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Clusters as a vehicle for regional development.

Clusters are a specific form of spatial organization of various sectors of industry and services regarded as the most mature form of organization of production in the post-industrial era. Research on existing cluster structures clearly demonstrates that clusters can be an important drive of regional development. Clusters have positive influence on the other sectors of local and regional economy and significantly contribute to the development of their international competitive advantage.

The clusters through external effects, such as technological spill-over, affect the other sectors of local and regional economy and thus lead to increasing their international competitive advantage. Even the cluster-like structures by many are viewed as stimulators of regional development capable to contribute significantly to the growth of export and attract considerable amounts of foreign investments. Cooperation within the cluster structures can produce a wide array of synergy effects and thus cluster participants can benefit even more. 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.

The concept of clusters represents an important step towards explaining the reasons for unequal distribution of economic activities in space and resultant disparities in economic development between various regions.

A groundbreaking model of clusters based on the triple helix of science, business and government has determined new approach to stimulating innovation in order to alleviate regional disparities and ensure sustainable hi-tech regional development.

The paper explores clusters as a crucial concept in modern management and contemporary economic development theories and discusses selected factors shaping clustering processes.

Introductory remarks.

A phenomenon of spatial concentration of economic activity was first observed over 200 years ago. Even today spatial concentrations of competing companies and other interconnected organizations are one of the most obvious and conspicuous distinguishing features of geographical regions. These concentrations attract a lot of attention of many prominent economists and think-tanks. The last century brought many theories trying to explain the reasons for uneven territorial distribution of economic activity.

In the era of progressing globalization when small and medium size enterprises are facing increasing competition on the international markets, the concept of clusters turned out to be a real breakthrough in management science. Policies designed to support development of cluster structures provide incentives to improve productivity, stimulate innovation in companies and thus enhance their competitiveness. The concept of clusters implies that international competitiveness is created through the coordination of specific activities undertaken at different levels and by different entities – central governments, local and regional self-governments, companies, different stakeholders and interest groups.¹

Cooperation and competition is typical for cluster structures. It was observed that companies and other organizations operating in clusters in certain areas cooperate, while in others compete.² Automobile clusters are a prime example of such behaviours. Jointly developed components are installed in cars sold under different, competing brands.

The most significant contribution to the popularization of clustering and the concept of clusters is attributed to an American economist Michael E. Porter who already in the 1980s represented so called positive school of strategic management and defined competition as ‘fighting with competitors’. A decade later Porter came to the conclusion that companies in certain areas will have to cooperate closer in order to compete jointly on the global markets and thus will create clusters.³

The appearance of the concept of clusters and resulting new approach to cooperation and competition have caused new challenges to management science. Clusters became a new

¹ Tamowicz P., *Uwarunkowania rozwoju nowoczesnych technologii w Gdańsku*, Gdańsk 2002, p. 32.

² Brodzicki T., Szultka S., Tamowicz P., Wojnicka E., *Niebieskie Księgi 2004, Rekomendacje nr 11, Polityka wspierania klastrów, Najlepsze Praktyki*, IBnGR, Gdańsk 2004, op. cit. p. 7, quoted from: Porter M. E., *Porter o konkurencji*, PWE, Warsaw 2001.

³ A quotation from Kalupa Ł., *Polityka wspierania klastrów w Polsce*, [in:] J. Trajkowski, *Rozwój przedsiębiorstw - strategia - integracja*, Zeszyty Naukowe 107. Poznań University of Economics Press, Poznań 2007, p. 107.

form of organization to which former management theories could not be directly applied since the cluster structure is devoid of the classic hierarchy based on the subordinate relations.

The concept of clusters fits into the new trend in economics which underlines the key role of spatial processes and non-economic localization factors. This trend appeared in the 1980s as a result of hotly debated and criticized traditional economic theories that could not be used by regional economists to explain occurring phenomena.⁴

Moreover, the role of clusters in creating competitive advantage increased markedly as a result of new technological and industrial paradigm recognizing non-material localization factors such as organizational and innovative abilities.⁵ Similar view was expressed by the Organization for Economic Cooperation and Development and the European Commission.⁶

The Triple Helix Model And Cluster Structures.

In 1995 Henry Etzkowitz and Loet Leydesdorff used the triple helix model to characterize the dynamics of relations between university, industry and government. The triple helix is a model that explains how the spheres of science, business and public sector institutions combine their efforts in creative cooperation in order to produce innovation. The triple helix creates the framework conducive to the transferring of knowledge between these three interdependent actors. Etzkowitz and Leydesdorff (1998, 2000) discovered that actors interacting within the framework of the triple helix, through their cross-fertilization of knowledge, create a spiral of innovation.⁷ Innovative projects which can affect significantly economic conditions in the European Union as a whole and their member states are created in the so called point of innovation, where the spheres of science, government and business overlap.⁸ Less attention is paid to individual projects and instead more preference is given to the integrated activities capable to generate new technologies, products and services. Innovative processes occur in a specific network of connections between companies, research-and-development units, non-government organizations (NGOs), public

⁴ Pietrzyk I., *Polityka regionalna Unii Europejskiej i regiony w państwach członkowskich*, Wydawnictwo Naukowe PWN, Warsaw 2000, p. 42.

⁵ Machaj F., *Klasy w ewolucji podejścia do rozwoju regionalnego*, [w:] M. Sławińska (red.), *Gospodarka-rynek-przedsiębiorstwo. Uwarunkowania rozwoju i zasady funkcjonowania*, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2008, p. 39.

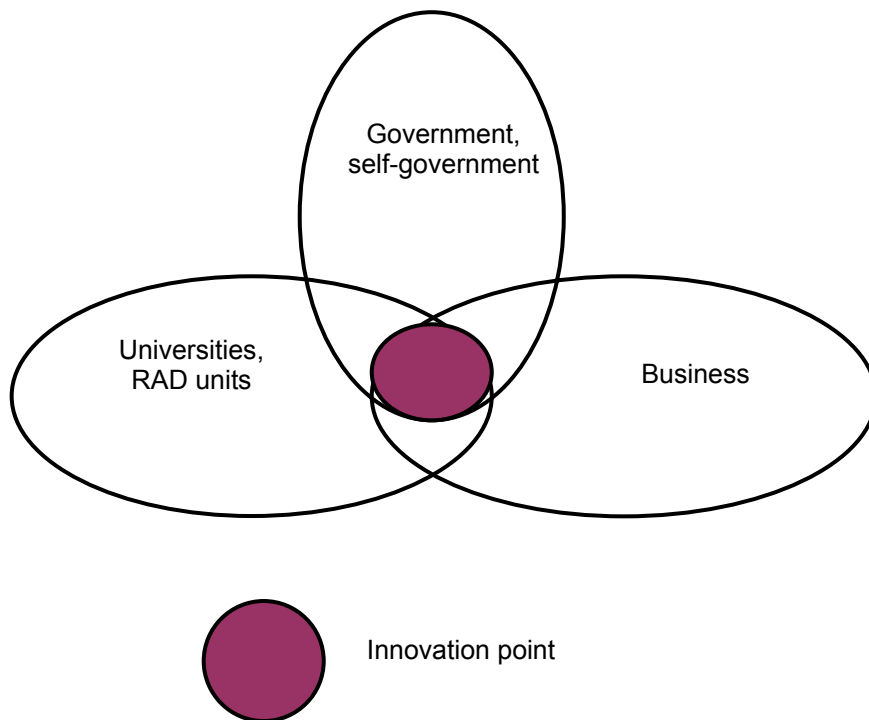
⁶ European Commission, *Innovarometer on cluster's role in facilitating innovation in Europe. Analytical Report*, Fresh Eurobarometer 187, The Gallup Organization, 2006.

⁷ Roberts A. C., *Procedures and Responsibilities Involved in the Implementation and Sustainability of a System of Innovation*, <http://www.essays.se>, p. 16.

⁸ Maciejczak M., Muniak R., *Zastosowanie...*, op. cit. p. 1.

administration and citizen initiatives. At the same time increasingly important is the role of relations and interdependence between dynamics of development of innovation by the private sector, the organization and development of the public sector and availability of specialized financial instruments.⁹

Figure 1. The Triple Helix Model.



Source: Bojar E. (eds.), *Klustry jako narzędzia lokalnego i regionalnego rozwoju gospodarczego*, Lublin 2006, p. 179; Etzkowitz & Leydesdorff (2000), [in:] A. C. Roberts, *Procedures and Responsibilities Involved in the Implementation and Sustainability of a System of Innovation*, <http://www.essays.se/>, (10.03.2009), p. 17.

As shown in the above figure, in the helix there is an equal distribution of knowledge between the actors. The point of innovation is where the knowledge is exchanged the most intensively and where, due to cooperation between the three actors participating in the helix, the synergy effects are produced.¹⁰ In theories, this model is referred to as ‘The Triple-Helix Model of university-industry-government relations’, which reflects the configuration of relations occurring within the clusters.

⁹ Maciejczak M., Muniak R., *Zastosowanie koncepcji potrójnej heliksy w tworzeniu narzędzi informatycznych dla sektora publicznego*, <http://www.maciejczak.pl/> (29.03.2009), p. 2.

¹⁰ Roberts A. C., *Procedures and Responsibilities...*, p. 17.

Network relations within the triple helix change participating institutions from relatively independent actors into interdependent ones. Government, universities and industry have an important role to play in the process of producing innovation. Moreover, as mentioned by Etzkowitz and Leydesdorff, universities and industry, previously relatively separate and distinct institutional spheres, in order to produce and maintain high level of innovation, now are assuming tasks that were formerly largely the province of the other. There is an important, but not dominant role for government and an enhanced role for the university in the Triple Helix. What drives this change in the role of these institutional spheres and their networks of relations is the need to sustain a high level of innovation.¹¹

Previously, various organizations functioned in hierarchically organized systems where their roles were precisely predefined by the system itself or the markets they operated on. Now they are expected to assume diverse, multiple functions and roles, not only within their own institutions, but also within these new networked and hybrid organizations.¹²

Presently innovativeness is perceived as the main factor determining competitiveness of companies. Using the Triple Helix Model, the roles of government or the university are no longer fixed or predefined, because interaction between the different functions is needed in order to generate and sustain the specific configuration of an innovation system. Innovation is no longer a function of a single institutional sphere such as industry. Innovation in ‘a system of innovations’ can itself thus be made the subject of a process of dissensus and consensus formation.¹³

Economists rightly argue that innovation is always associated with industry and enterprise. However, in the case of innovation systems one should also recognize the whole infrastructure of knowledge delivered by universities and research-and-development centres [Narin, 1997]. Not only scientific institutions assume the role of knowledge and human capital vendors, but act as ‘business actors’ responsible for creating intellectual property and setting up new companies as well. Moreover, self-government bodies enter the scene as entrepreneurs directly or indirectly, to variable extents, not only supplying the resources to the other actors or regulating their mutual relations, but as an instigator of organizational innovations and structural adjustments that increasingly form the basis of innovation systems. The partners are both participants and observers.¹⁴

¹¹ Etzkowitz H., Leydesdorff L., *The Transformation Of University-industry-government Relations*, Electronic Journal of Sociology (2001), <http://www.sociology.org/>, (14.03.2009), p. 3.

¹² Ibidem, p. 6.

¹³ Ibidem, p. 7.

¹⁴ Etzkowitz H., Leydesdorff L., *The Transformation...*, p. 8.

Some authors claim that the triple helix model is not sufficient to explain economic phenomena in the post-modernistic reality. Based on current developments and discoveries made in Canada in the field of biotechnology and nanotechnology Mehta attempts to point out that in order to function properly the helix needs the fourth actor – the audience, i.e. society. Mahta argues that only the quadruple helix of university-industry-government-society relations can ensure development of innovative solutions in the knowledge-based economy. Society is the final recipient (consumer) and verifier of concepts and products developed as a result of cooperation between the spheres of science, industry and government. It is society that takes advantage of the knowledge-based innovation system.¹⁵

We are witnessing that a new model of innovation is emerging, transforming and redesigning national and institutional boundaries. Boundary crossing provides an inspiration to innovation, at the levels of organizations, technologies, and knowledge. This system needs both functional differentiation and structural integration. The triple helix of university-industry-government involves internal transformations in the institutional spheres as well as expanded relations among different levels. Understanding the dynamics of these relationships is crucial to understanding the very purpose of innovation.¹⁶

Clusters as a breakthrough in regional development policy.

A transformation of roles played by economic system actors has determined new competences of the public sphere institutions in term of their involvement in creation of innovation and enterprise development. In economic literature there are many examples of good clustering practices, however, there is no universal model of setting-up and stimulating development of cluster initiatives. There are also contradicting opinions as to which actor is predestined best to take the leading role in the cluster formation process.

The phenomenon of clusters is attracting a lot of attention of politicians involved in economic issues which resulted in development of many cluster based-policy concepts.

Cluster-based policy (CBP) is a new type of strategic economic policy based on cooperation between many different market players. CBP incorporates a set of activities and instruments employed by authorities of different levels in order to enhance the competitiveness of local and regional economies by creating incentives and conditions for

¹⁵ Furtak J., *Nowe uwarunkowania polityki rozwoju regionalnego*, <http://ekonom.univ.gda.pl>, p. 3.

¹⁶ Etzkowitz H., Leydesdorff L., *The Transformation...*, p. 16.

setting up and development of regional and local cluster systems.¹⁷ Supporting development of interactions and connections between companies, and between companies and research-and-development units and public administration institutions is an essential ingredient of cluster-based policy. In particular, efforts should be focused on these cluster initiatives and cluster structures which can be effective stimulators of further economic growth in a region. Tangible effects of implemented cluster-based policy should be numerous cluster initiatives understood as organized efforts to increase growth and competitiveness of clusters within a region, involving cluster firms, government and research community.¹⁸

Cluster-based policy can be pursued at the national or regional level, or at both levels simultaneously. Government can be involved directly or indirectly, which means that implemented cluster-based policy can be oriented on supporting bottom-up initiatives (branch or regional) or can be aimed at the implementation of top-down initiatives.¹⁹ Many institutions are involved in the CBP formulation process, ranging from competent cabinet ministers, responsible for strategy formulation, setting the general development directions for selected priority areas, and provision of financial means needed to complete projected activities, to regional government and self-government bodies and other agencies. An active involvement of regional and local authorities is a sine qua non condition for successful implementation of cluster-based policies.

Many countries have developed comprehensive regional development policies based on clusters. Management of clusters and cluster initiatives is vested in existing institutions, self-government bodies or agencies established specifically in order to provide management of such projects. A recognition of clusters as a modern policy tool that can be harnessed to stimulate and accelerate regional development has significant ramifications on the Polish regional landscape. A report launched by the Organization for Economic Cooperation and Development (OECD) in 2005 stated that in Poland ‘emerging regional innovation systems show a strong similarity to clusters, especially in high-technology sectors’. These structures could not be termed ‘clusters’. In 2006, however, a team of researchers headed by prof. E. Bojar of the Lublin University of Technology identified in Poland 43 operative

¹⁷ Brodzicki T., Szultka S., Tamowicz P., Wojnicka E., *Polityka ...*, p. 16.

¹⁸ Solvell O., Linqvist G., Ketels Ch., *Inicjatywy klastrów w gospodarkach rozwijających się i w fazie transformacji*, original title: *The Cluster Initiative Greenbook*, Polish Agency for Enterprise Development, Warsaw 2006.

¹⁹ *Ibidem*, p. 17.

clusters and cluster initiatives.²⁰ In recent years a lot of new cluster initiatives emerged in Poland, some of them emerged in the Lublin region, one of the most underdeveloped regions of Poland and the European Union.

Summary

The concept of clusters has determined a new approach to competition between firms operating in close territorial proximity, entirely different from that offered by representatives of positive school of strategic management. The clusters have also redefined the position of public authorities in the complex structure of relationships between companies and have determined the new roles to be played by the government and self-government bodies in stimulating regional development.

Moreover, the concept of clusters and observed clustering processes turned out to be very helpful in order to explain uneven spatial distribution of economic activities and elucidate why certain regions develop faster than others. It helped explain interdependence and complex relations of competition and cooperation between actors in areas of high concentration of economic activities.

What we have learnt from cluster studies is that clusters and analysed clustering processes have improved the understanding of innovation systems. Cluster studies have been the corner stone of industrial policy adopted by many countries. Clusters are now perceived as an important policy tool that can be used to boost innovation and increase competitive advantage of companies and therefore increase competitiveness of regional and national economies on international markets. Today, it is regarded that cluster management includes building good partner relationships and cooperation links between local government bodies and agencies, companies and research community within the framework of the triple helix model. Effective cooperation between these three spheres is crucial to ensure economic growth in a region. Government, industry and research community interacting in the triple helix, through their cross-fertilization of knowledge, create a spiral of innovation. This groundbreaking model of cluster functioning based on the triple helix of government-university-industry relations is a complete departure from the dominating role of a state in

²⁰ Bojar E., Bis J., *Czynniki zagrażające klasteringowi – efektywnemu krowaniu i funkcjonowaniu klastrów gospodarczych w Polsce*, [in:] E. Bojar., *Klasy jako narzędzia lokalnego i regionalnego rozwoju gospodarczego*, Lublin University of Technology Press 2006, p. 182.

economy and a laissez-faire policy model. The roles played by actors transformed entirely, now the actors create three interdependent and cooperating spheres.

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