THE TRIPLE HELIX IN CLUSTERS - A METROPOLIS SHAPING FACTOR

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Biographical notes

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Abstract
A formal status of being a metropolitan area opens up vast opportunities for economic and social development for the whole region and a metropolitan area itself. However, literally only few big urban areas in Poland, including Lublin, are capable to meet all applicable statutory qualitative and quantitative requirements.

Lublin with its geographical location, population, established Special Economic Zone and Regional Science and Technology Park, numerous organizations and institutions, including local and regional business supporting agencies as well as many successful research-and-development units, has a solid base to become a ‘metropolis of knowledge’. Intensified co-operation between all three spheres within the framework of so called ‘triple helix’ could largely strengthen this process. The very concept of a ‘triple helix’ is based on interactions between three types of organizations – scientific centres, public institutions, including self-government authorities, and business. Lublin has all the assets to become ‘a cluster of knowledge’. Co-operation between scientific institutions, science and technological parks, business incubators as well as properly designed policies based on the economy of knowledge and therefore providing significant preference to high added-value projects are crucial for Lublin to be considered a metropolis of knowledge.

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1. The metropolis – general concept
Nowadays metropolization is one of the most important determinants of the modern development pattern. A majority of big cities in highly developed countries and some big cities in developing countries have became very prominent and highly efficient modern economic centres with well developed science and technology centres as well as service sectors, including consulting, financial, mass media and publishing services [Smętkowski M., Jałowiecki B., Gorzelak G. (2008)].

Currently, metropolises and metropolization processes attract vigorous attention of many planners, policy makers and researchers. This is because at the European level it is quite commonly believed that the development of metropolitan areas is crucial to spatial cohesion, sustainable economic growth, increased competitiveness and shaping a proper structure of the settlement system in the European Union [Smętkowski M. (2007)].

The Organization for Economic Cooperation and Development (OECD) defined a metropolitan area as a densely populated and functionally coherent area with a high concentration of varied business activities. Such areas have well developed economic links such as common labour market, supply chains, etc., they encompass many administrative units [OECD Report (2006)].
Economic, scientific, financial and cultural potential tends to concentrate in metropolitan areas and therefore economic and social development processes are stronger there.

According to a definition given by B. Jałowiecki, a metropolis can be defined as an urban agglomeration with more than 500,000 residents that additionally meets the following criteria [Jałowiecki B. (1999)]:

- the area offers top quality services and it should have many institutions and well developed infrastructure,
- it has significant innovative potential (technological, economic, social, cultural and political),
- the area concentrates many scientific and tertiary education institutions,
- the very location in many aspects is exceptional,
- the area concentrates many administration and governing bodies,
- it has excellent transport infrastructure and well developed communication links (for example an airport, etc.),
- the area should have extensive international contacts and participate in various international events.

Currently the Polish government has been working on a bill on metropolitan areas, also called ‘Metropolitan Act’. According to a draft released to the media on May 12, 2009 by the Ministry of Internal Affairs and Administration, a metropolitan area can be set up on any well developed area that represents spatially coherent settlement system. This system should cover at least one urban poviat with all its adjacent communities (gminas), providing that considered area has strong spatial and functional relationship, including intense flow of people, commodities and services. A metropolitan area should have at least 2 million residents with the population density exceeding 200 inhabitants per sq. km. According to the bill, the Cabinet is also authorized to establish a metropolitan area when ‘(...) at least three urban poviat are in direct spatial and functional relationship, provided that this area is inhabited by at least 500,000 persons and the population density is at least 200 inhabitants per sq. km. (...)’. It is predicted that within the abovementioned legal frames in Poland there could be established only 3 metropolitan areas: the Upper Silesian Metropolitan Area, the Warsaw Metropolitan Area and the Treble City Metropolitan Area [Polish Press Agency].
In our opinion definition proposed in the abovementioned bill is severely flawed. In literature a growing body of prominent authors express their views that the metropolitan status should not be defined by statistical criteria alone [Hołuj D., Hołuj A. (2006) p. 47] and the number of inhabitants has ceased to be an exclusive factor to determine a city’s position [Furman S. (2008) p. 1]. Paretka has specified the following factors that in fact constitute modern metropolises [Paretka T. (2007)]:

– networking,
– performing high level specialized metropolitan functions,
– economic and cultural potential,
– development of knowledge based economy, and
– governance and wise leadership.

In later paragraphs we will take a closer look at the networking and the development of knowledge based economy, supported by governance and wise leadership.

2. Metropolises as regional development centres

Metropolises can be seen from two perspectives, they can be considered as the poles of growth or the network arrangements. Nowadays however both perspectives interrelate. Phenomena tend to concentrate in a pole city, while the network arrangements form distribution channels for these phenomena [Hołuj D., Hołuj A. (2006) p. 57]. Metropolises are the centres of regional development.

The significance of metropolises and their crucial role in regional and national development was rightly emphasized in a document entitled ‘The declaration on the role of metropolises as regions of innovation and knowledge’, passed by the Union of Polish Metropolises (UMP) in April 2009. We can read therein that ‘(...) it is becoming quite obvious that we are witnessing that the world economy is subject to metropolization and in global economy based on knowledge the metropolises determine the development potential of any given country. No-one can deny that business activities tend to concentrate in metropolises; it is the metropolis that innovative potential of knowledge based economy is concentrated in (...)’ [Declaration (2009)].

A metropolis growing around a ‘core’ city tends to spread various impulses that stimulate further development of the whole area. According to Furman these development impulses may stimulate [Furman S. (2008) p. 11]:

– transferring tacit knowledge and technology;
– developing new tertiary education institutions (or branches of existing ones);
– developing regional systems of innovation,
– setting-up in adjacent areas regional branch offices by enterprises headquartered in metropolises or business relocation;
– setting up regional trading and service centres, logistics centres and wholesale facilities, etc.;
– developing transport and telecommunication infrastructure in surrounding areas.

J. Stachowicz noticed that the regions considered as complex systems encompassing interrelated networks of diverse human activities are being organized in order to create proper frames for different activities. Centres of societal activities are connected each other with various organizational and social links (for instance cooperation links within the enterprise value chain), they are also interconnected by the streams of knowledge and create the nodes in the network of information resources and values. Due to that network an organization, enterprise or even region becomes a specific being (societal system) with its own identity. In regions these nodes represent centres of various human activities for enterprises, organizations and institutions and they are organized and developed in order to facilitate specific production or economic goals [Bojar E., Stachowicz J. (2008)]. Knowledge development technologies are worked out in big cities, in metropolises considered as centres of regional development. They have suitable resources and needed assets to facilitate this process, including universities and resilient scientific centres, research-and-development units, well developed industry with many successful enterprises, etc. In such environments complex links between government institutions, business and science tend to develop forming the triple helix structure.

The triple helix is a model of innovation that embraces complex relations between the following three spheres – science (represented by universities, research-and-development units, science supporting institutions, etc.), industry (enterprises) and government bodies (including regional and local self-governments) that take place in the process of capitalization of knowledge. Developing the triple helix of university-industry-government interactions is crucial to regional development [Leydesdorff L., Etzkowitz H. (2001)]. Development potential of every region is increasingly based on cooperation and interactions between these three spheres. These interactions are formed at three levels – formal and organizational level (formal agreements, concluded letters of understanding and the like), cognitive level (knowledge flow structures and processes, communication links, data bases, data banks, etc.), and at the social and cultural level (trust and
confidence, structures developing the positive social capital). The lack of these links significantly hampers the flow of knowledge within a region.

3. Metropolises of knowledge

A metropolis can be concisely defined as a concentration of institutions, enterprises and investors geared to operate within the framework of the knowledge-based economy (knowledge economy). Development of knowledge-based economy is increasingly at the centre of attention of many programme documents on regional development worked out by the European Union’s institutions. Also in opinions expressed by many policy makers and economic development planners a proper pace of economic growth in the whole European Community cannot be achieved without assigning the highest priority to the development of knowledge and reorientation towards knowledge-based economy.

Knowledge-based economy is characterized by accelerated development of knowledge employed in the manufacturing processes and the growing importance of intangible assets and innovation, as well as the real revolution taking place in the resources of knowledge [Fic M. (2007) p. 75]. The triple helix theory first expounded in 1995 asserts that in all regions there are three spheres that permeate each other, that is knowledge, innovation and consensus. The sphere of knowledge is shaped by universities and research-and-development units carrying out their research work used by the industry and business, while the sphere of consensus is created by the representatives of different circles and professions in order to develop new strategies and work out novelty ideas, such as setting up clusters that constitute forums used for discussion and reaching consensus on regional development strategies, policies and regional research. The sphere of innovation constitutes a mechanism used to achieve the goals previously defined within the abovementioned sphere of consensus [Fic M. (2007) p. 80].

A very special role is attributed to technologically advanced cities of supra-regional significance, often termed as technopolises. A term ‘technopolis’ encompasses any city that has developed economic development strategy based on science and research-and-development traditions [Hołuj D., Hołuj A. (2006) p. 47]. This term is especially useful in relation to reputable world-wide recognized academic centres offering huge scientific potential, research infrastructure and resources that can be used by regional economy. But a technopolis cannot be properly formed and grow without other institutions and organizations that test developed technologies in practice such as hospital test and research units, clinical laboratories, libraries, trade and industry chambers,
professional associations and corporations, as well as many other institutions and organizations that operate in the field of widely understood sector of education and training, like various foundations, associations, and other non-profit organizations [Hołuj D., Hołuj A. (2006) p. 49].

4. The clusters

The very concept of clusters constitutes a new approach to creating international competitiveness of economies. It is based on a systemic approach and non-linear character of the innovation process. The clusters are a specific form of spatial organization of the industry and service sectors. They are considered as the most mature form of organization of production, capable to sustain economic growth in the post-industrial era [Szultka S., Brodzicki T., Wojnicka E (2004) p. 81]. Moreover, functioning in clusters gives enterprises vast opportunities to create and develop their competitive advantage.

In literature there is an exceptional consensus as regards potential benefits for local, regional and national economies that may result from operation in clusters. Observations show that successful clusters providing access to specialised and relatively cheap means of production, as well as other varied resources used in economic activity contribute essentially to the increased productivity of local businesses.

A survey on the impact of clusters on the regional and national economies carried out by the European Commission in 2002 [European Commission (2002) pp. 24-25] demonstrated clearly that the clusters contributed hugely to the formation of better economic conditions (for instance in Denmark), increased productivity and profitability (in Italy), stimulated economic growth and were perceived as a knowledge base (in Portugal) or as innovation centres (the United States), while in Finland the clusters formed the centres of knowledge.

The very fact that businesses operate in a close spatial proximity is very stimulating and supports innovation. Developing clusters tend to release entrepreneurial initiatives that result in new businesses being set up, which in an obvious way translates into new jobs generated in regional and local economies [Szultka S., Brodzicki T., Wojnicka E., (2004) p. 81]. Many observations give legitimate grounds to consider the clusters as specific drivers of regional development. The clusters through external effects, such as technological spill-over, affect the other sectors of local or regional economy and thus lead to increasing their international competitive position. Even the cluster-like structures by many are viewed as stimulators of regional development that are capable to contribute
significantly to the growth of export and attract considerable amounts of foreign investments. Cooperation within the clusters can produce a wide array of synergy effects and thus the cluster participants can benefit even more from the increased efficiency and the market competitiveness. Cooperation within the framework of clusters is particularly advantageous to small and medium-sized enterprises, they can combine their innovative potential, team up and apply for external funds more effectively [Bojar E., Stachowicz J. (2008)].

The clusters are an objective phenomenon which results from spatial concentration of various entities; these organizations enjoying each other’s confidence in some fields cooperate and compete in others. Cluster mapping is a very difficult and arduous task. A first survey of clusters emerging in Poland dates back to 1989. In a report on the development of clusters in Poland released by the Market Economy Research Institute in 1989 one can read that 18 cluster structures located in 8 out of 16 voivodeships have been identified. In 2005 the Organization for Economic Cooperation and Development published a report entitled ‘Business Clusters: Promoting Central and Eastern Europe’, OECD 2005, where we can read that ‘(...) regional systems of innovation emerging in Poland show a lot of similarities with the clusters (...). Both cluster mapping and regional surveys demonstrate clearly that Poland has an immense potential for the development of competitive cluster structures in the future. To date, however, this potential remains idle. Sadly, a survey of developed policies and institutions supporting small and medium-sized enterprises allow to draw a conclusion that there are very few initiatives that promote clusters effectively (...).’. The most recent report entitled ‘Development of Clusters in Poland’, based on the secondary data analysis has identified in Poland 51 cluster initiatives. Interestingly enough, all of these clusters are regional clusters carrying on business activities strongly connected with regional specificity.

In eastern Poland all mapped clusters are actually in statu nascendi. Present initiatives and attempts to establish clusters are inspired largely by the current trend in the European Union's policy promoting clustering and resultant financial support provided for such projects within the framework of structural funds. Quite significant financial support is also offered by regional self-government authorities that have developed strategies for the development of key sectors of regional economies. However, while developing any cluster supporting scheme one should always remember that economic policy can only remove development barriers hampering economic growth, strengthen the vitality of cluster initiatives and provide needed assistance, including capital and supporting services. There is no chance that economic policies can replace market mechanisms.
that create objective circumstances and conditions for developing a specific cluster in a given area [Plawgo B. (2007) p. 40].

5. The clusters in Lublin region
Cluster mapping carried out in Lublin region clearly demonstrates that cluster initiatives first and foremost emerge in the areas with high concentration of organizations or businesses operating in similar sectors. All in all, since 2004 five cluster initiatives exploiting regional agricultural potential were undertaken, including Ecological Food Valley and today non-existent hop growers cluster ‘Chmialaki Nadwiślańskie’, to mention the most prominent ones. Next four cluster projects were based on regional tourist resources (Lublin Cultural Cluster, the Cluster of Restaurateurs and Hoteliers, and the cluster ‘Loessial Ravines Land’). In addition to that, one identified cluster grouped enterprises operating in wood and timber sector (Lublin Wood Cluster) and one in health service (Health Resorts and Spas Cluster). In the pipeline there are another four cluster projects grouping businesses operating in the sector of services (e.g. the cluster ‘Cebularz Lubelski’). Some identified cluster initiatives are of supra-regional significance, such as the cluster ‘Association of Casting Components Producers KOM-CAST’ and the cluster ‘Aviation Valley’ [Bojar M. (2008) p. 194].

Scientific and research-and-development potential is one of the most precious regional assets. Lublin region has a well developed network of universities, schools and other education institutions, providing teaching and training at all levels of education. In the city of Lublin alone, the capital of the region, there are five public universities and five privately owned tertiary education institutions, offering both undergraduate and graduate studies. In the other cities of the region there are another 8 tertiary education institutions. Moreover, in the region there are based several nation-wide research-and-development centres. Lublin has one of the highest proportions of students and academics.

For many years now programme documents developed both at the regional and local levels have been attaching great importance to developing and strengthening cooperation links between science and business. Among the highest priorities of developed programmes is transferring the most recently developed technologies to business and adjusting currently offered academic syllabuses to the market requirements [Operational Programme (2006)]. These can considerably increase economic and innovative potential of the region. In this context very important are provisions
concerning science and technology parks, business incubators and guarantee schemes, incorporated into Regional Development Strategy.

The city of Lublin has won quite significant funding available within the framework of the Integrated Operational Programme for Regional Development in 2004-2006 (Action 2.6 – Regional Strategies of Innovation and Knowledge Transfer). The successful project ‘Lublin – the City of Knowledge’ is aimed at establishing and developing close cooperation links between universities with a view to setting up a permanent cooperation network (academic cluster of knowledge). It is expected that this academic cluster of knowledge will create the framework for more efficient spread of innovation and transfer of developed technologies from science to industry. This will facilitate better and more productive use of available regional intellectual potential that has been identified within the framework of previously carried out project ‘Intellectual Capital of the Lublin Region’ [Bojar E., Bojar M. (2007)].

Lublin’s initiative to establish the cluster ‘Lublin – the City of Knowledge’ is a good example how the city’s assets can be combined together and used to build its competitive advantage. However, as stated early, the clusters are an objective phenomenon and therefore occurring clustering processes should be accompanied by adequate support and incentives offered to science and technology parks, business incubators, as well as suitable policies developed and implemented in order to promote economy based on knowledge. Leydesdorff and Etzkowitz have made it clear that ‘the network interaction university-industry-government is crucial to economic growth based on knowledge’ [Leydesdorff L., Etzkowitz H. (2001)].

The role that the government should play according to the triple helix model is properly understood by the authors of a document entitled ‘The Declaration on the Role of Metropolises as Regions of Innovation and Knowledge’, passed by the members of the Union of Polish Metropolises (UMP) on April 7, 2009. The President of the city of Lublin was among the signatories of this declaration. According to its provisions ‘(…) the government and regional authorities should be keen promoters and supporters of cooperation between science, education and business. They should be able to create social and infrastructural environment for the development of knowledge-based economy. Not only is this the main task, but also clearly defined mission to be realized by governing bodies of metropolitan areas (…)’.
6. Summary
Metropolitan status opens up vast opportunities for economic development of the whole region. However not all urban centres, including Lublin itself, can meet tough qualitative and quantitative criteria to be formally declared a metropolitan area. Lublin with its geographical location, population, well developed network of public and private institutions, including business support organizations, regional and local development agencies, research-and-development units, Science and Technology Park, Special Economic Zone and many other thriving institutions providing support for innovative undertakings, has got all necessary assets to become a real metropolis of knowledge. Strengthened cooperation within the framework of the triple helix of science, industry and government as well as emerging cluster structures could largely contribute to this process. Clusters developing in regions markedly increase their competitive advantage [Bojar E., Olesiński Z., (2007) p. 40]. Network organizations, including clusters, stimulate innovation and transfer of knowledge [Bojar E., Stachowicz J. 2008 (2)]. Every cluster needs a leader capable to initiate, organize and coordinate cooperation between all involved parties within the cluster structure itself as well as with external partners. These functions can be performed by an institution or an individual representing government or self-government bodies, established research-and-development unit, or even by a big enterprise [Bojar E., Bojar M., Żminda T. (2007) p. 5]. Combination of advantages offered by the clusters with institutional and technological backup of the region developing according to the rules of the knowledge-based economy could produce desired synergy effects. If Lublin is successful in promoting and developing cooperation links based on confidence between all involved partners, within the triple helix of university-industry-government, and sustain this process by properly designed and implemented policies preferring high added value resulting from the premises of knowledge-based economy, it can achieve its ambitions of becoming the metropolis of knowledge.

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