostering development of the institutional system (law, administration). This approach has been also kept in the governmental (official) document prepared on the basis of the *Expert's draft* and approved in June 2011.

The core of both documents is the concept of a network metropolitan centre or polycentric metropolis (Fig. 1), *i.e.* interrelated functional regions of Polish cities/agglomerations with significant demographic, intellectual and production potential on a European scale and functional areas of lower levels connected to them. The authors see the desired state of the Polish space as a grid of interconnected functional areas of different spatial scale providing residents access to jobs and social services needed for development and preservation of human and social capital (Szlachta, Zaucha 2010, p. 163).

The concept of polycentric metropolis performs several important functions. Firstly, according to the previously described effect of coordination, it informs and creates the expectation about shaping a new global integration zone (GIZ) in this part of Europe. This zone would economically and socially interact with other areas of this type increasing competitiveness of the Polish space in Europe. Secondly, it creates a framework for public choice decisions on shaping the Polish territory in the absence of Long-Term National Development Strategy, in particular:

- it implements and promotes important territorial objectives such as polycentrism or spatial order, regarded as intrinsic values of public choice – for example, it is used to reduce the scale of urban sprawl around big cities,

without compromising on efficient use of labour resources (an important developmental asset in the country) and contributes to sustaining the critical mass necessary for development at the powiat (county) level¹;

- it tries to settle the dilemma of choosing between solidarity (economic and social cohesion) and competitiveness, e.g.:
 - ✓ it points out to benefits of joining and strengthening the existing economic, environmental and social potentials (with clear determination of the scale of conflicts connected with it);
 - ✓ it clearly defines the level of powiat (county) capitals as the level that sustains spatial cohesion of the country – at this level common standards of access to economic services of general interest are to be defined,
- it presents spatial operationalization in Polish conditions of the sustainable development paradigm – limiting the intensity of growth to nodes of networks and reducing the scale of extensification of spatial management which will lead to a decrease in the number and intensity of environmental conflicts.

Thirdly, it is assumed that in the methodological dimension the concept of polycentric metropolis will be an important contribution to the EU debate about the future of cohesion policy and the place of territorial cohesion in EU and national development policies (for that please see Zaucha 2011). Experience with its implementation will also show whether, it is appropriate in a longer term to retain the current breakdown of the objectives connected with competitiveness and cohesion in the EU budget and how relate them to territorial cohesion.

During the public debate in Poland the concept of polycentric metropolis , however, was largely criticized and accused of having too small load of social solidarity, of marginalization of regions without metropolitan centres, consolidation of existing territorial divisions and shallow approach to shaping the Polish territory. In order to address all those concerns in more evidence base manner more in depth examination of theoretical foundation of the concept and the key theoretical models of economics of flow would be desirable. In particular one should take a closer look on the existing knowledge on the essence of the network linkages and then examine different approaches of application of spatial structures in the macro development policies.

¹ Poland is divided into sixteen regions/provinces (voivodeships) composed of twelve up to forty two counties (poviats) – all together there are 379 county-level entities in Poland.

2. Spatial functional approach – network linkages

Barca Report (2009), as a foundation for the reform of the cohesion policy, brought the issue of spatial functional linkages back to the European debate. After Philip McCann, Barca points, *inter alia*, to spatial conditions for further increase of economies of scale. According to Barca, “in Europe, where space for large agglomerations to grow is limited and polycentrism is high, economies of scale and growth can be generated by ”networking between major agglomerations and their hinterland” and by “dense networks of big or middle sized cities” (Barca 2009, p.19). It is worth to consider then, the mechanism of functional relations development and their durability.

In economics, the functional approach has always been prominent. The market category is the crowning of the process since the market creates functional relations between manufacturing sector, households (as consumers and resource owners), financial sector, the state and the foreign countries, *i.e.* organises general economic flows (Zaucha 2010). However, market has a non-spatial character (Zaucha 2007).

The classical location theory (Blaug 1994, pp. 630-632), in accordance with the mainstream economics, can explain the development of functional relations only around a priori fixed set of poles and growth centres in order to avoid traps of the Starret’s theorem (1978). Von Thünen studies (1826) present the mechanism of the development of the crops intensity around the central town, while Launhardt (see Blaug 1997, pp. 604-609) completed Thünen’s theory of supply with the analysis of the market areas’ significance for the location of industrial plants. Launhardt studied optimal markets of competing producers located in certain points and providing services for evenly spatially distributed consumers. This approach was summarised in the perfect competition models as the Lösch demand cone (1940 [1961]) operationalized by Bos (1964). “All the leading elements of classical location theory are present in Lösch – Thünen’s analysis of areal production serving a punctiform market, Launhardt’s analysis of punctiform production serving an areal market, Weber’s theory of transport-and labour-orientation in the least-cost sitting of industrial plants, Hotteling’s analysis of spatial competition under conditions of duopoly and oligopoly” (Blaug 1997, p. 609).

The Lösch model is harmonised with Christaller’s well-known theory of hexagonal market areas (1933). It was aimed at explaining rules governing the spatial distribution of cities. According to Christaller, different ranges and thresholds for different goods and services cause the development of a hexagonal lattice. Market areas of central points (cities) producing goods and services of different order (different threshold and range) are overlapping forming a network.

The classical location theory does not, however, in principle present the reasons for the development of network linkages. International trade theories may be helpful in this matter. They are non-spatial but they attempt to answer the question on cooperation mechanisms between sometimes distant points. In accordance with the theory of international trade developed by Torrens, Ricardo and Mill, specialisation was determined by comparative advantages and terms of trade. However, the possibility of applying these solutions in explaining the interactions within the economic integrated circuit in one monetary system is limited and it requires additional assumptions concerning diverse levels of remuneration of the factors of production. The perspectives of establishing the mezzo network cooperation based on the constant differences in the levels of remuneration of the production factors seem to be limited, though.

Taking into consideration the spatial diversity in endowment of factors of production (Heckscher–Ohlin–Samuelson model – H-O-S) makes the issue of regions' different production specialisation more straight forward. In accordance with the H-O-S model, “countries tend to export goods” “that are intensive in the factors with which the country is relatively well-endowed” (Krugman, Obstfeld 1993, p. 75). Assuming the limited mobility of the factors of production, one may also generalise these considerations to the regional level.

In 1960s theories of international trade began to consider such factors as differences in technological levels (Hirsch 1967; Posner 1961), size of external market (Keesing 1965), attractive forces between countries, consumers' preferences for variety, distance, costs of transport and communication, i.e. spatial and spatially conditioned factors. Thereby, theories on intra-industry trade emerged (for more information see Zielińska–Głębocka 1996). Theory began to refer to empiricism now – the most often used models for predicting trading were the gravity models, in case of which the economic potential, distance and trading costs were the most important factors explaining the size of trading (see e.g. Overman, Redding, Venables 2001, p. 2).

As far as geography is concerned, Ullman (1957, 1980) had similar considerations. As one of the first, he suggested that geography should be treated as a science on interactions, meaning proving the existence of interdependencies between geographical areas (Taylor 2000). The Ullman's triad includes: complementarity, transferability and intervening opportunity. “These terms refer to interactions between regions, i.e. they explain why connections and flows between some centres are stronger than in other cases” (Taylor 2000). Complementarity results from the diversity of territories; it may be an outcome of interactions between natural and anthropogenic factors (e.g. economies of scale or economies of scope). This category is close to the idea of comparative advantages. The intervening opportunity is a function of the existing opportunities and their alternatives, *i.e.* it refers to competition intensity. It may be, for example, analysed on the basis of the number and quality of transport services related to transfer of people, goods and information

between the analysed points in relation to services available between these and other points. Transferability, on the contrary, refers to the costs of movement between the analysed interacting points (Taaffe *et al.* 1996, p. 72).

The network relations did not become the subject of proper interest of the mainstream economics until 1990s. Inclusion of spatial factors (distance, trading costs, and economies of agglomeration) into macroeconomic formalised (rigorous) international trade models was possible thanks to Dixit and Stiglitz (1977) models of monopolistic competition. That is how the research subdiscipline was established in economics referred to as a new economic geography (Fujita *et al.* 2000; Krugman 1991; 1991a; Krugman, Venables 1995). It searches for the reasons of concentration in increasing returns (economies of agglomeration), while the development of relations results from consumers' high preference for variety. Moreover, concentration results from the decrease in costs of movement due to transport innovations (Burniewicz 2009; Gutiérrez *et al.* 1996; Janelle, Beuthe 1997; Louma *et al.* 1993; Mikkonen, Louma 1999; Murayama 1994)². Telecommunication develops in a similar direction by decreasing the distance and increasing the role of metropolis (Hodge, Koski 1997).

In accordance with the new geography, in the case of strong cumulative or circular causation (forward and/or backward linkages *i.e.* spatial synergic effects) at little trading costs specialisation of production profiles is present rather at subnational (subregional) level than between countries (see Venables 1999). Specialised subregions have to interact with each other. Therefore, there are network relations present within the countries.

At the same time, Castells developed his concept of network society (1996; 1997; 1998). It emphasises the pro-development significance of interactions in postmodern social and economic reality. Castells indicates that the organisation of economy, public institutions and the social identity are the basic sources of the social changes dynamics. He believes that the important factor of social systems' dynamic is the development of modern telecommunication technologies and the change of traditional human interactions. The dominant interactions are organised around a new central value – information. It is connected with an increase of global significance of technopolises – cities organised around the ideas of supporting the development of modern technologies.

The concept of functional polycentricism was also developed in 1.1.1 ESPON project. However, it has not endeavoured to present a more comprehensive analysis of the phenomenon³. The attention should be paid, however, to the typology of network relations based on the flows (ESPON 2005, pp. 46-47). Interactions were divided into

² Partially after Taylor 2000.

³ Due to the lack of data, the present project has not endeavored to present a comprehensive analysis of network interaction between cities. Some important theoretical points are however presented and exemplified (ESPON 2005, p. 53).

institutional (cooperation between self-governments or development agencies by strategy development or exchange of experiences) and those resulting from spontaneous development of labour markets, housing market, goods and services market, and historical social and cultural factors, i.e. resulting from certain degree of complementarity (therefore, the project is focused on the research on functional specialisation of metropolises.). While analysing network relations, the authors of the report pointed the significance of institutional factors although they did not exclude market mechanisms. In their opinion, the connectivity was also important as it guaranteed the possibility of interaction at a distance.

The above mentioned economic studies and models, in the analysis of network linkages, are focused on the reasons for the emergence of businesses agglomerations and the conditions for economic interactions (mainly via trading and direct investments). Businesses concentration and faster development of certain points in space results mostly from economies of scale and economies of scope, comparative advantages and other determinants of complementarity, institutional factors, and geographical characteristics, such as accessibility, and, finally, coincidence and historical events. Linkages, however, result from the distance resistance, the intensity of preference for variety, and barriers related to financial flows and labour resources.

The new economic geography presents also the significance of public sphere intervention for the existence and intensity of network linkages. It proves the existence of multi equilibria situations . Therefore, the public sphere intervention may play significant role in the selection of the development trajectory at its early stage. Due to the catastrophic character of changes, exceeding threshold values of certain parameters (e.g. costs of exchange) causes the self-supporting process of cumulative causation. Otherwise, the scale of intervention may be relatively small. Changes, once initiated, have their own dynamics that is difficult to reverse or stop due to the lock-in effect – see Ottaviano 2002, p. 12. The initiated changes (peripherisation of certain areas, activation of other areas) are stable and difficult or impossible to reverse. The effectiveness of policy developing and modifying expectations is also worth mentioning. In accordance with the new geography, it is able to lead to changes in spatial business activity without the need for application of fiscal instruments - the so-called coordination effect. As far as spatial configurations are changed, costs go before benefits. Relocation means that first there occurs the loss of agglomeration benefit, and only after some time new agglomerations generate new benefits. Expectations may change the present situation – by stimulating relocation – if the today's discounted value of the expected future benefits exceeds the expected costs.

Moreover, the new geography emphasises the need for the considered intervention. Decrease of trade costs by the construction of new technical infrastructure between highly and poorly developed regions, for example, is not always favourable to the

latter. In accordance with the new geography, the existence of and differences in the prices of non-mobile factors of production precondition the application of “the active transport policy” in growth acceleration of poorly developed regions. The lack of these factors may result in polarisation of spatial distribution of business activity. Global and local spillovers models of the new geography indicate that the transport policy enabling the linkages between poorly and well developed regions by accelerating the development of the entire area leads to the concentration of production in the well developed regions. That is the reason for the suggestion to substitute development of infrastructure for transport of goods and people with intensification of diffusion of ideas and know-how.

In spite of these impressive results, many important questions determining the development and durability of network linkages and their interactions still remain unexplored. For example, the ability of different types of settlement units (of different potential and order) to be involved in network relations still requires deep analysis. The new economic geography models show that the lagging behind regions will benefit with very low exchange costs and low mobility of labour. Otherwise, there is a danger of the so-called backwashing effect. It seems, however, that the selection of factors determining the ability to be involved in network linkages is much wider. Certainly, these are institutional factors, ability to stimulate development endogenous factors, strategic planning (development of inspiring perspectives for changes), as well as local identity and other non-mobile endowments. This issue requires further research.

Another research problem is the creation and implementation of the development policy in network environment. As proven by many studies, municipal authorities are interested mainly in assuring high living standards for the citizens – their voters. Therefore, they often disregard the role of their cities in the development of larger territorial units. Urban policy concentrates usually on the cities’ structural problems (see Leipzig Charter⁴ with emphasis on the degraded urban spaces and the sustainable development of the cities⁵). In such situation, establishing network functional linkages may be suboptimal due to disregarding externalities therefore for the entities from outside the city, and, in the extreme cases, it may be ceased in fear of greater competition for local business entities.

Next issue that requires research concerns thresholds. There are no practical parameters determining relocation decisions in Poland known. Thresholds of accessibility and differences in the level of real wages, for the processes of labour

⁴ “LEIPZIG CHARTER on Sustainable European Cities” available at: http://www.eu2007.de/en/News/download_docs/Mai/0524-AN/075DokumentLeipzigCharta.pdf.

⁵ Toledo Declaration defined urban development in the broader context indicating that the urban dimension should be an integral part of the concept of territorial cohesion. Declaration available at: <http://www.mimlarodasi.org.tr/UIKDocs%5Ctoledodeclaration.pdf>.

and capital migration have not been defined. Without these parameters, spatial policy implementation is based on the principle of learning by doing.

3. Macro-spatial policies – spatial efficiency

The World Bank has an unequivocal position on the desired shape of spatial policies, that includes the primacy of the market over public intervention. Development, in its nature, is polarised. “Today, a quarter of the world’s GDP can fit into an area the size of the Cameroon, and half into one the size of Algeria” (*World Bank* 2009, p.10). Gill (2010) states that “prosperity does not come to every place at once, and to some places it does not come at all”. Concentration of production is inevitable, objective and natural. This applies also to Poland (Fig.2). The more affluent the country is, however, the less spatial differences in the living standards occur. The main mechanism of this process is migration of labour force (*World Bank* 2009, p. 62) and the process of spilling prosperity in the form of cheap and high quality goods and services available outside the place of manufacture due to good infrastructure. Spatial and regional policy should therefore encourage areas with the best development (*those of a high economic density*) and ensure their availability to the rest of the country. The key concept is the economic and spatial integration (*shift from spatial targeting to spatial integration*). It allows changing polarised growth (*unbalanced’ economic growth*) into increase in supporting social inclusion (*inclusive development*) (*World Bank* 2009, p. 20). Integration requires using mainly market mechanisms, *i.e.* agglomeration economies, migration and specialisation. According to the report and depending on the scale and complexity of the problem, instruments necessary for its implementation involve the following:

- *Spatially blind sectoral policies (institutions) in their design and universal in their coverage available to everyone regardless of location* (e.g. regulations affecting land, labour and international trade and social services such as education, health, water and sanitation) – sufficient to solve one-dimensional problems whose essence is too low density (intensity): e.g. incipient urbanization areas (local level) or countries with large areas of underdevelopment (national level).
- Infrastructure as a mean for connectivity – vital in solving two-dimensional problems, whose essence is shortage of density and low accessibility, e.g. rapid urbanization congesting areas (urbanization leading to congestion and choking off agglomeration economies) or nations with dense lagging areas.
- Spatially targeted programmes (interventions) such as fiscal incentives for some areas to reduce social and economic divisions – crucial for solving complex problems such as disparities inside cities in advanced urbanization.

The OECD perceives these issues differently. OECD experts (2009a) also refer more to arguments of efficiency than axiology. They highlight, however, that fixed

development disparities mean failure to use development resources and potential. Therefore, growth-enhancing policies from both points of view, on the grounds of efficiency and equity, should concentrate on the regions lagging behind. Agglomeration does not always accelerate social and economic growth and assumptions of linear relationship between concentration and development should not be taken for granted (OECD 2009c, p. 8). OECD's conclusions are based on results of studies carried out by this organization. Out of 78 metropolitan regions of the OECD, only 45% registered in the first decade of 21st century an increase in the GDP per capita that was faster than the national average. Two thirds of GDP in the OECD is generated outside the core regions. OECD researchers interpret this phenomenon as an opportunity for growth in all kinds of regions and ascertain that policies boosting agglomeration through infrastructural investments (in hard infrastructure) will not automatically lead to higher economic development (OECD 2009b, p. 3). What is more, as Barca and McCann state (2010):

- growth in less developed regions do not strengthen inflation tendencies due to weaker pressure on resources;
- possibilities of growth for the most developed regions are often limited by spatial conditions;
- increase of such regions creates significant agglomeration disadvantage;
- because of already achieved high level of development, such regions use their resources less and less efficiently, according to US econometric studies if the size of these regions was doubled, it would cause increase in production by 5-7%.

The policy proposed by the OECD as a starting point assumes that growth chances and potential exist in the entire territory of the country. We must, therefore, design activities supporting growth in a way that would encourage each individual region to reach its growth potential from within. Faster growth can be achieved when regions are able to mobilize their local resources and assets instead of relying more and more on support from the country or European Union. Fostering growth, even in regions that are economically lagging, is in the interest of national governments as it contributes to national output without hindering growth opportunities (OECD 2009b, p. 5). The OECD supports the concept of integrated growth placing emphasis on synergies between assets, growth factors (successful combinations of factors) and stakeholders and regions. Effective policies should (OECD 2009b, p. 5):

- link infrastructural investment with creating human capital and innovation potential since infrastructure is an important but not sufficient condition for growth (this is confirmed by the example of Germany that shows a limited role of infrastructural investments as a driving force for development of lagging behind and peripheral regions);

- emphasise investments in human capital, stimulating innovation, supporting research, since agglomeration of knowledge leads to positive effects of spatial diffusion and is a long-term factor of region's growth;
- pay attention to institutional factors, e.g. stakeholders' ability to communicate under local innovation systems.

The concept of development policy that is place-based, created by a group led by Barca (2009), relates to two approaches. Barca by definition denies spatial blindness of sectoral policies indicating that they have important though sometimes unintentional territorial implications (Barca, McCann 2010). According to Nijkamp's research (2010), even monetary policy is not spatially blind. Hence the need for coordination of sectoral policies for a specific territory. The essence of Barca's proposal is to break the uniformity of these policies. Different regions require different policy mixes. Development requires appropriate institutions, spatial structures and policies, and it is not possible without understanding the historical, cultural, political, planning context, without taking into account infrastructural factors, land ownership and their impact on administrative structures as well as institutional and settlement systems (Barca, McCann 2010)⁶. A characteristic feature of place-based development policy is to adapt to the specific context of territorial and spatial relationships, as well as aggregation and disclosure of preferences and knowledge of local actors (Barca, 2009, p. 4). This is in line with the territorial dimension of cohesion policy, namely the territorial cohesion, introduced in 2009 under the Treaty of Lisbon (on this topic, see. Duhr *et al.* 2010, pp.188-189, 208,219-223; Zaucha 2011).

This proposal provides a counterpoint for the current EU regional policy which focuses on compensating for regional differences in unit capital costs (arising due to production gap) and changes in flows of labour and capital. Previous EU activities were often based on "subsidies to firms or sectoral interventions, often with an exclusive focus on the creation of jobs or on physical connections between places. It is often based on the replication of best-practices through a top-down method" (Barca 2009, p. 4).

The idea of a place-based development policy borrowed from analyses of the World Bank respect for space and importance given to agglomeration economies, i.e. the need to create a critical mass of development. By contrast, the OECD conclusions are consistent with the postulate of an integrated approach and emphasis on activation of endogenous potentials.

⁶ "Development is about fostering the right kinds of institutions and the right kinds of spatial economic arrangements in the right places. But this itself requires an understanding of the profound contextual role played by history, culture, politics, transport networks, land use planning, and land tenure systems, on the existing and emergent institutional and governance structures and systems of places" (Barca, McCann 2010).

Barca (2009) did not, however, attempted to formulate hard priorities. Although exemplary groups of issues that could be supported from the EU level were indicated, he did not specified the sequence of investment in network connections on different geographical scales.

4. Discussion and conclusions

Conclusions to be drawn from this part of considerations indicate a wide margin of uncertainty in shaping macro-spatial policies that arrange network connections, both as to the nature of these linkages, as well as to their degree of hierarchy. Research has delivered a large number of useful observations regarding e.g. the need for such an integrated approach, taking account of territorial character when formulating policies or interdependence of relationships of creating growth centres and relations between them. Despite that on the grounds of existing analyses it is not possible to point out to optimal shape of spatial linkages on the macro scale. Further research on this topic is needed. Policy cannot, however, wait for its results. For these reasons, currently required solutions need to be subject to public choice decision mechanism. Decision makers usually refer to a broad international context (and even global) in order to answer questions about acceptable levels of spatial differences in living standards in within the country, desirable shape of the arrangement of the territory of the country or about the present and target model of development, including proportions among its economic, social and environmental components.

The allegations challenging the concept of polycentric metropolis therefore cannot be analyzed in the light of objective criteria of efficiency. The redistributive effects of polycentric metropolises and its impact on augmenting developmental differences in space cannot be easily predicted or taken for granted. Nevertheless, the answer about the shape of the Polish territory without polycentric metropolis might be useful in such a debate.

1. Firstly, the intensity of concentration processes would not be smaller without polycentric metropolis. However, it would, be reduced to the bipolar structure of Łódź-Warsaw and the South of Poland. It is indicated by both – economic models discussed in the analysis of the World Bank and available national surveys. For example, draining human resources by Warsaw, as in the case of the Middle Pomerania region, revealed in the analysis of the Institute of Geography and Spatial Organisation of the Polish Academy of Sciences, would probably be strengthened. Benefits from abandoning polycentric metropolis concept for territories outside the area of influence of large cities would therefore be illusory.
2. Secondly, the Polish territory would become more vulnerable to external shocks in the absence of a centre generating and organizing domestic flows. This would be a difficult experience, particularly for peripheral and less developed

areas, e.g. eastern Poland, Middle Pomerania or western borderlands. The current global crisis highlighted in a special way the importance of endogenous forces and growth factors.

3. Thirdly, the existing transport policy detachment from the broader development policy (in particular the policy relating to cities) could become even deeper, which would lead to further sectoral disintegration, and this is hardly desirable in the light of the OECD studies and models of the new economic geography.
4. Furthermore, “cohesion” foundations of spatial policy could be undermined. Instead of e.g. standards of accessibility to services of general interest, the bargain force of individual regions or political situation would determine the allocation of funds.
5. Similar risks apply to sustainability of development at the macro level, since the withdrawal from the concept of polycentric metropolis may result in further uncontrolled development along transport corridors.

These arguments do not expressly determine the validity of the concept of polycentric metropolis. The discussion on it requires, however, formulation of alternative ideas, assessment of their long-term effects on objectives and values that shape long-term development of the country and exploring alternative options of allocating funds for implementation of the competing concepts and ideas.

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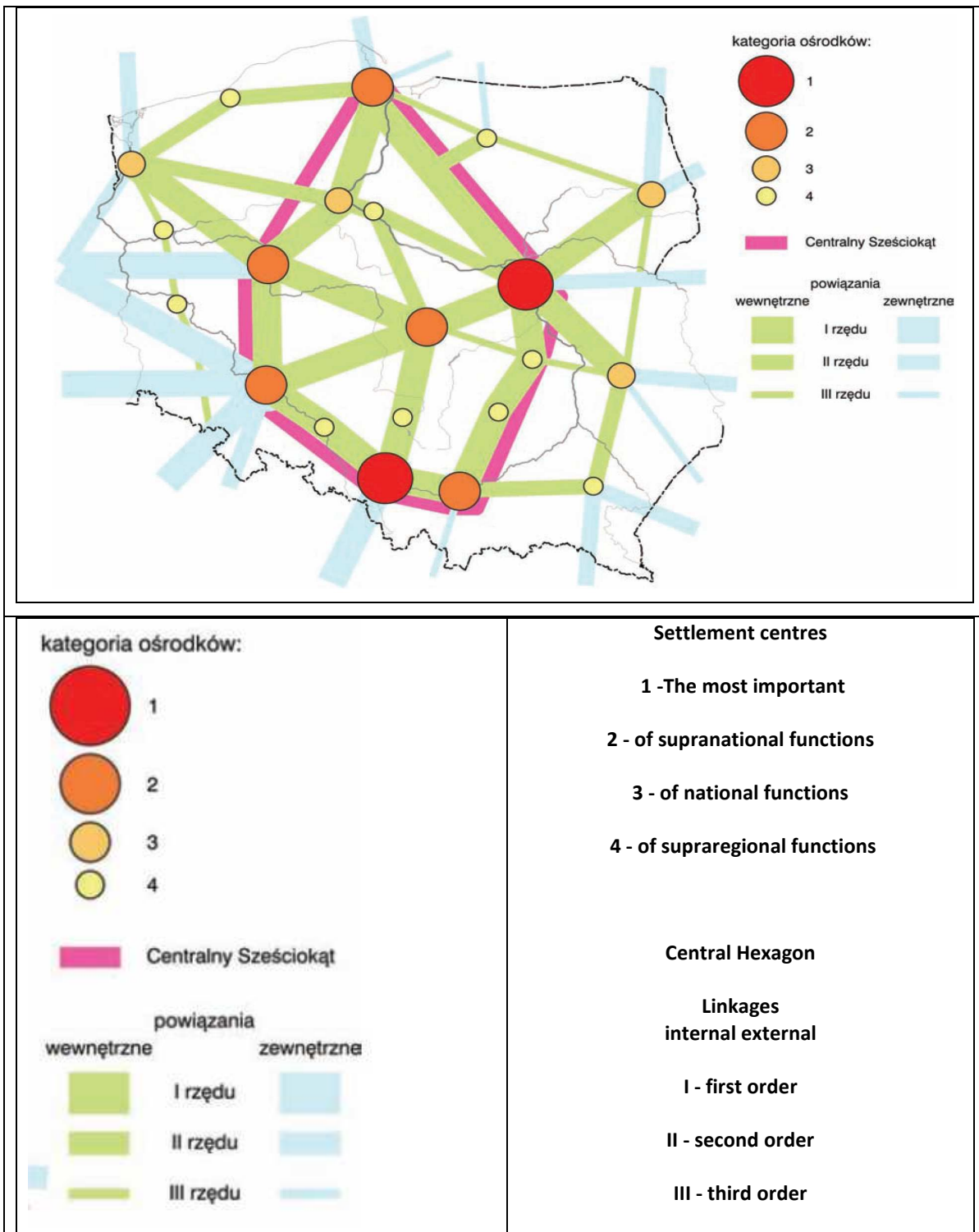
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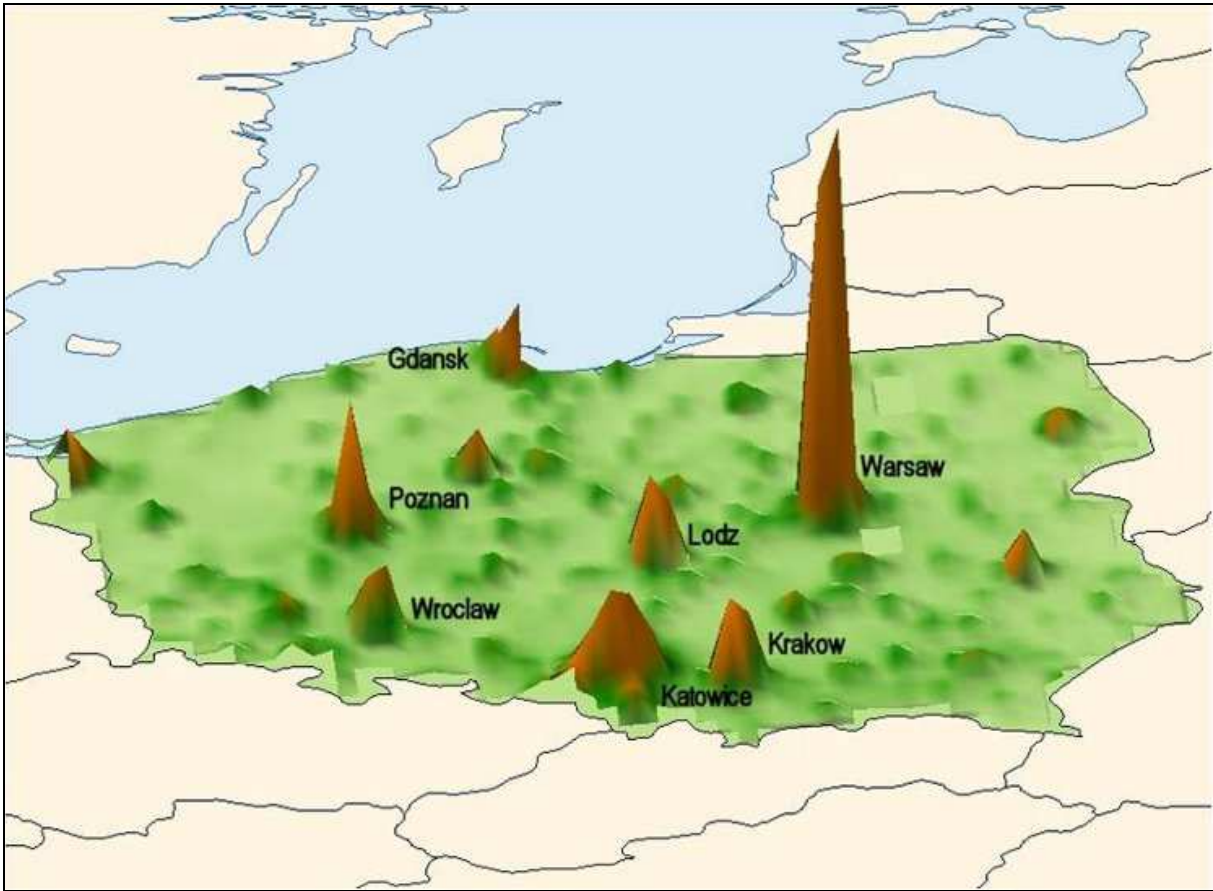
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Fig. 1. Model of network metropolis and functional linkages



Source: Korcelli et al. 2010, p. 142.

Fig.2. Spiky economic activity (GDP per sq km) in Poland



Source: World Bank GIS Laboratory after Gill (2010).



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