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Cluster as an Approach to Innovation Development of Entrepreneurships – A Case Study from Poland

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Innovations pose as a fundamental component of prosperous development of entrepreneurships. Clusters, through creating the possibility of cooperation among areas of science, technology, and economy, influence innovation development of enterprises collaborating within their structure. This article presents cluster as an environment-stimulating component in the field of research, and an innovation based on a case study from Poland. In addition, the new approach of cross-cluster cooperation has been introduced as an extended and diversified way, to attain high levels of innovativeness and competitiveness by collaborating entities.

Today's world wide processes of internationalization and globalization force entrepreneurships to search for new solutions in order to keep their position in the market and develop their activity. Innovativeness and integration are rising in importance as they consist of certain characteristics for survival in the world of competitiveness.

The concept of innovation plays a special role. The ability to introduce new innovation into the market is one of the most crucial conditions of competitiveness, though it is not an easy task. First and foremost, it requires the possession of a huge variety of resources such as natural resources, financial capital, human capital, etc. Innovation can be defined in a very broad way,

starting from the one related to the product innovations regarding product or service, through process innovations introducing new technologies, to innovations in marketing or organization. However, the essence is to implement new solutions in practise.[1] The innovative solution can be defined as a result of its own research and development activity of an entrepreneurship, or as an effect of collaboration with other enterprises, institutions, etc. In addition, innovation can pose as an outcome of intangible knowledge such as patents, licenses, software, know-how, etc., or tangibles such as machines and devices. The main attribute is the fact that a new quality is being developed and introduced into practise.[2] According to Freeman and Sőlvell,[3] 'innovation is based on a process of incremental reduction of technical and economic uncertainty, where new technologies typically undergo a number of modifications and business models are adjusted accordingly. New particular knowledge and skills develop over time'.

Through introducing new products or services into the market, entrepreneurships try to respond to buyers' needs while simultaneously assuring for themselves a presence in the business. For the reasons of being more attractive to the customers and more effective in production, enterprises may also wish to implement new processes and/or activities in the company, change the technique or technology of production which has been in use, or the way the firm has thus far been operated. These activities pose different ways of implementing innovations within the company.

Enterprises have to be innovative in order to have competitive advantage above others. Innovations bring certain advantages for the company:

1. they influence the enterprise's performance, e.g., increase efficiency and productivity (affect productivity growth),
2. may result in increase of company's profitability,
3. increase chances of obtaining better position on the market and thereby help the firm to stay competitive.[4]

As competitiveness of entrepreneurships strongly depends on their level of innovativeness, companies feel the need to provide sophisticated methods and tools that enhance innovation technology development in the company.

In order to stay innovative, entrepreneurships, especially small and medium enterprises (SMEs) have to overcome certain difficulties. The two main obstacles are financial constraints and barriers connected with people's mentality. Financial barrier concerns very high cost of collaboration with research and development (R&D) institutions. These costs are hard to overcome for individual (small) companies, which often do not even possess a separate entity in charge of R&D in the business.[5] Secondly, the mental obstacle is connected with the fact that individual firms, very often, do not see the sense of spending large sums of money for activities which are incomprehensible for them, or actions of whose outcomes cannot be ascertained.[6] Extremely high expenditures on innovations and a limited number of prospective new solutions within the single units', force companies to take part in open innovations based on collaboration with external partners.[7]

The process of creating new innovations began to be realized within specified forms of cooperation, among different organizations from the areas of science, technology, and economy. Clusters play a special role among the innovation network linkages.

Cluster as an Approach to Innovation Development of Entrepreneurships

Literature adduces clusters in various ways. Nevertheless, the most well-known definition is the one presented by M. Porter,[8] stating that cluster is 'a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities'. All attributes are embedded within this definition. Close proximity is needed in order to enable occurrence of positive effects of mutual infiltration, and to benefit from the usage of the same resources. In addition, cluster gives an advantage of interconnection and interaction based on common aims, and the advantage of creation of networking linkages among entities from various areas.[9] Clusters link the phenomena of cooperation and competition with each other.

Clusters as a specific form of cooperation of industry and service sectors create the base for the development of creativity, innovativeness and competitiveness. They foster partnership activities among entities. Entities cooperating within a cluster create vertical and horizontal ties. A vertical tie represents the cooperation in the chain from supplier to final recipient of a particular initiative, while a horizontal tie involves cooperation among entities providing complementary products or services. Horizontal ties usually concern company-to-company relation or company-to-R&D sphere. These ties are the most important from the innovative point of view. Enterprises cooperating within a cluster may obtain certain benefits such as:

1. better and cheaper access to specialized inputs such as machinery, components, business services, qualified human capital resources, etc.,
2. great possibility of information, knowledge, know-how, and experience exchange,
3. receive faster, cheaper and more extensive information about the market, technological and technical developments, new marketing ideas, etc.,
4. opportunity to benefit from institutions and public goods enabling companies, e.g., to recruit already trained employees, to obtain (by lower costs) expert advice from the local institutions, to use specialized infrastructure, etc.

In addition, clusters stimulate competitive pressure even among indirectly competing or non-competing participants, which has a motivating influence on entities who thereby are more likely to co-locate R&D, cooperate on production, co-monitor and rapidly perceive customer needs, do common marketing activities, etc.[10]

Clusters stimulate and revitalize cooperation in the business environment. As highlighted earlier, entrepreneurships cooperating within such a network can gain multiple benefits derived from various activities.

Nevertheless, the most crucial area of cooperative activities seems to be oriented towards research and innovation development, as the way to stay competitive in the globalized market. For companies, it is easier and more economical to pool their efforts into

common scientific research rather than doing them individually. The base for research and innovation development translates into the exchange and creation of new ideas. Thanks to the closeness of companies, there is a possibility of face-to-face contact. These, in turn, give firms a good opportunity to exchange experiences and knowledge, to learn from one another (co-learning), and learn by directly observing other firms (learn from their practice). Within a cluster, it is easier for companies to organize common workshops, traineeships, conferences, and other events, where people 'shuffle' their views and new ideas for further development are born, and where they can simply learn more (about investment programs, products certificates, and production processes; obtain knowledge about new technical and technological solutions, or current market trends, etc.).[11] Moreover, companies more readily collaborate on collective research and development projects as they have a trusting relationship with their partners. Common goals are achieved through mutual collaboration. Companies often share their equipment, and combine human resources (skills and qualifications of people). Through multiplying their resources, enterprises can experiment on lower costs, and attain more creative and original solutions. Furthermore, through mutual complementation, they reduce weak points or risks of a new innovation. Their synergy contributes to an increase in the effectiveness of the research, and proceeds in generating new results.

Collaboration of companies facilitates innovation progress not only in a cluster as a whole but also, especially in separate entities, which as isolated firms, would not have enough time nor money to lead research at high level, and to explore new innovative solutions.

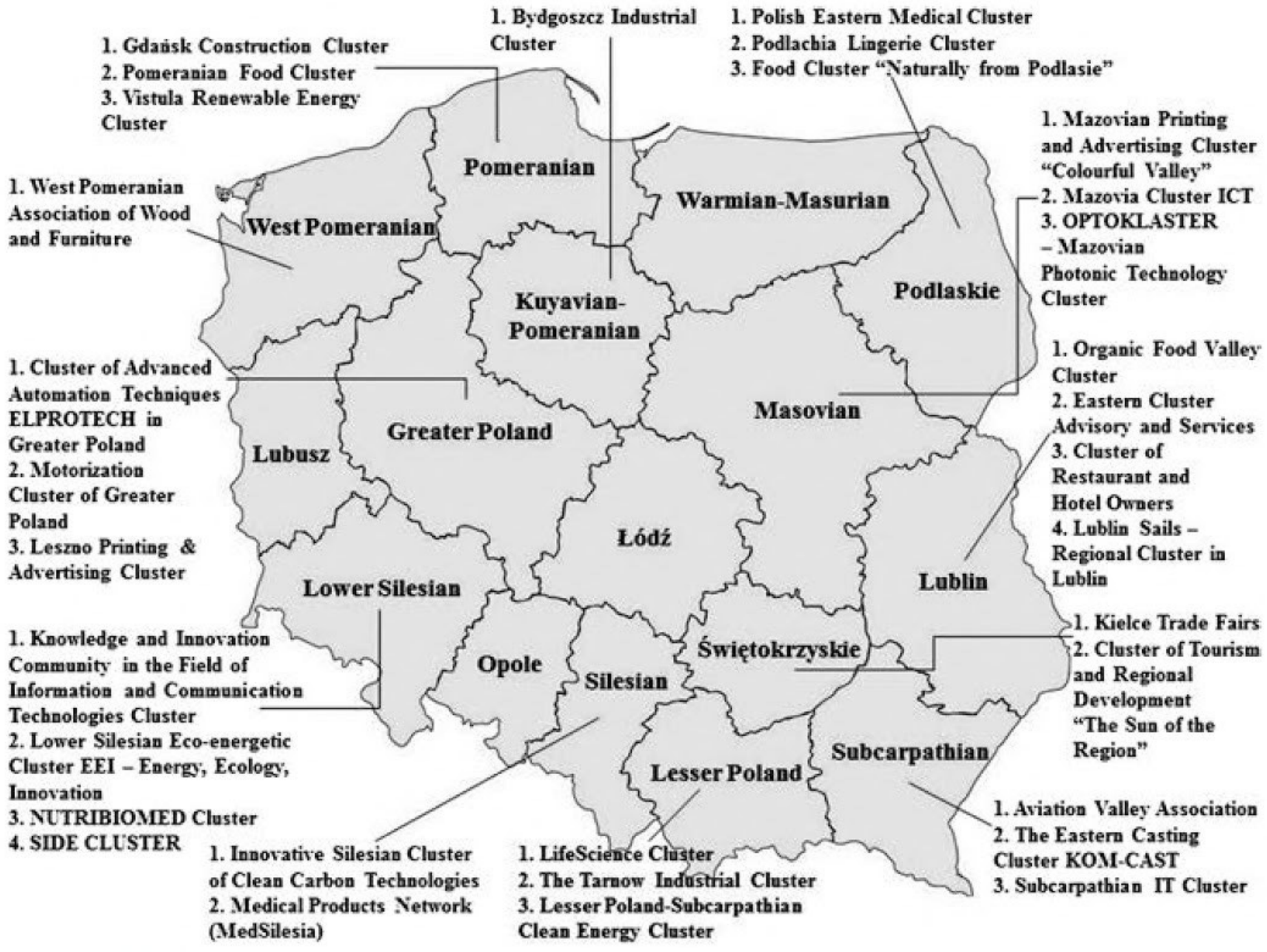
Cooperation in the Area of Research and Innovations Based on an Examined Group of Polish Clusters

In Poland, the idea of clustering appeared in the 1990s and initially developed slowly. The interest in clusters increased gradually and

since the year 2006, the importance of clusters was highlighted in governmental programs and strategies oriented towards innovation economy, innovativeness and competitiveness. Since no cluster policy has been founded so far, all activities directed towards clusters and cluster initiatives have been realized under innovation policy. The innovation policy in Poland supports linkages and networks of cooperation, joint ventures and investments of entrepreneurships, promotion of cooperation not only among enterprises but also within business surrounding institutions, exchange of information and experience, etc. It focuses on innovative activity resulting in creation and adaptation of new or improved solutions in products, services, and processes. The multidimensional and multithreaded character of innovation policy allows innovative development on different levels, starting from regional to national. In each voivodeship (province/ administrative division of Poland), respective Regional Innovation Strategies (RIS) were defined and implemented. The common aim of all strategies introduced, is to increase entrepreneurship within the region, increase competitiveness of scientific offers, utilize natural potentials, promote different types of co-operation — common planning of regional development (enterprise-science-economy networks), create innovative infrastructure, spread pro-innovative attitude, etc. All these activities create favourable background for clusters development. Clusters, in turn, pose the 'door' to progress of an individual company. They stimulate improvement, specialization, innovativeness, and competitiveness of their participants.

Within this research, a group of 32 Polish clusters were examined. The group characterizes a relatively young age; 29 out of 32 clusters (90.6 percent) were established during the last four years. The Tarrow Industrial Cluster (established in 1999) is the oldest cluster and the Vistula Renewable Energy Cluster (established in 2009) is the youngest one in the group. Figure 1.1 presents the clusters which were examined based on the location of the voivodeships.

Figure 1.1 Examined group of Polish Clusters According to the Voivodeships



Source: Developed by the authors.

Note: The contours of the map of Poland adapted from http://bibioteka_zsg. manifo.com/mapy (accessed 6 August 2013).

These clusters lead their activity within a variety of industries starting from traditional branches — e.g., food production, wood industry, construction industry, clothes industry — to modern and high-technology industries — e.g., photonic industry, life science, IT, aviation, automation industries, etc. Disparity of industries in which the examined group of clusters operate, may render an impression that the particular clusters prioritize the main goal of their activity differently. However, this research found that the main goal of more than 60 percent of these clusters is to support entrepreneurships in a particular branch/industry, in order to help them maintain their innovativeness and competitiveness in the market, and to create thick bonds of cooperation among enterprises, science entities, governmental authorities (local and/or regional), and business surrounding institutions, in order to enable easier development of innovation processes and technology transfer.

As further goals, the following can be distinguished:

1. Realization of innovative projects within a particular branch;
2. Obtaining financial support from various sources, for example, EU funds, government subsidies, etc.;
3. Improvement of the competitiveness of SMEs in the region (spreading regional development based on particular production; comprehensive development of a region; promotion of region; job creation in the region);
4. Organization of workshops, conferences, symposiums, traineeships (increase of qualifications), and other events (exhibitions, trade fairs, festivals, etc.) where new information and knowledge can be exchanged;
5. Common promotion (common brand name creation);
6. Common production (an easier way of acquiring orders; costs reduction; obtaining new and/or better position on the conditions which dictate the market).

It is obvious that clusters create a natural environment for development. The principal developments being research activities, education and training, which in turn are inseparable parts of the innovation progress. Clusters give the opportunity to classify enterprises into workgroups, according to their specification

of production or activity, that fosters more regular meetings within companies. This, in turn, creates a positive environment for discussion about common matters and problems, such as, common logistic activities focused on supplies, transport, warehousing, cooperation, and division in work, etc. Enterprises readily collaborate on the creation of collective cluster product, common unique offer for auctions (possible to present to wider scale of customers), and share orders. Thanks to cooperation, they are able to react faster to market changes, and undertake certain activities, leading to improvement in quality and competitiveness of products and/or services offered by the cluster. Together, they willingly participate in international events, which provides the opportunity to meet experts in that particular area of industry from all over the world. Furthermore, they are more open to the development of cooperation with foreign entities, that broadens companies' horizons in the fields of their activity.

Generally, a cluster goal is to lead cooperative companies to such organizational, technical, and technological changes which would enable them to produce on a high quality level, comparable with the best firms in the field.

The activities perceived by cluster managers as the most interesting for cluster members are prove to be complementary with key goals, posing the essence of cluster activity as a structure. Among the most attractive activities for cluster participants, managers identified the following (listed according to their popularity):

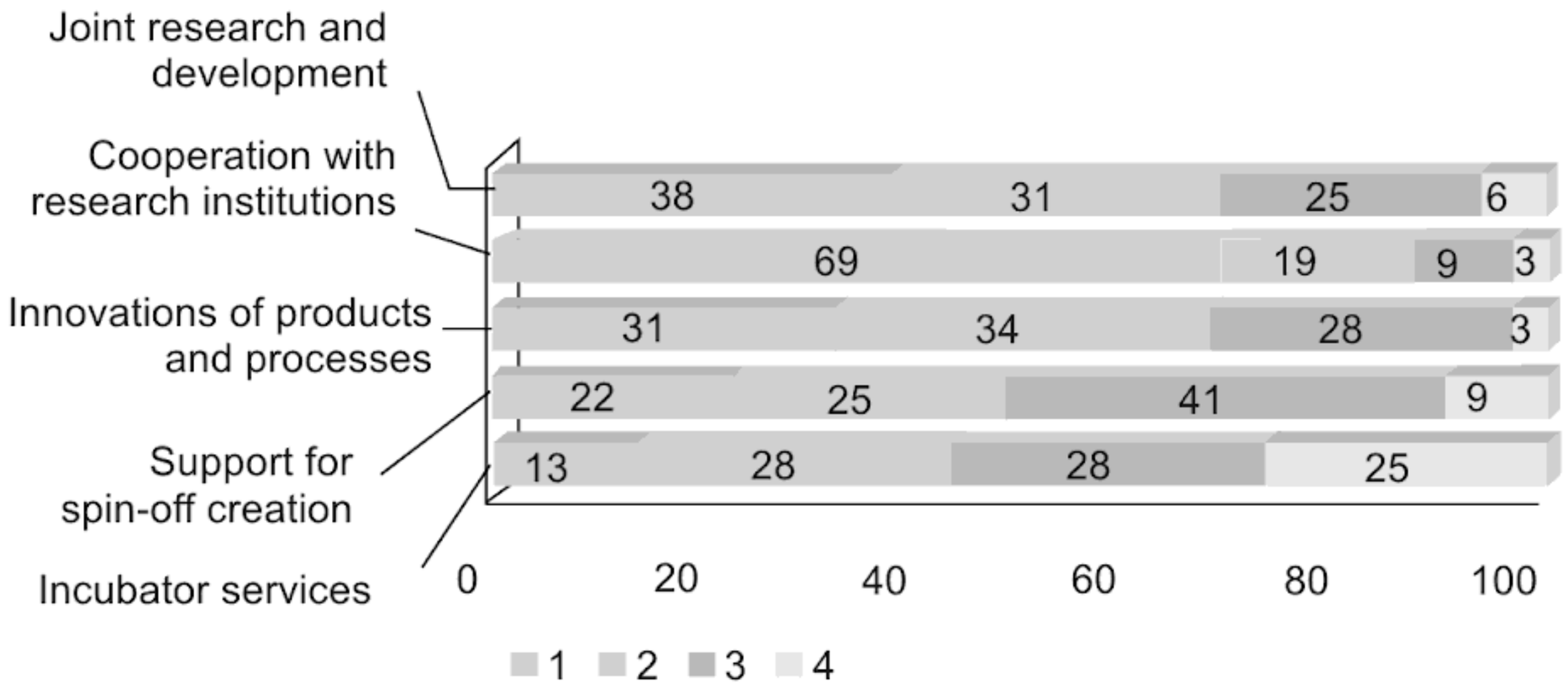
1. common promotion (common brand name creation),
2. spreading the network of collaboration (exchange of information, know-how, undertaking collective projects) and creation of cooperation bonds (enterprise-science-economy linkages),
3. organization of conferences, workshops and other events,
4. help in acquiring contacts (supplier-receiver), common orders, better conditions on the market,
5. lobbying in favour of financial support from authorities (subsidies, funds),

6. (a) common marketing, common offer on the market,
   (b) participation in international projects, trade fairs, economic missions,
7. (a) support of entrepreneurships in particular branch/ industry (facilitating innovative processes and technology transfer, integration of environment),
   (b) organization of networking (informal) meetings,
   (c) increase in human resource capital qualifications,
8. obtaining support for cluster activity,
9. creation of supportive institutions (technological parks, trade institutions),
10. (a) promotion of the region,
    (b) development of education at high school level,
    (c) support for spin-off creation.

For companies, initially, it is most crucial to build a cognisable brand name, in order to increase the consumers' awareness about certain products, services, etc. However, the importance of cooperation and its intensification is also high. Companies seem to understand the need of adhesion and cohesion in action. They realize how difficult it is for an individual company (especially SMEs) to survive in the market. Therefore, they decide to join their forces in common activities and ventures. Within a cluster, it is easier for enterprises to undertake collective research, work on common projects, and apply for support from authorities. It is also less difficult to maintain competitiveness due to the more open access to the latest research (e.g., technological foresight), analysis, and trends in the sector. All distinguished activities are complementary to one another, and directly or indirectly influence research and innovation development in enterprises.

Common ventures in the area of research and innovation are in-built in cluster activity. Clusters were asked which of the distinguished activities they currently offer; which they are planning to provide for cluster participants in the near future or upon request, and which they do not plan to do at all.

Figure 1.2 Joint Activities of a Cluster in the Area of Research and Innovations* (percentage)



Source: Developed by the authors.

Notes: *Where: 1 – cluster currently offers activity; 2 – cluster currently does not offer activity but is planning to do so in a few years; 3 – cluster currently does not offer activity but is able to arrange it if needed; 4 – cluster neither offers nor plans activity.

As Figure 1.2 shows, the most interesting activity for the examined group was cooperation with research institutions (e.g., research and technological parks, universities, colleges, non-profit institutions, etc.), with 69 percent of clusters already providing the activity, and another 28 percent being ready to offer it. Thanks to this opportunity, cluster participants are able to pool their capital sources into common research projects making them more approachable (Table 1.1). Moreover, research institutions may also allow them to access the latest (used on the market) cutting-edge solutions, find out more information about the market itself (forecasting market behaviour), obtain expert opinion, or consult planned ventures. Very often, these amenities are not available to individual companies due to very high costs. Further in significance are joint R & D and joint innovations of products and processes, resulting in 38 percent and 31 percent respectively of already provided activities, with another 56 percent and 62 percent accordingly, being ready to offer, if required. Joint R&D allows companies not only to combine their knowledge and experience (since they often search for similar solutions in the area), but also to lower their expenditure spent on research (central management of research and development and division of costs). Moreover,

Table 1.1 Joint activities in the Area of Research and Innovations and their Benefits for Cluster Participants

Type of activity	*Benefits for cluster participants*
Joint research and development	Decrease in expenditure on research per entity Joining knowledge and experience Searching for common solutions in the same industry area Refining of exploit technologies Central management of research and development Finding new trends, areas, markets Composing and implementing innovative solutions available only for clusters and cluster initiatives (EU programmes, traineeship programs, etc.)
Cooperation with research institutions	Co-financing of research projects Direct access to research results realized by public institutions and universities e.g., market research Access to latest solutions Cooperation with experts in the area/consultancy Implementation of research results in practice
Innovations of products and processes	Cluster carries results of new technologies development and suggests the implementation of complex products and devices Faster and less risky implementation of innovations in the market Better conditions/position (of company) in the market Optimization of production processes
Support for spin-off creation	Enlargement of cluster Support of innovations in particular industry area, region Increase of flexibility in activity of a company (element of restructuring)
Incubator services	Development of entrepreneurship environment in the area

Source: Author's own conclusions[12] and from *Clusters and their Impact on Companies Performance*, Pavelkova, et al., p. 119, Prague: GRADA.

common research brings new findings about the market and new trends used within the industry which gives companies the opportunity to quickly respond to changes. In addition, some solutions provided (e.g., within special programmes) may only be available for companies collaborating within a cluster or cluster initiative. Regarding innovations of products and processes, cooperation within a cluster enables better recognition of market demand, and faster and less risky implementation of innovations in the market. Besides, enterprises applying modern solutions (e.g., advanced industrial technologies) and trends are more attractive to potential customers, and thereby they may reach an advantageous position, and obtain a chance to dictate conditions in the market. In the area of research and innovation activities, support for spin-offs and joint activities regarding incubator services are the least popular. Only 22 percent of clusters offer support in creating new entities derived from the parent company (even though, clusters do not initiate spin-off creations themselves, they offer them support in contacts creation, various discounts by virtue of being cluster members, etc.). Only 13 percent take action oriented towards incubator services (additionally, as many as one-quarter of examined clusters do not plan to offer this activity at all). Nevertheless, those activities may bring certain benefits as well, such as an expansion of the cluster or increase in the development of entrepreneurship environment in a particular area.

Clusters create a network of linkages among enterprises, science and economy. Adequate interaction among these three spheres is fundamental for the successful development of entities involved in any field, especially in the area of research and innovations.

Development of Innovativeness and the New Concept of Cross Cluster Collaboration — 'Clustering the Clusters'

Cluster, as a specific type of network, is a platform for cooperation of entrepreneurships, government authorities, educational, and business surrounding institutions, in particular, the geographical area. The need of proximity has provoked the creation of

cooperation networks within the region or adjacent regions, so far. Nowadays, the new concept of 'clustering the clusters' appears. The meaning of the word 'cooperation' has been taken to a higher level. Cluster networks started to expand into partnerships, clubs, platforms of cooperation, alliances, bilateral agreements, trans-national cooperation, or groups of collaboration around the world. The innovativeness and competitiveness have been transferred from clusters to entire eco-systems. New opportunities for entrepreneurships cooperating within clusters have started to arise.

The need to improve the business and research environment has also been noticed within Polish clusters. Among the examined group, 69 percent of clusters (22 entities) declare their cooperation with at least one other cluster. The question arises, what are the reasons for this type of collaboration? Within the investigated group, 68 percent (15 of the clusters) cooperate in order to exchange knowledge, information, and experience in a particular branch/industry and models of collaboration. Another 27 percent collaborate on collective projects such as those related to EU or those concerning technology of production (foresight), etc. The other clusters are co-organizing educational events such as conferences, seminars and workshops, business-to-business meetings, or common events in character of promotion (advertisement of common products, promotion of region). Another group cooperates on collective ventures, activities (e.g., promotion), doing common research (preparation of innovative projects), or support the establishment of new emerging clusters. They usually show active cooperation in a few of the afore-mentioned areas simultaneously.

Whole cluster structures as well as single enterprises feel 'the weight of competitiveness', which is why they resort to new solutions such as cluster-to-cluster cooperation. Through they focus on mutual exchange, policy-learning, and collaboration which in turn contributes to the progress of each member. Mutual motivation and stimulation help to reach the level of world-class performance. Single entities realize that in order to 'be in the running' in a global market, they have to possess concrete tools

to influence the transfer of knowledge and innovative activities. Since those tools are often unattainable for them as individuals, they see cooperation and partnership within the cluster structure as a way of extension of business affiliations, bringing competitive advantages and further development.

The concept of cross-cluster cooperation, the reason behind requirements and/or restrictions for this type of collaboration, as well as its influence on cluster structures and the performance of single enterprises are a subject for further investigation.

Conclusion

Being innovative is a hallmark of economic dominance and successful performance of an entrepreneurship. As individuals, companies have very limited resources and often cannot afford to be innovative. Therefore, they are motivated to participate in open innovations, based on cooperation with external partners. As a good approach to research and innovation development, the collaboration within cluster network appears. Cluster as a structure provides a series of possibilities which influence the progress of its participants. Thus, innovation development could be supported mainly by the following activities:

1. networking,
2. mutual communication among companies,
3. access to information,
4. access to innovative technology,
5. joint research/cooperation with research institutions,
6. education of human resources, and
7. cooperation with educational institutions.

Enterprises know that innovations are based not only on physical resources (access to laboratories, expensive equipment, huge amount of capital supporting research) but first and foremost on human capital and people's ideas (skills and qualifications plays a crucial role in innovative processes). Innovation processes within a cluster are based on continuous interaction across organizations. Clusters, as a specific type of network, assure the opportunity for information exchange, funds conjunction, expertise exchange, and ordered and diversified cooperation among entities, providing

fundamentals for innovative development. Companies, through multiplying their resources, can obtain more creative and original solutions. The possibility for cross-cluster cooperation extends the horizon of the entities even more, and it becomes a new perspective for building up knowledge and experience for companies, leading to innovative solutions on a wider scale.

The experience of clusters confirms the importance of dynamic development in the area of research and innovations for the healthy progress of clusters themselves and all its members.

Notes

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