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Role of clusters in the Polish innovation system

Abstract

This article presents the role of clusters in the Polish innovation system. This role has evolved in recent years due to maturing of cluster organisations and the expansion of their ability not just to provide services for cluster members but also to perform selected public tasks. This study aims to provide a better understanding of the nature and extent to which clusters can contribute to the objectives of development policies and thus to the economic development of the Polish economy and answer the question what role clusters can play in the innovation system. Based on a survey of 44 cluster organisations in Poland and interviews with cluster managers, the study explores the possibility of engaging Polish cluster organisations in the implementation of public policies. The results confirm that many of the Polish clusters achieved such a level of development that they themselves see the possibility of engaging in public tasks, for example education and specialised training, helping enterprises in digital transformation, monitoring technological trends, and so on. Therefore, it is justified pursuing a dual cluster policy. This duality means focus on two objectives: supporting cluster organisations on the one hand and implementing cluster-based development policies on the other hand.

Keywords

clusters | cluster initiatives | cluster organisations | cluster policy | innovation system

JEL Codes

O25, O32, O38

1 Introduction

This article aims to investigate the role of clusters in the Polish innovation system, both from a theoretical viewpoint and through the prism of practical experiences. The rationale for this research arises from the observation that clusters have recently become important elements of regional innovation systems, having interlinkages with all kinds of innovation system actors. Taking into account these linkages, the question arises if and how clusters can be employed to implement elements of the innovation policy or economic development policy.

To identify the role of clusters in the innovation system, a model presenting linkages of clusters with other actors of the innovation system was developed. An analysis based on the web resources (cluster strategies,

research reports, reports published by public authorities, etc.) and interviews with cluster managers builds on that model. A survey among cluster organisations in Poland was used for the analysis. The survey was conducted in 2019 and was financed by the Ministry of Economic Development. The method used for the survey was a computer-assisted Web Interview. The list of clusters was consulted with the Working Group on cluster policy. The questionnaire was sent to a sample of 215 cluster organisations. For this sample, 44 cluster managers/coordinators responded to the survey. There were six national key clusters (out of 13) in the group of respondents who filled in the questionnaire. The interviews were carried out with selected cluster managers of key national clusters. These are clusters selected in a competitive procedure with significant potential for the development of the Polish economy and are internationally competitive.

The study helps to better recognise the role of clusters in the Polish innovation system. This leads to policy implications: how to engage clusters in implementation of the public policies that aim to develop innovation potential and knowledge base. This article broadens the knowledge of clusters and cluster policies and their role in economic development. In addition, the article has a practical dimension providing recommendations for cluster policies.

2 Clusters and innovative systems in the economic literature

The concept of clusters has been defined in diverse ways. For example, Porter (1998, p.197) defined a cluster as a geographic concentration of interconnected companies, suppliers, service providers, firms in related industries, and associated institutions (e.g. universities, standards agencies, and trade associations) in particular fields that compete but also cooperate. Rosenfeld proposed a similar definition—a geographical cluster of companies operating in related sectors, cooperating or otherwise related to each other or providing complementary services to each other and using the same infrastructure as well as specialised suppliers (Rosenfeld, 1997). The cluster theory is based on the assumption that proximity generates benefits that are related to traded and non-traded interactions between firms, institutions and individuals. Some theories underline the significance of location and spatial proximity for industrial performance and competitiveness (Ketels, 2011). Clusters are seen as one of key factors influencing entrepreneurship, innovativeness and regional development (Porter, 1998).

It should be mentioned that in the literature, there are concepts of cluster, cluster initiative and cluster organisation. Cluster initiatives are understood as organised efforts to enhance the competitiveness of a cluster, involving private industry, public authorities and/or academic institutions (Sölvell, Lindqvist, & Ketels, 2003). The cluster organisation is formalised. It works to intensify growth and increase the cluster's competitiveness. However, these concepts are commonly treated interchangeably (Weresa and Kowalski, 2017; Głowska, 2018; Morgulis-Yakushev and Sölvell, 2017).

Both practical experience and scientific research show that efficiently managed, developing and

developed clusters give a number of benefits not only to entities operating within them (mainly enterprises) but also for the region where the cluster emerged as well as for larger economic systems (entire national economies, or cross-border areas) (Ketels, 2013; Delgado, Porter, & Stern, 2012). Clusters have a positive impact on the level of innovation, growth and the survival rate of new enterprises (Delgado et al., 2012).

The cluster concept is related to the notion of innovative systems, in particular regional innovative systems. They are defined as a set of private and public institutions operating in a defined territory, connected within a network, whose operation and cooperation enable the production, adaptation, modification and dissemination of innovations and new technologies in the region (Edquist, 1997; European Commission, 1999).

As noted by Voyer, regional innovation system is characterised by:

- strong links between companies and supporting infrastructure, which stimulate the innovation process in enterprises and thus the development of a regional innovation system,
- geographical proximity of enterprises strengthening the efficiency of absorbing innovation,
- self-sufficiency; the larger the regional system, the greater its self-sufficiency (Voyer, 1998).

These characteristics relate directly to the cluster concept: geographical proximity of enterprises and strong links between companies and supporting infrastructure. According to Cooke (2010), regional innovation systems can enhance economic growth, employment, and competitiveness. Its role and performance can activate potential resources and information, enhance flexibility, and reduce uncertainty, thus optimising the regional innovation environment. One of the components of regional innovation systems that impact their operational effectiveness are clusters (Furman, Porter, & Stern, 2002).

3 A role of clusters in the Polish innovation system

Clusters combine companies, research and development institutions and universities specialising in a given industry or area of knowledge and infrastructure that can be utilised to invent new products or services.

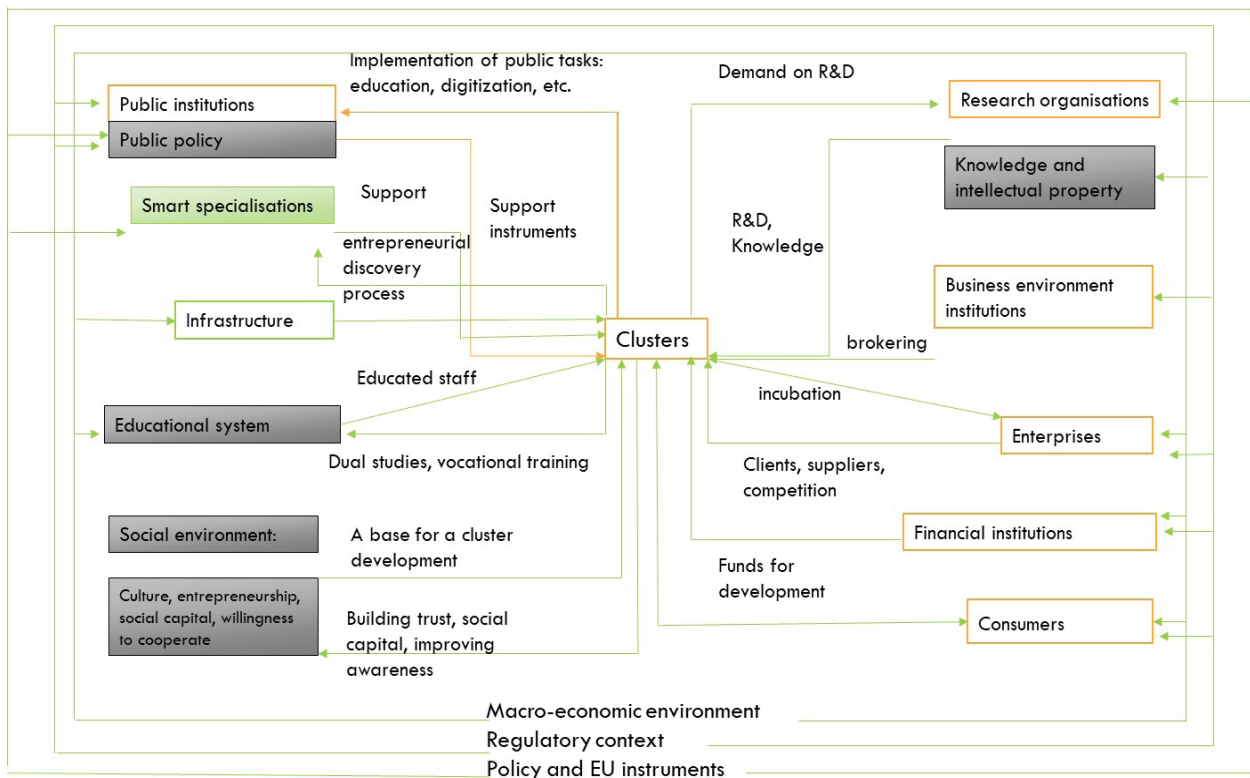


Fig. 1. Linkages of clusters with other actors of the innovation system. Source: own elaboration.

The existence of such structures provides governments with an excellent opportunity to promote economic growth by supporting innovation and R&D (Christensen, Lämmer-Gamp, & Gerd Meier zu Köcker, 2012). The ability to collaborate in knowledge creation within regional innovation systems is one of the factors making clusters a key point of this system. The linkages with other institutions in the regional ecosystem are presented in Figure 1.

In Figure 1, the clusters have been placed in the centre of the innovation system to show relationships with other elements of this system. Social conditions are the foundation of the cluster's existence. These include culture, social capital and willingness to cooperate. However, successful clusters affect these factors, building trust, giving examples of cooperation and raising awareness about the role of trust.

Research and scientific institutions are often members of clusters. They provide knowledge and conduct research and development works ordered by cluster members. Clusters, in turn, are a source of demand for the results of scientific work and should be sort of a feedback channel. Scientific institutions provide qualified staff. Clusters are a source of practical knowledge, so they are an ideal partner to conduct

studies in the dual system as well as to conduct specialist and industry training.

Business environment institutions provide clusters with brokerage services, while clusters often play a role of business environment institutions, for example in the field of start-up incubation.

Companies outside the cluster can be competitors, suppliers and customers. Individual customers are also among the customers—the purchaser of the cluster's products. Infrastructure and the financial markets, thanks to which capital for development is obtained, are the foundation for clusters' functioning. Particularly noteworthy are the links between clusters and public institutions. In Poland, clusters have so far been mainly recipients of public support. However, the higher their level of development, the better they can perform various public functions.

The effective use of clusters can be beneficial from the point of view of industrial transformation, innovation and quality of services offered in the knowledge-based economy (Bembenek, 2017).

In addition to the above-mentioned functions, the cluster organisation performs various services for entities operating in the cluster, including but not

limiting to the exchange of information, training and consulting, joint promotion, sharing or managing common infrastructure, facilitating technology transfer, providing market analyses, and so on. Cluster initiatives and cluster organisations are coordinated by the cluster managers, which are usually understood as persons involved at the stage of establishing a cluster initiative, having a vision of cooperation and encouraging potential members of the created initiative.

Cluster coordinators most often offer services in four areas:

- Coupling project and business partners (e.g. suppliers and subcontractors),
- Preparation and organisation of information and networking events, meetings and thematic workshops, exchange of good practices,
- Promotion of the cluster, that is, at various national and international events,
- Preparing and offering training for cluster members for the development of the cluster (Ministry of Economic Development, 2019).

Most cluster organisations that operate for several years or longer offer support in the field of information activities under available external funding for cluster members, preparation and organisation of information and events, organisation of participation of cluster members in exhibition and trade events on foreign markets and cluster promotion at national and international events.

The survey among cluster managers shows that the largest number of clusters participating in the survey can provide services in three areas:

- Animation of development projects in the field of technology and innovation (e.g. joint research and development projects, demonstration projects or prototype development projects benefitting multiple companies);
- Organisation of support in identifying technological problems and facilitating the use of specialised services related to the development and implementation of technology;
- Linking technological start-ups with large investors.

Other services that the cluster coordinators would like to offer include:

- Training;
- Marketing activities for the benefit of SMEs;

- Research in the field of digitisation;
- Creating a joint brand and sales platform (Ministry of Economic Development, 2019).

Interviews with cluster managers revealed that they would like to offer services related to the provision of demonstration infrastructure and manufacturing infrastructure. Such infrastructure is often too expensive for one company to buy if it does not plan to use it continuously or the scale of operation is not large enough. In such cases, when cluster companies need specific machines and devices on the intermittent basis, a renting might work better. The cluster can, therefore, make the desired infrastructure available to its members and collect fees, which can be further used for infrastructure development or other new services for cluster members. However, it is worth making a point that such arrangements push a cluster towards business-like activities involving various risks. These may need handling separately from those associated with more conventional activities due to their different nature resulting from a possibly bigger scale and longer commitment period.

4 A role of clusters in implementing public tasks

Until now, no intentional incentives have existed that would encourage clusters to support the development and perform public functions. Despite this, clusters in Poland are increasingly involved in public tasks. Awareness of the benefits of cluster activities for the development of National and Regional Smart Specialisations is increasing among cluster managers and its members. Clusters are also increasingly involved in cooperation with educational institutions that educate young specialists (including engaging in dual system education), which, in the future, will ease an access to qualified employees. A large part of clusters also see potential in supporting technology and innovation policy, including by initiating cooperation with institutions from the environment that, in particular, applies to cooperation with scientific institutions able to provide knowledge for the development of innovation and modern technologies.

The results of the survey show that the largest number of surveyed clusters engage in public tasks related to technology and innovation policy in the field of initiating cooperation between science and

business (84% of clusters). This is valuable as practical experience shows that it is difficult to establish a successful science—business cooperation.

Cluster managers were asked to mark three public tasks in which they would like the cluster to get involved. The most frequently indicated tasks include those belonging to the areas of strategic cooperation with educational institutions and the development of technology and innovation policy (Ministry of Economic Development, 2019).

In the indicated areas, clusters can be involved in particular in:

- Vocational and specialist education of pupils or students to meet the needs of industry for employees with specific competences and qualifications;
- Monitoring technological trends and the latest scientific achievements related to the cluster's activities.

A willingness to engage in cooperation with educational institutions results mainly from the lack of qualified employees, and thus the difficulties in filling all positions in the company. Therefore, clusters would like to join the vocational and specialist education of pupils or students, which, in the future, will allow to meet the industry's need for employees with specific competences and qualifications. The involvement of clusters in vocational training and specialist education is very valuable for the industry as the representatives of cluster members know the demand for skills and competences in a given industry. Interviews with cluster managers confirm that clusters can play a role in digitalisation, and they want clusters to act as a Digital Innovation Hubs. Their role would be to support businesses in necessary digital transformation and promoting cooperation among them.

5 Conclusions and implications for a cluster policy

The concept of cluster-based economic development policy formulated at the OECD forum is understood as a set of actions and instruments used by authorities at various levels to raise the level of competitiveness of the economy, by stimulating the development of existing or creating new cluster systems (Roelandt and den Hertog, 1999). Until now, such a model did not work in Poland due to the insufficient number of

mature clusters that have developed infrastructure and experienced staff. Support from EU structural funds led to the creation of a large number of cluster initiatives during the financial period 2007–2013. However, a bulk of those clusters did not survive without public support.

The concept of development policy based on clusters is a serious departure from traditional economic development programmes focusing on individual approach to enterprises. Support for clusters is, in turn, based on the view that companies and individual industries are connected by various direct and indirect relationships. The main relationships have been described in this article. Cluster policy contributes to building “a collective efficiency” in the region, understood as related to the occurrence of external benefits, higher profits achieved by those economic entities that are located in a given area (Krugman, 1991).

To date, cluster policy in Poland has focused on supporting clusters. This was in line with European trends and the approach to cluster policy. In empirical research of clusters carried out at the request of the European Commission, it was noted that in all the examined technological networks, the initial expenses for initiating their activities were made from public funds because enterprises were not interested in investing in uncertain long-term projects (European Commission, 1999).

At present, however, clusters in Poland are already mature enough to support the implementation of many public tasks and the managers/coordinators of clusters that responded to the survey, declared such a willingness. National key clusters are particularly predestined to perform this role. Therefore, on the one hand, support for the development of cluster organisations should be continued so that they can reach the level that allows them to engage in various tasks commissioned by public administration, and on the other hand, a cluster-based economic development policy should be introduced. While selecting clusters for cooperation, consideration should be given to their competitiveness and development potential as well as the opportunity to coordinate activities between private companies and the public sector.

Already in 2003, the European Commission noted that in Poland, no cluster-based economic development policy had been implemented. Since then, due to insufficient organisational resources and the weakness of cluster organisations, they were not considered to be entities that can participate in implementing public policies. Given the current level of cluster

development, some of the leading clusters in Poland can be a tool in economic development. This situation has a possible impact on the policy mix and the cluster policy. A new model that will be implemented starting in 2020 will allow to use the potential of clusters. To assess the effects of this policy, an in-depth study will be needed in a few years.

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