CLUSTERS AND CLUSTER INITIATIVES, LITERATURE REVIEW WITH A CASE STUDY FROM POLAND

Patrycja Pudło

INTRODUCTION

Cooperation ideas have become trendy in the European Union and in Poland recently. Numerous networks and clusters have been established. Some of cooperation ideas arise thanks to administration and business support organizations. Cluster pioneer was American economist, Michael E. Porter. His defining the idea of clusters in 1990 inspired the business and science world. Today, clusters and cooperation networks are a very effective worldwide tool in development policy at national and regional level. In Poland, past organizational solutions, such as co-operatives, guilds and economic self governments, have lost their effectiveness and become invalid. Accessing the EU has provided Poland with support programs, which are a tool of Union policy, enabling such things as funding of B2B relations, establishing co-operation between entrepreneurs, scientific centers and administration. Extensive research has been conducted and many clusters and co-operation networks have been founded nationwide. Innovation in business has been noticeably enhanced. All these co-operation-based relations were, are, and will be needed to fill the gap that has been impairing Polish SMEs’ competitive capacities in Europe [6]. Article presents cluster and cluster initiatives in Poland.

1 THE CLUSTERING PARADIGM

The whole concept of industry clustering is tightly linked with the concept of innovation, knowledge economy and regional development. It enables and facilitates the transfer of knowledge and technology among cooperating public and private institutions. However, clustering is not a new phenomenon. Since 1890, a British economist A. Marshall concluded that industries are often locally, respectively regionally concentrated, and they often receive various benefits of these externalities (f.e. savings of scale, sharing of risk and innovation costs etc.).

In the later stages, the clustering theories are further developing the concept of industrial concentration. J. A. Schumpeter referred to industry clustering in 1939, and similarly G. Becattini introduced in 1979 a concept of industrial districts based on the Marshall’s theory [16].

Finally, the key knowledge on clusters came from M. Porter, who in his book The Competitive Advantage of Nations (1990) proposed the so-called Diamond model of competitive advantage. Porter defined clusters as regional concentration of interconnected companies and institutions of particular industry. Thus, clusters are a group of interrelated industries and other entities important to competition. They may include suppliers of specialized inputs, providers of specialized infrastructure, competing enterprises, universities, or R&D institutions. Porter (1998) later defined cluster as „geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also cooperate”. Many clusters include governmental and other institutions -universities, standardization agencies, research groups or trade associations - that provide specialized training, education, information, research, and technological support. Clusters use to extend vertically to the sales channels and customers, as well as horizontally to the producers of complementary products and other enterprises in related industries in terms of skills, technologies, or common inputs. Porter created the Diamond model of competitive advantage of nations, clusters and regions that consist of four main elements. In the later stage, he added two more elements ant thus he broadened the Diamond model [10]:

1. **Factor conditions** - human resources, physical resources, knowledge resources, capital resources and infrastructure. Specialized resources are often specific for an industry and important for its competitiveness. Specific resources can be created to compensate for factor disadvantages.

2. **Demand conditions** - in the home market can help companies create a competitive advantage, when sophisticated home market buyers pressure firms to innovate faster and to create more advanced products that those of competitors.
3. **Related and supporting industries** - can produce inputs which are important for innovation and internationalization. These industries provide cost-effective inputs, but they also participate in the upgrading process, thus stimulating other companies in the chain to innovate.

4. **Firm strategy, structure and rivalry** - constitutes the fourth determinant of competitiveness. The way in which companies are created, set goals and are managed is important for success. But the presence of intense rivalry in the home base is also important; it creates pressure to innovate in order to upgrade competitiveness.

5. **Government** - can influence each of the above four determinants of competitiveness. Clearly government can influence the supply conditions of key production factors, demand conditions in the home market, and competition between firms. Government interventions can occur at local, regional, national or supranational level.

6. **Chance** events - occurrences that are outside of control of a firm. They are important because they create discontinuities in which some gain competitive positions and some lose.

As R. Rothwell developed the five generations of innovation development he pulled to the surface also networking tendencies of companies over time. Rothwell’s five generations of innovation provides an historic overview of industrial innovation management in the Western world from the 1950’s onwards. He found that each new generation was in fact a response to a significant change in the market such as economic growth, industrial expansion, more intense competition, inflation, stagflation, economic recovery, unemployment, and resource constraints. The five generations of innovation management is a descriptive model of how (manufacturing) companies structure their innovation processes over time: [12]

1. **Generation - the technology push approach** (1950- mid 1960’s) – suppliers are involved into innovation processes.
3. **Generation – coupling of R&D and marketing** (mid 1970’s – mid 1980’s) – companies are moving away from individual R&D projects.
5. **Generation – system integration and networking** (since 1990) – companies are tightly cooperating on matters of R&D, marketing and supporting matters.

Especially the last of Rothwell’s generations – **the system integration and networking** – that set in 1990s served as a foundation for industry clustering. System integration and networking were supposed to ensure the flexibility and hi-speed development. Enterprise processes were automated through business sources planning and maintaining information systems. A business ecosystem was in the centre of attention; and advantage of strategic partnerships, together with collaborative marketing and R&D activities have risen on importance [12]. The fifth generation of innovation had formed a framework for the concept of modern industry clustering that is directly linked to integrated business processes.

According to David L. Barkley and Mark S. Henry (2001), clusters include groupings of firms with diverse characteristics, and as a result, varied potentials for employment growth and local economic development [2]. Authors recognize different types of clusters depending on cluster participants. A cluster may consist only of firms engaged in the production of similar products; a clusters also may be composed of vertically integrated firms or firms linked by their reliance on specialized services or labor markets. Interaction among cluster members ranges from limited purchase - sale relationships to extensive interfirm collaboration, and state and local support for cluster firms ranges from passive to proactive.

The Cluster Policies Whitebook (2004) reviews some of the key elements of clusters, while they not need to be necessarily present in all clusters/ cluster initiatives [1]:

1. **Geographical concentration** – this hard aspect of clustering was identified already by A. Marshall. Firms are more likely to cooperate with local actors, and there are also other benefits derived from co-location in certain areas (availability of specific natural resources at certain area, lower transaction costs, specialization of supplies from factor markets, more effective information sharing, interplay with local customers). Clustering of businesses in specific area may drive the spill-over effect in regional specialisation and enhanced division of labour. Authors defend also a soft aspect of local concentration – the social factor – which is face-to-face contact.
2. **The specialization or common denominator of a cluster** – industrial clusters tend to be specialised, participating parties cooperate together in a core activity, which provides direction towards emphasis on the same markets or processes. The spill-over effect is evident also in this element, as cluster may work beyond one specific industrial sector.

3. **The cluster actors** – a cluster needs to be build from more cooperating enterprises. The establishing members (companies, governments, the research community, financial institutions), the core of the cluster, determine the specification of the cluster, they promote cluster initiatives and perform cluster actions.

4. **Cluster dynamics and linkages: competition and cooperation.** This element is linked to connections and interrelations between clustering actors as they are co-workers and competitors at the same time.

5. **Critical mass** - makes the cluster resistant to exogenous shocks or other kinds of pressures, including “losses” of companies, even when they might be regarded as “key companies”, as long as a critical threshold of remaining players is not exceeded. Every cluster needs a critical mass to achieve their inner dynamics.

6. **The cluster lifecycle** – as clusters are not only temporary initiatives, they pass through different lifecycle stages likewise other organisations. The first stage, agglomeration, is based on a number of companies and other actors in specific region. The second stage, emerging cluster, presents the beginning of actors’ cooperation around a core activity. The third stage, developing cluster, indicates new linkages (formal or informal) between actors as new actors in the same or related activities emerge in the region. The fourth stage, the mature cluster, determines a cluster that has reached a certain critical mass of actors, developed relations outside of the cluster, to other clusters, activities, regions. There is also an internal dynamic of new firm creation through start ups, joint ventures, spin-offs. The fifth stage is transformation, which indicates that in order for a cluster to survive and avoid stagnation, it has to innovate and adapt to external changes. The cluster may transform into one or several new clusters that focus around other activities or simply change the ways products and services are delivered.

7. **Innovation** – enterprises within a cluster are included into process of technological, commercial or organizational changes. These innovative clusters are supported by three driving forces: formation of new firms and technological diversification; inter-actor network creation; inner dynamics of cluster formation.

## 2 CLUSTER AND CLUSTER INITIATIVES IN POLAND

Problem of clusters and cluster initiatives was taken by Ketels and Solvell (2006), researches showed that: Poland had registered 156 clusters of different sizes, different structure and from different industries. Influence clusters and cluster initiatives were also subject of Cichoń and Figiel (2007) research. In publication of Cichoń and Figiel, number of clusters from several regions was correlated with value of GDP per capita. The results showed that, regions with a greater number of clusters had higher economic development (mazowieckie, śląskie, małopolskie and wielkopolskie voivodeship) [3, 8]. The less number of clusters was in świętokrzyskie, opolskie, warmińsko-mazurskie, lubuskie, and podlaskie voivodeship. Research of Skawińska E. Zalewski R. I. (2009) showed that, sector of food industry, transport sector, sector of logistics, sector of financial services and construction sector were the most popular sectors from Polish clusters. Research of Pudło P. and Pelegrinová L. (2010) conducted on eight bordering NUTS II regions (three regions of Slovakia and five Polish border regions) showed that, in south Poland was 30 clusters and cluster initiatives. ICT, energy industry, tourism, culture and free time were the most popular sectors. [13]. In catalogue, “Polish Cluster and cluster activity” (2012) we read that, until March 2012 were created around 212 of cluster initiatives. Mazowieckie Voivodeship has been particularly active in this field, grouping as many as 26, which ranks it first in the country. They are quite numerously represented in the Warmińsko-Mazurskie (18) and Śląskie Voivodeships (17). Most frequently initiatives are created by businesses, which is a good sign for the level of self-organization and cooperation of the business environment. Business support institutions are also quite active (e.g. regional development agencies, associations, foundations), R&D institutes and entities from the field of science. A majority of initiatives is relatively young (created between 2007-2009), but in connection with a high level of education of employees employed by their members this fact points to a significant development potential. Despite their young age, Polish clusters take on a number of activities aimed at the use of the synergy effect. These include: preparation of a joint offer, conducting lobby activities, placing joint orders, sales by a joint distribution channel. Picture 1 presents structure of cluster initiatives in Poland [6].
The analysis of sector structure of the Polish cluster initiatives (picture 1) reveals that, they function both in sectors recognized as innovative as well as more traditional. The most numerous is the ICT sector represented by 28 cluster initiatives located predominantly in the Mazowieckie (6), Małopolskie (5) and Śląskie Voivodeship (4). As much as 27 initiatives in 11 voivodeships operate in the tourist sector. Their strongest concentration can be observed in the Lubelski region in which there are 4 such initiatives. Other sectors are also well represented such as: food sector (20), eco-energy (18) and wood industry (13). Although there are 20 cluster initiatives in the food industry they are characterized by significant fragmentation – they are scattered over 12 voivodeships. Three initiatives each operate in the following voivodeships: Lubelskie, Łódzkie, Podlaskie and Warmińsko-Mazurskie and single initiatives in the remaining voivodeships. Special attention should be paid to the textile and clothing industry operating in the Łódzkie Voivodeship which groups as much as 5 cluster initiatives. This region centers the biggest number of enterprises dealing with the production of textiles (21,0%) and clothing (23,5%). The wood industry is strongly represented in the Warmińsko-Mazurskie Voivodeship which focuses 4 cluster initiatives, while other voivodeships only feature one. The initiatives from Warmia and Mazury relate primarily to the production of furniture and windows. The automobile industry is characterized by a marked concentration on the territory of the Mazowsze region – it groups most cluster initiatives from this sector (4), there are 6 of those in the entire country. Attention should be drawn to the presence of initiatives specialized in the production of “green” automobiles [4,5,6].

Porter M. claims that, local environment, specialization, acceleration of innovations, strategy based on coordination, trust and continues exchange are key elements of achieve competitive advantage [9, 15]. That’s why very important became local policy and infrastructure of several regions. Research of Skawińska E. and Zalewski R (2009) on chosen polish clusters showed that, the most important success factors are: fiscal and monetary policy, trends in economy, self-government, industry parks, incubators and R&D institutions.
CONCLUSION

Clusters are an inevitable part of regional development. A lot of research on clusters acknowledged that clusters are a better way for enterprises to enhance their performance as clusters are a source of innovation thanks to knowledge spillover and links created among enterprises. As a relatively new trend, clusters emerged also in Central Europe, mainly as a result of national and European support. On the territory of Poland there are 14 Special Economic Zones (SEE) with the total area of 11 thousand ha, which make it possible to conduct business activity on preferential conditions. Special Economic Zones enable the entrepreneurs to obtain special benefits for e.g. tax reliefs [14].

Analyze of cluster and cluster initiatives in Poland showed that, the number of clusters is rising. The most popular sectors from polish clusters are: ICT, tourist, food sector and eco-energy.

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Author’s address:
Mgr. Patrycja Pudlo, PhD, The Faculty of Business Economics with seat in Košice, Department of management, patrycja.pudlo@gmail.com
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Abstract

Cluster and cluster activity based concept, in recent years, has motivated more and more policy makers and economic development practitioners to turn this concept as new tool to strengthen regional economies. Poland also see advantages of clusters concept. In recent years, in Poland we observed increasing number of clusters. Article shows theoretical background of clusters approach. The aim of the article was to present cluster and cluster activities in Poland.

Key words

Cluster, Cluster activity, Cooperation Ideas, Economic Effectiveness.

JEL Classification

L14, O52