

EXPERIENCE WITH CREATION OF TECHNOLOGICAL CLUSTERS IN THE SLOVAK REPUBLIC

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Abstract

The research of clusters becomes an important field of scientific research in the Slovak Republic. The article presents partial results of the research project “International platform for research and communication of clusters” that was conducted in the years 2014-2015. One of the aims of the project was to analyse and to evaluate the present state in technological clusters in Slovakia. The aim of the article is to present the main results of the project, especially to find out what are the main factors affecting the activities of technological clusters, to identify main problems and barriers in their operation and to formulate basic presumptions for successful creation (formation) and operation of clusters in Slovakia. The paper was created as a part of international project NBS 57/2013 “International platform for research and communication of clusters”.

Key words: cluster, advantages and disadvantages of clustering, barriers of clusters development, factors of success.

Introduction

Cluster concept is considered to be a very important development factor in the structure of national economies in EU countries. It is believed that dynamic clusters enhance the competition and regional innovation (OECD

1999) as they help to concentrate the business efforts and build specialisation advantages. It is widely accepted that technological change underpins a global economy and that geographic location and concentration is of foremost importance for regional development and competitive advantage (Porter 2000).

The main role of clusters is to gain a synergic effect from relative aggregation of cluster subjects at local, regional and global level. Clustering should help member enterprises to boost their effectiveness, improve their competitiveness, innovations and to spread new knowledge and contribute to economic growth of the region. There may well be substantial advantages for the new entrepreneur in setting up in an established cluster, and concomitant disadvantages in not locating in such environment. In their role as subcontractors, small firms will find business within the cluster, whilst in their role as aggressive opportunity seekers the turbulence and dynamism in the cluster will throw up opportunities to be sought (Kuah 2002). As the clusters do not have the same configuration (Markusen 1996; Romanellii, Khessina 2005) and may have different forms and different innovative impact, we will focus just on technological clusters.

1. Technological clusters in the Slovak Republic

The clusters are most commonly defined as geographical concentrations of enterprises, suppliers, service providers, institutions (universities, trade chambers) in related industries, which are connected to each other. They are both competitors as well as co-operators. In comparison to clusters, the cluster initiative represents an organisational effort orientated to the increase of growth and competitiveness of clusters in regions by active support of enterprises, government, self-government and research community. By the term cluster initiative, we sign the project of cluster development and strengthening of its competitive ability (Solvell et al. 2006).

Clusters (Ketels, Memedovic 2008: 378) are affected by cluster-specific business environment conditions resulting from individual actions as well as cooperation of companies, government agencies, universities and other institutions in the national and regional innovation system. Similar conclusions were made by Lundwall (1993), Edquist (1997) or Cooke (2001).

A decade ago, many of the initiatives were quite entrepreneurial, and often without a robust legal form or clear policy framework surrounding them. Cluster initiatives constituted a mix of bottom-up private initiatives and top-down public initiatives. Over time, formal cluster policies and programs have gained legitimacy across the world, and today almost every country, region and international aid agency has some form of a cluster program (Lindqvist et al. 2013).

As Diez (2001) states, “rather than an innovation policy for companies, it is a question of an innovation policy with companies“. In European Union member states, the cluster initiatives are mostly the part of their national innovation strategies. The Slovak Republic has also included the initiative in The Innovation Strategy of the Slovak Republic (MH SR 2007; MH SR 2014). One of their main goals is to create appropriate conditions for clusters development. Although The Innovation Strategy of the Slovak Republic, regional innovation strategies and other initiatives and policies consider clusters to be an important tool for sustainable development and for increasing of competitiveness of regions and innovation potential of small and medium sized enterprises, the Slovak Republic does not have a functioning support mechanism for the creation and development of clusters. There is no law regulating the setting up and operation of clusters. However, there was a spontaneous formation of different types of technological clusters with the goal to develop different industries.

It has been previously argued (Humphrey, Schmitz 2002) that in a globalising economy the only enduring basis for competitive advantage will be localised and based on tacit knowledge. The formation of the world market (except for other challenges) increases the importance of heterogeneous, localised capabilities for building firm-specific competences (Maskell, Malmberg 1999) and those, with appropriate academic and research support, may be specifically integrated within a cluster. On the other hand, the technology clusters exhibit a more lateral structure consisting of direct and indirect competitors developing diversified applications of the same core technology within different markets or industries (St. John, Pouder 2006).

Thus, in this article, we distinguish between two types of technological clusters: clusters based on value chain and clusters based on competences. Clusters based on value chain are defined by the net of suppliers bonds, i.e. there are subjects providing follow-up activities. For example, automotive cluster is usually created around the value chain backbone connecting the car producer and its suppliers, who could be connected with other specialized suppliers of industrial technologies, tyres, electronics or plastics. Clusters based on competences are orientated to specific area of technical competence in region (for example research and educational institutions). In this type of cluster, the essence is created by the application of knowledge and competences throughout different economic activities. Example of this type of cluster could be information technologies and software, whose geographical concentration could be clear, but applications and clients are very heterogeneous (Prno 2005). Both types of clusters can also be found in the Slovak Republic.

For the existence of clusters in the Slovak Republic, as well as in the European Union (especially in the middle Europe), the cooperation of cluster subjects within a specific industry is very typical (Solvell et al. 2006). St. John and Pouder (2006) actually specify such network as an industry-focused type of cluster.

2. Methodology and aim of the research

To evaluate the present state of clusters and to identify the main problems and barriers in their operation we have conducted the empirical research in all technological clusters in Slovakia during the years 2014-2015. The data was gathered by the questionnaires and interviews with the management of clusters. To have a more complex view of the cluster functioning we have interviewed the management of selected enterprises as well. We have also used the secondary data (various documents, strategies and policies). To evaluate the state of technological clusters in Slovakia we have formulated a set of research questions:

- what are the main activities offered to cluster members?
- what are the financial sources to cover the costs in a cluster?
- what are the main problems that emerged during the existence of a cluster?
- what are the main recommendations to make the cluster activities more effective?
- in the following parts of the article, we present the outcomes of the primary research.

3. Results and discussion

The clusters in Slovakia were created as a bottom – up initiative with the significant support of regional self-governments. At present, there exist the following clusters:

- 1st Slovak Engineering Cluster (Banská Bystrica region) located in Detva, created on 4th November 2008,
- ABC – Academic Business Cluster (Bratislava region) located in Bratislava, created on 13th December 2011,
- Danube Knowledge Cluster (Bratislava region) located in Bratislava, created on 19th August 2010,
- National Energy Cluster NEK (Bratislava region) located in Bratislava, created on 15th March 2012,
- Automotive Cluster – western Slovakia (Trnava region) located in Trnava, created on 7th December 2017,
- Electrotechnical Cluster – western Slovakia (Trnava region) located in Trnava was created on 23rd May 2011,

- Energetic Cluster – western Slovakia (Trnava region) located in Trnava, created on 2nd December 2009,
- BITERAP cluster (Košice region) located in Košice, created on 30th November 2004,
- Cluster AT+R (Košice region) located in Košice, created on 14th July 2010,
- Košice IT Valley (Košice region) located in Košice, created on 6th March 2007,
- Slovak Plastic Cluster (Nitra region) located in Nitra, created on 23rd March 2009,
- Z@ict (Žilina region) located in Žilina, created on 30th June 2008,
- Energetic Cluster of Prešov region located in Prešov, created on 13th July 2012.

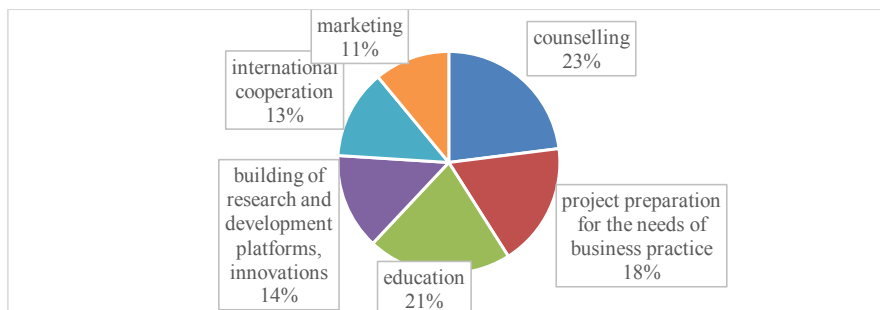
All clusters in the Slovak Republic were established as associations of legal entities. It confirms that this form is the most suitable legal form of clusters in Slovakia.

It is essential that the clusters utilize mutual cooperation and support of all cluster subjects in all activities, which are credential and important for its competitiveness (Pavelková et al. 2009).

Cooperation within the clusters in Slovakia is based on direct personal contacts of cluster managers and enterprises. Cooperation consists of sharing information and helping with problem solving. Managers of clusters agreed that the most important long-term activity of clusters is innovations (clusters in Slovakia are facing the absence of pro-innovative tools, therefore, their innovation activities are limited). Examples from Slovak technological clusters confirm that in the centre of cluster activities are enterprises, which bring practical experiences and have an overview of research, development and production. The set of activities (services) realized within a cluster and offered to its members is one of the assumptions of its successful existence (Sabadka 2008).

We can state that the majority of clusters in Slovakia offer their members services focused on counselling, project preparation and project management, marketing, education and international cooperation, in which counselling, international projects preparations and education prevails. Besides these activities, they also provide other services, which are helpful for overall cluster development, such as: a) creation of proper communication platform, b) support to general external awareness or c) popularization of particular industries, on which they are focused in their activities.

Figure 1. The structure of activities offered by clusters in Slovakia



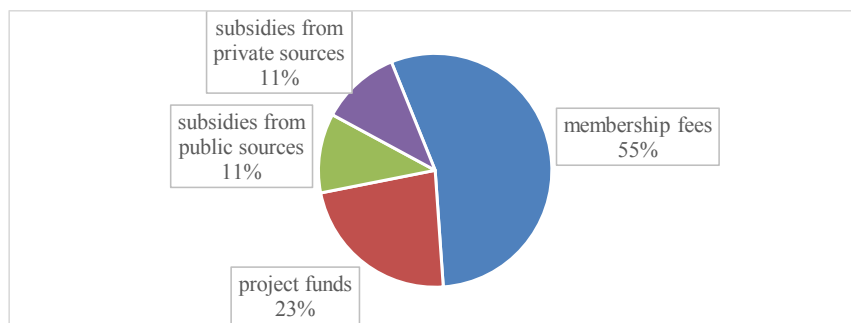
It is positive, that clusters systematically cooperate with their partners in order to publicly spread information about general cluster contribution, to prepare common projects oriented on fundraising from both structural funds and public sector, as well as in the effort to lob at principal institutions for better conditions and additional financial support.

The results of the research show, that the management representatives of Slovak clusters consider innovations to be the main opportunities for their further development, as well as regional and international cooperation, education of cluster members, interconnection of the public and private sector, intensive cooperation with both secondary schools and universities, including building of research and development platforms (Balog, Duman 2010).

Unfortunately, clusters' managers in Slovakia also identified many negatives they faced in the development of their activities, among which financial problems seem to be the most important. We can clearly state that clusters face many problems due to the lack of finances necessary for their early stages and operational activities. Significant share of their activities and operational costs are covered through their own financial sources and EU funded projects.

The structure of financial sources in Slovak clusters is covered mostly by membership fees (with the total share of 55% they are the most crucial financial source in Slovak technological clusters), project funds form up to 23%, subsidies from public budgets and private sources both represent 11% of total clusters' budgets.

Figure 2. The structure of financial sources in Slovak clusters



Because the reimbursement from EU supported projects is frequently irregular, clusters also suffer from insufficient liquidity. They perceive extraordinary bureaucracy in negotiations with Slovak ministries (the verification process in case of funding is extremely long) which prolongs the whole reimbursement process. Limited financial sources determine the extent of activities the clusters are realizing. For example, consequent reduced innovations' support and lower possibility to establish new contacts at foreign markets are the results of such shortage. The above-mentioned problems caused that the new projects were cut down and cooperation with foreign partners was less intensive.

As a certain positive shift in development of clusters since 2013 we can consider subsidies administrated by the Ministry of Economy which supports the activity of technological clusters (maximal support offered by the Ministry is limited to 70% of total allowed costs in the budget of approved project, the rest is covered by applicants). The ability to create new knowledge and innovations is supposed to be the crucial condition of a successful approval of the request. Minimal subsidy of 10 000 € and maximal subsidy of 20 000 € serves for the purposes of clusters' competitiveness growth, support of further cooperation, as well as for strengthening of international awareness through commonly solved projects and initiatives. Financial sources for the support of cluster organizations are implemented through the Slovak innovation and energy agency.

The realized analysis brought following findings on common problems in development of Slovak technological clusters (Lesáková et al. 2015b):

- only formal establishment of cluster in some regions as a political act and promotion and no real activities of cluster management towards its members,
- absence of law on the clusters and no effective and sustainable supporting tools for development of clusters in the Slovak Republic,

- no implementing institution of government support policy for clusters,
- worries of SMEs about losing or limiting their sovereignty when included in cluster,
- fear to trust the large partners and missing motivation in research and development,
- lack of financial sources for early stages and operating of clusters,
- lack of interest.

According to the previous experience, many Slovak small businesses are sceptical in case of possible integration into the cluster organisations or other forms of joint venture. Small businesses are frequently observed as to the risk perception or to the possibility to adopt external financing (except of special occasions). They are afraid to trust the partner subjects and are missing motivation for participation in research and development.

Companies that are members of any cluster mentioned these factors as the most significant disadvantages of their integration:

- a) partial loss of independence,
- b) strict subordination to the dictate of dominating companies,
- c) organizational and legal obstacles, for example, the lack of experience with the new form of establishments and thus even the inability to synchronize the activities and cooperation between many companies.

In the effort to make those activities more efficient, Slovak clusters joined themselves together and established a Slovak Cluster Union in 2010. Its main aim is to support economic development and competitiveness of Slovak regions through the process of business clustering. This Union cooperates at national level, mostly in preparation of crucial cluster oriented strategic documents. At present, it becomes a partner in communication campaigns at both national and international level. Currently, it has 10 members and still takes in new partners.

In 2013, these six Slovak clusters were awarded the Bronze Label of the European Cluster Excellence Initiative (ECEI), which is granted by European Secretariat for Cluster Analysis:

- Automotive cluster – western Slovakia located in Trnava,
- Slovak plastic cluster located in Nitra,
- 1st Slovak engineering cluster located in Banská Bystrica,
- Košice IT Valley located in Košice,
- Cluster AT+R located in Košice,
- National energy cluster NEK located in Bratislava.

The above-mentioned cases of viable clusters in Slovakia confirmed, that for successful development it is needed to interconnect subjects from sev-

eral areas, primarily from business, science, research, education and public administration.

Cluster policy poses claims on all subjects that participated in its implementation, mainly from the point of view of its administration and management. They should know all regional, economic and institutional structures in detail. Therefore, it is supposed and recommended to involve public administration institutions into the creation of regional networks.

Cluster policy should especially be conformed to particularities of appropriate region, its companies and institutions. Even though it has to be built on region's strengths, the extent and structure of participants within the network is also important, including profiles of those participants (Sabadka 2008).

Managers of technological clusters in Slovakia considered as the key postulates of cluster's success mainly: the quality of management, including clearly formulated objectives, long-term vision, strategic orientation, common trust, effort to cooperate and intensive activity of members. They also added that good relations and regular communication is quite a good predisposition of cluster's growth. Proper financing is also important, as managers emphasized its crucial contribution in all developing efforts (Duman et al. 2009). As barriers of development, they identified the lack of interest, low motivation, insufficient financial sources and communication problems.

Results of our research, as well as outcomes of previous researches (Balog, Duman 2010; Duman et al. 2009; Pavelková et al. 2009) proved the following key features to be significant: professionalism of managers, common trust and communication, strong business orientation in companies, implementation of innovative technologies, available financial sources, support from the governmental and regional level, education and cooperation with educational institutions, common research projects, cooperation with research institutions and availability of information.

Conclusions

According to Porter (2000), the stimulation of clusters is supposed to be the basis for establishment of regional development strategies. According to OECD, the problems of small enterprises arise not because of their size, but because of their isolation. This is the reason, why the companies are connecting each other at local level, in order to grow commonly on global level.

In the years to come it is probable that the differences between economic performance of regions will grow. Regions, which are able to identify and develop their uniqueness, support team spirit and cooperation between entrepreneurs, universities, research and other institutions will be prepared for their continual and growing competitiveness and penetration to foreign

markets (Prno 2005). Particularly clusters create a great potential for development of effective cooperation of private and public sector and represent perspective form of networking.

The outcomes of empiric research revealed that the key preconditions of successful clustering are related to both internal and external factors. Very important condition of prosperity is diversity of cluster members. The presence of diverse subjects in the cluster (not only enterprises) brings different attitudes to problems being solved and more effective solutions. Ideally, the cluster combines the strengths and benefits of several types of entities to reach the synergy (e.g. research and development institutions come up with innovations, educational institutions represent a source of skilled and qualified labour, government provides financial, political support, resp. promotion of cluster, enterprises implement and commercialize innovations).

The other assumption of effective clustering is clear and common vision, strategy and goals that integrate interests and efforts of all stakeholders into a single unit despite their heterogeneity. Clearly defined activities of cluster as well as formal rules and official form of cooperation (legal capacity) contribute to better performance of cluster. If the members of cluster understand the benefits of clustering and are convinced of its usefulness, they will be motivated to cooperate. The system of external cluster support established by government and municipalities is also essential, but insufficient for successful operation of clusters. Practical experience suggests that the cluster can only be successful and sustainable if its members spontaneously take the initiative and show real interest in cooperation and teamwork. The fact, that in the Slovak Republic have been established clusters because of spontaneous need for enhanced cooperation of businesses and other stakeholders without any targeted initiatives, proves the importance of motivation in clustering process. The cluster cannot successfully operate without confidence in partners, effective communication and sharing of information. Lack of knowledge, distrust or concerns about networking often work as main obstacles to clustering.

Except of willingness to participate in cluster and interest in cooperation, sufficient financial sources are also ranked among essential assumptions of cluster existence. Every activity of cluster costs money, especially long-term activities (e.g. focused on innovations) require sustainable financing. Clusters may not rely only on subsidies or member fees, but should prefer multi-source financing including self-generated capital – particularly to finance challenging investments.

The viability of cluster depends much on qualified human resources of cluster, especially management. Some clusters are underdeveloped in terms of human resources needed for their smooth and professional operation.

The larger the cluster, the more difficult it is to harmonize the activities of individual cluster members and the higher are the demands on the competences of human resources in cluster. Educational activities focused on development of managerial skills and expertise can increase the qualification of personnel in clusters thus improve the quality of services.

The future of clusters lies especially in inter-cluster cooperation (inter-regional, inter-sectoral, national and international) that brings opportunity to improve research activities, develop projects, share experience and best practices on establishment, management and organization of clusters' activities among their representatives.

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