CLUSTERS AS A FACTOR OF LOGICAL ECONOMIC DEVELOPMENT, THE CASE OF CZECH REPUBLIC[*]

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Abstract

The concept of clusters, as the empirical phenomenon of geographical concentration of economic and innovation activities, is recognized as one of the key factors for strengthening small and medium-sized enterprises, which are believed to be the driving force of local economic development. The evidence suggests that local economies that are based on networking and cooperation between companies, financial institutions, public and academic actors, as well as different organisations, generate better outcomes. Clusters are significantly related to prosperity and local economic development by providing an environment that is conductive to innovation creation and knowledge spillovers, vertical integration and specialisation, pressure for competition, supply chain creation, and competitiveness and employment growth.

The role of national governments at all levels in creating and implementing cluster policies has been increasing in the last decade. Through various policy actions, programs and cluster initiatives, governments provide much needed support and initial platforms for dynamic growth of clusters.

The case of Czech Republic is presented as an example of successful cluster policy development. The analysis of two specific clusters, supported by the government, illustrates their significant impact on economic development of regions.

Key words: *cluster, small and medium-sized enterprise, local economic development, innovation, knowledge creation, competitiveness, cluster policy, cluster initiative.*

INTRODUCTION

There is little doubt that growth and prosperity of nations depend to a great extant on the ability of SMEs to generate employment, create added value, GDP and innovations, as well as fasten economic growth. Due to its vitality, flexibility and responsivity, SME sector is resilient to external shocks and is more likely to adjust successfully to dynamic changes on the global market. SMEs are more innovative and tend to be more productive than the larger ones. Furthermore, they are considered to be crucial parts of the supply chains, providing materials and services to large businesses and distributing goods to customers. However, SMEs are facing numerous difficulties, especially when obtaining economies of scale in acquisitions of inputs such as equipment, materials, capital and consulting

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services, and when internationalizing certain functions. Surveys have showed that the majority of SMEs' problems are caused by their isolation, rather than their size.

The concept of clusters, as the empirical phenomenon of geographical concentration of economic and innovation activities, is a modern description of what had been known under the heading of „industrial districts" back in the 19th century. The work of geographers on the localisation of economic activities has contributed significantly to what is referred today as a concept of clusters. It has been widely believed that agglomerations of related industrial activities are an important factor for economic development. More recently, the concept has been popularised by Porter's "diamond model" of competitive advantage.

Because the evidence clearly shows that clusters are significantly related to prosperity and that SMEs benefit from them, the concept has gained enormous popularity in recent years. Enterprises are not isolate entities, but rather interact with suppliers, clients, competitors and government institutions when carrying out their business activities. Enterprise's competitive advantage is to a great extent determinate by the quality of those relations and linkages. Clusters provide competitive advantages for those firms participating in them.

Clusters can be defined as a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills. [19, p.9] Clusters may range from the local to the national, but the common element of most clusters is the concept of networking and cooperation between companies and institutions. Entities participating in clusters are linked by externalities and complementarities and usually located near each other, thus enjoying economic benefits such as access to specialized human resources and suppliers, knowledge spillovers, pressure for higher performance in head-to-head competition, as well as increased productivity and operational efficiency as a result of linkages and synergies across firms, more efficient access to public goods, better coordination, and diffusion of best practices.

Instead of being limited to a specific sector, industry category or relations that develop within an individual value added-chain, cluster involves various actors, each focused on its core business, among which a strong complementary specialisation exists.

Clusters often evolve spontaneously over time. However, the role of national governments at all levels in creating and implementing cluster policies has been increasing in the last decade. Through various policy actions, programs and cluster initiatives, governments provide much needed support and initial platforms for dynamic growth of clusters. Because it is seen as an effective instrument for improving SME's performances, competitiveness and innovativeness, the policymakers in developed countries have put the concept of clusters in the focus of their attention. Clusters are recognized as the key drivers of competitiveness and innovation, and thus of growth and jobs. It was widely believed that clusters, as a prerequisite for SME's more dynamic development, would enable the achievement of the most important goal set in the Lisbon strategy – "making the EU the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010". [4]

While relevant literature recognizes different approaches when identifying the main characteristics or the key elements of clusters, it can be stated that the concept generally comprises of the following seven dimensions: geographic concentration, specialisation of clusters, the actors, dynamics and linkages – competition and cooperation, critical mass, the cluster life cycle, and innovation. [3, p. 1]
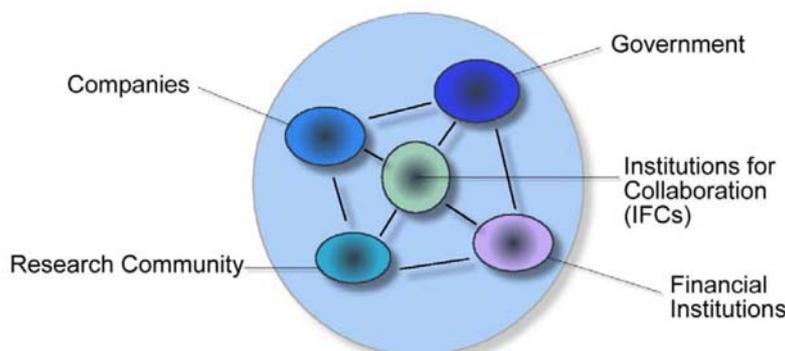
Geographic proximity enables firms to benefit from external economies of scale, social capital and learning processes, as well as facilitates the flow of knowledge and the interactions that lead to the innovation process. Clusters are characterized by complementary specialisation of all actors, who are interlinked by their core activities. The presence of competition within a cluster pressures participating

firms to acquire competitive advantages by lowering costs or prices, increasing quality, gaining new markets and customers. The competition is equally important within and between clusters. On the other hand, firms cooperate around cluster's core activity, tending to achieve economies of scale and scope by pooling risks and resources, and by developing complementary functions.

Despite of the differences that may occur in the way clusters grow or work, they, by default, involve the following actors: [15, p. 19]
   – Companies including both SMEs and large firms - competitors, suppliers of goods (e.g. machinery and input components) and services (e.g. consulting, legal and business services), buyers, firms in related technologies sharing common factors.
   – Financial institutions – traditional banks, commercial banks, venture capital, private equity and angel networks.
   – Public actors – national ministries and agencies involved in industry and economic development policy, regional policy, science and technology policy; regional agencies and regional units of national bodies; local communities.
   – Academic actors – universities, research institutes, technology transfer offices, science parks.
   – Private and public private organizations for collaboration – NGOs, chambers of commerce, cluster organizations, formal networks, etc.
   – Different kinds of media creating "stories" around the cluster and building a regional brand.

Figure 10.1. Categories of cluster actors

Source: [3, p. 25]

A certain minimal concentration of workers, managers, entrepreneurs, experts, financiers, etc. is needed in order for a cluster to benefit from multiple interactions, knowledge flows, learning and innovation processes. Critical mass makes the cluster less sensitive on external shocks and the loss of specific resources or skills that are crucial for its further development. As clusters are organizational forms with long-term perspective, they tend to undergo similar stages in the development process. It is generally agreed that all clusters pass through the following phases: agglomeration, emerging cluster, developing cluster, mature cluster and transformation. The last common element of clusters refers to innovation. By stimulating unplanned interactions, personal exchanges and an intensive science-industry interplay, clusters provide fertile ground for the creation of innovation.

CLUSTERS AND LOCAL ECONOMIC DEVELOPMENT

As a result of an ongoing process of globalisation, business environment is characterized by uncertainty, dynamism and turbulence. In order to survive and grow, companies are compel to continuously introduce new and better products, participate in a fast growing markets, maintain leadership positions in terms of quality and technologies, as well as offer competitive prices for their products and services. In attempt to handle challenges and meet the needs of the market, firms focus
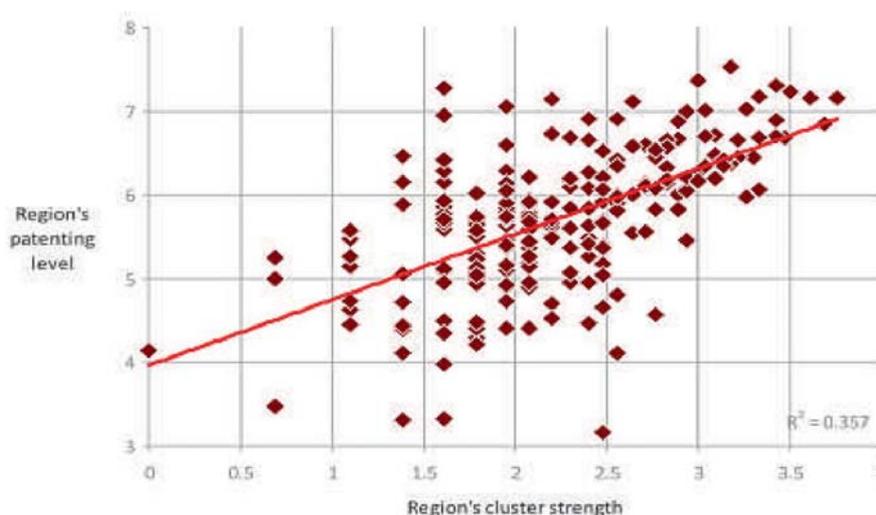
on their key competences and only on parts of the value chain. Knowledge and cooperation have become the key factors of success.

Clusters are related to local economic development by providing an environment that is conductive to innovation creation and knowledge spillovers, vertical integration and specialisation, pressure for competition, and supply chain creation which enables local SMEs to increase their productivity, operational efficiency, export performances and competitiveness. Geographic proximity contributes to knowledge flows and dynamic social interactions, which are believed to be crucial for innovation creation.

Numerous case-studies exist pointing out to the impact of clusters on regional and local economic development, employment and innovation. The data analysed by the European Cluster Observatory shows that there is a positive correlation between clusters' strength and the economic prosperity of European regions. Regions with a higher share of employment in strong clusters are generally more prosperous. Porter's study (2003) of US clusters shows that US regions that have a high proportion of their total workforce located in "strong" clusters enjoy a higher level of economic development in the forms of average wages and employment growth. [17, p. 29] A study by Wennberg and Lindqvist (2008), covering 4,000 new entrepreneurial firms in knowledge intensive industry sectors in Sweden, shows that at the firm level clustered firms created more jobs, higher tax payments, and higher wages to employees. [17] Several academic studies suggest that there is a strong relationship between clusters and increased innovation. For example, a comparison between cluster performance and the best performing innovation regions in Europe shows that 7 out of 19 regions having a strong cluster portfolio are among the top three most innovative regions. A study on the European biotechnology industry [2] shows that a large majority of European biotechnology firms, public research organisations, and patenting belong to a relatively small number of local clusters.

Firms in clusters can achieve higher levels of efficiency, by benefiting from agglomeration effects in form of economies of scale and scope, and can have access to critical resources and capabilities which do not exist within an individual entity, but are available through networks inside the cluster. Intensive and regular interactions between buyers, suppliers and organizations lead to incremental improvements, thus creating both technical and non-technical innovations, with the ability to diffuse quickly within clusters. Furthermore, new and better economic combinations of skills, capital and technology often occur within clusters.

Figure 10.2. Cluster strength and patenting level in European regions

Source: [19, p. 23]

The positive relation between local clusters and economic performance can be pointed out by their long-term economic impact on unemployment, income and the local start-up rate. Clustered firms are more innovative, patent and trademark innovations more often, create more jobs and more dynamic economic growth. There is a positive correlation between number of patents produced within a region and strength of regional clusters, as it is shown on Figure 10.2. Considering patents as an indicator of innovation performance, it can be concluded that clusters foster innovation at regional level.

Due to the fact that cluster-based regional economy generates better results, regional and local authorities in developed countries have become more active in creating and implementing initiatives and policy measures to promote cluster development. More than 130 different policy measures in support of clusters have been identified in EU member states. Following their examples, developing and transitional countries have significantly relayed on clusters as a factor of more dynamic regional and local development. Aiming at promoting entrepreneurship, innovation, creation of more and better jobs, as well as improvement in competitiveness and export performances, both financial and non financial support has been provided to local SMEs, institutions and other possible cluster actors. The analysis of the case of Czech Republic will illustrate the contribution of successful government support to cluster and, consequently, local economic development.

THE CASE OF CZECH REPUBLIC

The development of clusters and cluster policy in the Czech Republic was primarily based on an effort to join the European Union. EU put significant pressure on the Czech government, which was expected to focus on promoting SMEs and their alliance, with the aim of increasing the competitiveness of domestic economy, in line with fulfilling the Lisbon strategy goals. Clusters, as an effective tool for fostering competitiveness, gained rapidly in importance. The Government has put efforts into creating programs for funding and supporting the development of SMEs.

Cluster development support in the Czech Republic can be divided into four periods:

1.   Period before entering the EU (2000- 2004)

During this period, the Ministry of Industry and Trade has developed a program aimed at promoting cooperation between small and medium enterprises. [18] To obtain the government support, in the form of grants, companies were obliged to fulfil certain criteria, such as to determine the minimum number of partners and the selected areas of activity. Grants covered up to 50% of project costs, but were limited to CZK 1.5 million. Besides MIT, the Czech Moravian Guarantee and Development Bank were also engaged in granting subsidies. Although concrete steps in developing cooperation between small and medium enterprises had been taken, the complete cluster development support program was still missing, while only particular sub-measures were being realized.

2.   Cluster development process (2004- 2006)

The concept of cluster policy, based on the possibility of drawing on finances from the Structural Funds of EU and running the Operational Program Industry and Enterprise (OPIE), [9] had been created during these years. The OPIE was established by the Czech Republic Ministry of Industry and Trade (MIT) in May 2004. The Program, as a part of the National Development Plan, was the basic document dealing with the preparation of the industry sector for the policy of economic and social cohesion. The OPIE's main idea was to preserve and enhance the competitiveness and efficiency of the industrial potential, improving economic performance and promoting structural changes in the industry to achieve significant progress towards approaching the economic level of the EU region. The Program funding was carried out by the EU Structural Funds and also by the Czech state budget. The program was defined by the following priorities: business environment development, development of enterprise competitiveness, and technical assistance. The intention to support the creation and development of clusters was outlined within the first and partially the second priority.

The Clusters Programme was introduced within the first priority, aimed at supporting two types of projects: [8]

    a) Identifying suitable companies for the clusters, evaluating the viability and contribution of clusters, as well as carrying out studies prior to the foundation of clusters -the activities regarding the preliminary studies were based on the description of sectors in the given geographic area and the linkages among individual participants. Regions, organizations authorized by regions, research institution and tertiary institutions engaged in cluster initiatives were usually the final recipients of grants. After fulfilling specific conditions, such as minimum number of participants and implementation of activities leading to the development of innovation and increasing of export, concerned parties could get financial subsidy from 200 000 to 1 million CZK (25,69 CZK/1 USD in 2004). Up to 75% of eligible costs could be covered by the grant. Forty two projects were chosen, receiving the total amount of 32 584 million CZK.

    b) Foundation and development of clusters- the main goal was to support cooperation between clusters' members on joint projects oriented on research and development, market research and competition, propagation etc., including the development of cooperation with research and tertiary institutions in order to enhance competitiveness, innovations and economic growth of clusters' members. Seventeen applications, in total of 344 008 million CZK, were submitted and 13 of them received 233 490 million CZK.

Table 10.1. Financing clusters (2004- 2006)

Program	Number of received applications		Rejected		Approved	
	Number of projects	Amount (CZK)	Number of projects	Amount (CZK)	Number of projects	Amount (CZK)
Established clusters	17	344 008 000	3	97 934 000	13	233 490 000
Identified clusters	60	46 877 000	17	12 881 000	42	32 584 000

Source: [6]

3. National Cluster Strategy (2005- 2008)

National Cluster Strategy [5] represented a summary of the general principles, measures and goals to be accomplished regarding the cluster policy in the Czech Republic. The document was based on examples of successful initiatives in the EU member states, and the possibility of their implementation in the Czech Republic. Cluster initiatives. The following objectives were recognized as the crucial ones by the strategy:

    – Targeted and coordinated usage of clusters, in order to link sources provided by the Ministry of Industry and Trade, the Ministry of Local Development, the Ministry of Labour and Social Affairs and the regions of the Czech Republic, in attempt to maximize the impact and the benefits of the granted aid.

    – Increase in the efficiency of joint activities, by deepening the dialogue between the regions, tertiary education and the private sector.

    – Identification and support of sectors and industries, which are recognized as the most important ones for further economic growth.

    – Assistance to groups of SMEs, by supporting joint activities directed at identifying opportunities for cost-sharing, overcoming barriers to traditional growth, as well as at participating in the development of the EU technology platforms.

    – Creation of a framework suitable for analysis, monitoring and performance evaluation of cluster initiatives and their impact on regional and national economy.

    – Preparation of an overall study on the Czech Republic industrial structure, for the purpose of identifying the most export potential sectors in the region.

4. Operational Program Enterprises and Innovation (2007 – 2013)

The OPEI [6] project provided ground for more effective withdrawal and usage of financial resources from the EU Structural Funds. The program is aimed at increasing the competitiveness of the Czech economy and the level of innovative performances of industrial sector, together with frontline services, by the end of the program period. The OPEI is an important tool for fostering the development of small and medium sized enterprises in the period 2007 – 2013, and it has defined the framework for the implementation of the Cooperation program, pointing out the importance of the development of clusters and business alliances. The Program provided an infrastructure for the creation of clusters, the development of poles of excellence and technology platforms for improving linkages between public and private sector in fields of science and research, as well as for the realisation of activities related to promoting networking, education and more effective usage of resources in support of cooperation.

In comparison with the previous programs, The Cooperation Program contained some differences. Firstly, the list of eligible costs was extended. Secondly, the administrative obstacles were reduced, and thirdly, the amount of funds was increased to the total of 5.3 billion CZK.

THE ANALYSIS OF SPECIFIC CLUSTERS IN THE CZECH REPUBLIC

With attempt to illustrate the success of cluster initiatives in the Czech Republic, two specific clusters are presented.

1. The National Machinery Cluster (former The Moravian – Silesian Engineering Cluster)

Was founded in 2003 and included 35 members.[20] At the beginning, due to the wide diversity of opinions and certain disagreements inside the cluster, the project faced considerable challenges, which lead to the decrease in interest among membership. As a result of the change in cluster leadership in 2005, the project was revived and new objectives and visions were set up. Furthermore, the cluster revival was supported by a grant from the Clusters Programme within OPIE. Such a positive trend has caused greater interest of the companies, and at the end of 2006 the number of members was almost doubled. NMC became the largest cluster on the territory of the Czech Republic, with the overall sales amounting to 70 billion CZK, and with 22.000 employees. In 2008 it was renamed the National Machinery Cluster (NMC).

A number of projects and activities were realized within a cluster, involving various companies, institutions and organizations. Some progress was made concerning the rehabilitation of vocational education in the eyes of the public in the Moravian-Silesian region. Induction centre-Cluster school was established, providing practical trainings for technical sciences' students. One of the purposes of the training and learning courses was to prepare students for easier employment after graduation. Furthermore, the Communication and information centre was created within a cluster. Specific database for engineering firms was introduced with the goal of enabling efficient and simple partner search service. The Engineering Innovation Park was formed in order to promote innovation and identify necessary requirements for more intensive innovation development. The cluster was engaged in supply chain development, thus increasing employment, operational efficiency and productivity of local engineering firms. Certain activities regarding human resources development and science and research promotion were realised, as well.

2. Cluster OMNIPACK, cooperative

The emergence of cluster was preceded by the association of 35 entrepreneurial entities (on the territory of three regions: Pardubice, Hradec Kralove and Vysocina) cooperating in the field of production. One of the cluster's main goals was to gain access to the grants for joint activities and projects. The OMNIPACK was the first cluster that applied for a grant in the second phase of the

Clusters Programme. In the "Entrepreneurial project of the year 2007" contest, it was awarded the "Cluster of the year 2007". [21]

The cluster was primarily focused on innovation, research and development. The establishment of the OMNIPACK cluster centre resulted in acquiring 13 facilities for the use of modern technology for developing new packaging systems. Development of marketing activities and search of market opportunities was another issue the cluster was concerned with, namely for the purpose of helping its members increase their market shares. The cluster also provided efficient promotion of participating firms, mainly by organizing joint appearances on international fairs, as well as advertisements in professional journals. Coordinated effort was made to develop human resources, by strengthening relations and intensifying interactions between education institutions and companies. The introduction of the E-learning system was aimed at improving technical and professional skills of local employees, while the emergence of the cluster's unique information system promoted development of information and communication technology. Cluster was actively engaged in organizing joint purchasing, thus enabling participating firms to benefit from economies of scale and optimisation of supplier-customer chains.

Generally, cluster initiatives in the Czech Republic can be considered as successful ones, especially in terms of their contribution to economic development of the specific regions. Firms benefited from participating in clusters in mutual ways. Cluster provided ground for an increase in their operational performances, productivity, innovation capabilities and competitiveness. Clusters, furthermore, created environment conductive for entrepreneurship promotion and the creation of new SMEs, thus contributing to local and national employment and economic growth. In addition to the focus on fostering entrepreneurial spirit among the local population, the concept of clusters provided support to existing enterprises and the needed restructuring and diversification of sectors. Clusters are an important factor for strengthening cooperation and communication between different business entities, which is believed to be crucial for knowledge and innovation creation. By encouraging innovative activities and efficient use of R&D, further development of specialized knowledge and skills, know-how, and quality suppliers, clusters contributed to intensive investment attracting in the analyzed regions. Clusters served as a ground for the concentration and coordination of public support for economic development of the regions. From an economic point of view, an increase in competitiveness of businesses and consequently of the entire regions, and the country as a whole, together with the dynamic economic growth, strengthening innovation capabilities and interlinks, the creation of more and better jobs, and the development of supply chains in specific industries, can be considered as the most important benefits from the process of clustering in the Czech Republic.

Clusters made the most positive impact in the Moravian- Silesian region. While in the recent past, the region suffered heavy economic and industrial difficulties, significant progress has been made in the past few years, mostly due to the creation of cluster. As a result of strong technological and innovation base and an increased competitiveness of the entire region, intensive industry growth has been achieved. By focusing on supporting major industrial sectors and more efficient use of financial resources from the regional budget, the cluster contributed to overcoming difficulties and obstacles of SMEs and industry, which lead to an increase in labour efficiency and employment, lower economic disparities among regions, as well GDP growth of the region.

CONCLUSION

Clusters are associated with employment growth, an increase in innovation and competitiveness, thus fostering more dynamic local, regional and national economic development. Today, there is substantial evidence that suggests that regions with strong clusters are innovative leaders, while regions with no clusters fall behind. The ongoing process of globalisation, which has brought uncertainty and pressure for constant improvements, has increased the benefits of strong clusters and raised the costs for regions which fail to develop some level of agglomeration. Clusters provide an

environment that is conductive to knowledge creation. The process of clustering, which goes beyond agglomeration and co-location, emphasizes dynamism, linkages between actors, competition, knowledge flows, and complementary specialisations.

In most countries governments and other public authorities are known to be responsible for the establishment and strengthening of clusters. Even clusters initiated by private actors are in most cases dependent on public funding. It is the policymakers who have the ability to promote local development by supporting the wider implementation of the concept of clusters. Being aligned with the approach of "open innovation", clusters foster constructive and complementary interactions that often result in new ideas and products.

The Czech Republic begun with creating and implementing cluster policies much later than most of the developed European countries, but the so far achieved results are promising. Clusters have contributed significantly to an increase of businesses, regions and entire economy's competitiveness, development of sophisticated technologies and innovative activities, efficient use of R&D, investment attraction, deepening of linkages and cooperation between different business entities, institutions and organizations, as well as to employment and economic growth in general.

The concept of clusters is recognized as one of the key factors for strengthening SMEs, which are believed to be the driving force of local economic development. Local economies that are based on networking and cooperation between companies, financial institutions, public and academic actors, as well as different organisations, generate better outcomes.

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