ORGANIZATIONAL FORMS OF COOPERATION IN CLUSTERS IN THE METAL MANUFACTURING SECTOR IN POLAND

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Abstract

The purpose of the paper is presentation of wider tendency that occur in economy (and particularly in metal manufacturing sector): creation of ecosystems of cooperating entities, emerging in specific organizational forms. Progressive specialization of manufacturing entitles causes the formation of networks of actors in place of large organizations producing a diverse range of products. While in the early stages of the metal manufacturing we can observe a tendency to concentration of ownership, production of final products made of metal takes place in a networks of many smaller entities. The producers in clusters and networks establish different organizational forms of cooperation. The scientific goal of the paper is to show existing forms of cooperation on the base of the research conducted in Polish clusters in the end of 2015. Against this background the forms of cooperation in metal manufacturing clusters in Poland have been presented. Conducted analysis showed it is important to distinguish the organizational form of cluster coordinator and cluster itself.

Keywords: Interorganizational cooperation, industrial cluster, metal manufacturing sector

1. INTRODUCTION

Cooperating companies in every sector of business activities has many possibilities to formalize it. Regional clusters are not treated only as agglomerations but as the sets of cooperating entitles, especially in the field of innovation. European and national cluster policy prompts cluster entities to formalize their activities. Cluster organization is formal reification of the cluster and represents the clusters and their members outside. From the other hand the cluster coordinators have their own organizational structure which may affect the relations between members. In the practice of cluster activities in Poland we can observe the difference between cluster organization form of the cluster and the coordinator. The aim of the paper was to consider the relation between these two aspects. The research conducted clusters in Poland in 2015 provide cognitively interesting proposals in this area. The situation in the metal manufacturing sector is similar that in other traditional sectors, but for better understanding the cluster question some basic facts regarding the sector have been presented in the paper for the most important European countries in metal manufacturing.

2. LITERATURE REVIEW

The companies, especially in manufacturing sector perform in the environment of other entitles. The internal factors influencing formalization of cooperation in the metal manufacturing sector consider: existing capital ties between entitles in the sector, forms of existing non-equity strategic alliances, existing logistic ties between businesses in the sector and expected level of formalization R&D collaboration. In the recent years one of the strongest determinants of interorganizational cooperation is innovation [1], [2] especially in environmental technologies in manufacturing and eco-innovation [3]. Interorganizational networks can have different organizational forms: multilateral strategic alliances [4], strategic networks corresponding to the industry structure [5], innovative networks or clusters. Industrial clusters are relatively new phenomenon in theory and practice of economy. Contemporary understanding of cluster are not only geographical agglomeration (Marshall, Porter) but network of cooperating entitles, initializing and realizing innovative project. For this reason clusters in high-technology and medium-high-technology industries are stimulated to cooperate in

science-industry networks. In the studies in these article the following definition of cluster have been adopted: "A cluster is a group of entities coming from different environments: business, science, government and civil society, consciously operating in a certain ecosystem, concentrated on a specific territory and/or around an established specialization. The synergy effect is achieved by the cluster through formal and informal relations, shaped by the potential and social capital of the cluster, which not only describe the functioning of the cluster, but they are formed and developed on the basis of joint actions (including innovative ones), knowledge exchange and competence improvement" [6]. This definition is consistent with the Gordon and McCann understanding of a cluster [1], Immarino and McCann [2] or the most often quoted Porter [8], [9]. Clusters in manufacturing sectors are dominated by existing networks of related manufacturers creating supply chain [10]. This situation is available in metal manufacturing sector, including steel [11], copper [12] and other metal related sectors.

According to clusterobservatory we can include to metal manufacturing sector 22 activities defined by NACE 2.0 industries, starting with manufacturing of basic iron and steel and of ferro-alloys, manufacture of metal products (tubes, pipes, hollow profiles and related fitting), metal processing (drawing, rolling, forming, casting), as well as manufacturing final products like: locks and hinges, tools, wire products, chain and springs, pumps and compressors). The approach to the construction of the sectors comprising a plurality of related activities is based on methodology of analyzing clusters [13]. Metal sector delivers also materials and semi-finished products to other manufacturing sectors and construction sector (ex. it is estimated that 80 % of consumer goods contain steel [11]).

Table 1 Number of cluster organizations and employment in metal manufacturing sector in selected European countries

Country	Number of cluster organizations in the sector	Number of employees in the sector[a] [thousands]	Number of enterprises in the sector[a]	Production value [mln EUR][b]
Bulgaria	2	43.3	2 741	1 736
Czech Republic	0	191.9	51 535	18 593
Denmark	2	24.4	2 735	4 368
Finland	1	40.0	3 654	8 834
France	2	291.3	13 565	58 893
Germany	3	859.2	30 783	173 785
Greece	2	30.8	3 087[b]	2 675
Italy	7	540.9	49 753	101 860
Netherlands	1	47.6	8 090	5 429
Poland	4	189.2	39 818	21 461
Spain	1	229.7	19 923	36 362
Sweden	2	83.2	10 907	20 608

Source: a - clusterobservatory.eu - data for the year 2011, b - Eurostat, data for the year 2013

As it is presented in the **Table 1** there is relation between number of enterprises in national sectors and number of cluster organization. Although the leader in European industry - Germany - has 3 cluster organizations, Italy being the second in production value has also the highest number of enterprises and cluster organizations.

There are several conditions of choosing cluster organizational form. One of the most important refers to the expected scope of public/private funding. In case of public funding cluster must have transparent structure for public control. The research presented in 2003 by Sölvell, Lindqvist a Ketels shows that more than half of the

cluster funds in Europe comes from the public bodies: the public sector was the main source of funds in 54 % of clusters, in 25 % of the clusters examined, the funds were combined from both public and private sectors [14]. Ten years later, in 2013, the same authors, shows the results of studies in clusters: 54 % of their financial resources came from public funds, i.e. from national, regional, local and international organizations [15]. Second important reason of formalization decision is connected with national policy and requirements specified in programs to support clusters. For example in Poland such requirements are presented in standards of cluster management adopted by Polish Agency for Enterprise Development in 2014, requirements for National Key Clusters [16]. Regardless of the formal requirements, clusters remain very important element of European cluster policy oriented on competitiveness and innovativeness of regions and countries [17].

3. ORGANIZATIONAL FORMS OF CLUSTERS IN POLAND

3.1. Methodology

The data from the clusters have been collected in the end of 2015 by the direct contact with cluster coordinator. In this research n=156 clusters in Poland have been investigated form different regions of Poland. Their specializations are presented on **Figure 1-11** clusters in Poland are specialized in metal manufacturing, in the group of “other specializations” we have also 2 clusters specialized in machine industry which is the derivative sector from metal manufacturing.

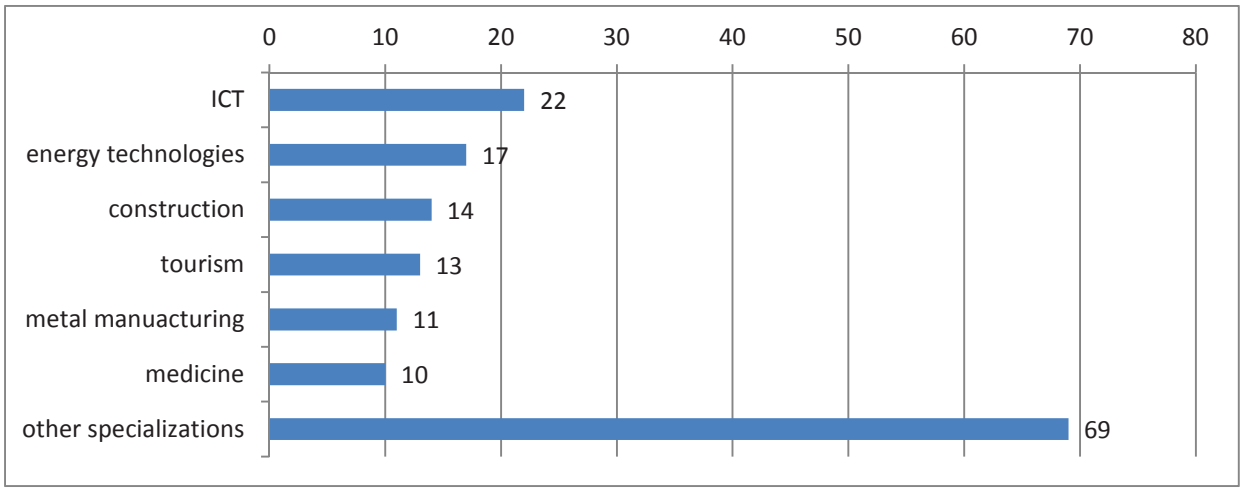

Figure 1 Specializations (dominant sector) of the clusters in Poland

3.2. Findings - organizational forms: cluster and coordinator

The analysis of organizational forms of clusters requires differentiation between the form of coordinator and cluster itself. Cluster policy in Poland strongly emphasizes the role of coordinator and its financial and organizational potential. Public aid is provided to the coordinator, which later distributes it among cluster members. The organizational form of the coordinator is not identical to the form of a cluster. **Table 2**, a contingency table, presents all the occurring combinations of organizational forms of clusters and coordinators in the studied group.

Amongst the organizational forms of clusters we must distinguish an agreement, which is the most frequent (73 clusters) form which defines the general responsibilities of the coordinator and cluster members. Another form of an agreement is the consortium (10 cases), which not only in practice is associated with the realisation of a certain objective, so it is temporarily connected with the realisation of a project.

An association, which occurs 51 times, is a cluster form based on the act on associations functioning in Poland. In the case of tourism clusters we deal with a local tourism organization - an association, whose members are

the entities of territorial authorities. This distinguishes this type of clusters from others, whose members are private individuals and legal persons are the so called supportive members. An association must be at the same time the form of a cluster coordinator - such a combination is the most frequent (44 cases).

Among the organizational forms of cluster coordinators we might distinguish the following: associations (55), foundations (23), private limited companies (38), stock offering companies (7). In the case of such companies these are most often the organizational forms of regional business institutions. Public academic entities functioning as cluster coordinators (16 cases) are universities and public academic institutes (industry institutes or institutes of the Polish Academy of Sciences). The organizational forms of the remaining clusters and their coordinators are presented in the table.

Table 2 Forms of cluster and cluster coordinator

legal form of the coordinator	legal form of the cluster							Total
	agree-ment	associa-tion	consor-tium	limited liability company	founda-tion	chamber of commerce	joint-stock company	
association	11	44	0	0	0	0	0	**55**
limited liability company	26	1	2	9	0	0	0	**38**
foundation	13	0	1	0	9	0	0	**23**
public research unit	9	2	5	0	0	0	0	**16**
chamber of commerce	5	0	1	0	0	3	0	**9**
joint-stock company	3	2	1	0	0	0	1	**7**
employers' association	2	2	0	0	0	0	0	**4**
local government unit	3	0	0	0	0	0	0	**3**
private university college	1	0	0	0	0	0	0	**1**
Total	**73**	**51**	**10**	**9**	**9**	**3**	**1**	**156**

Source: own elaboration

In the metal manufacturing sector 11 clusters can be identified, which are presented in the **Table 3**. Two of the presented clusters have obtained in 2015 a status of National Key Clusters: Polish Aluminium Cluster and Metal Cluster. This is all the more important that the status have been granted only eight clusters. Dominant legal form of clusters in metal manufacturing sector is agreement (6 clusters), which is not associated with significant responsibilities for cluster members. Association as a legal form have been chosen by 3 metal clusters and the most demanding legal form of limited liability company have been chosen by 2 clusters. In the latter case every of the cluster members each cluster's member pays its share to the company, therefore the shareholders are interested in the company's persistence. Every of the investigated metal cluster stresses the importance of innovation in their development plans. Strengthening the competitive and innovative potential of cluster members was cited as the main reason for its creation. Every of metal cluster have an active status (the end of 2015), which is not evident in case of other clusters in Poland.

Table 3 Characteristic of cluster in metal manufacturing sector in Poland

Lp.	Name	Year of establishment	Legal form of the coordinator	Legal form of the cluster	Number of affiliated entitles
1	Dolnośląski Klaster Metalowy Lower Silesia Metal Cluster	2012	joint-stock company	agreement	14
2	Wschodni Klaster Obróbki Metali Eastern Metal Treatment Cluster	2009	association	agreement	91
3	Lubuski Klaster Metalowy Lubuski Metal Cluster	2008	association	association	27
4	Technologiczny Klaster Odlewniczy Modern Cast Modern Cast Technology Cluster	2011	limited liability company	limited liability company	15
5	Wschodni Klaster Odlewniczy KOM-CAST Eastern Foundry Cluster KOM-CAST	2011	association	association	14
6	Klaster Spawalniczy KLASTAL The Welding Cluster KLASTAL	2007	chamber of commerce	agreement	18
7	Klaster Obróbki Metali * Metal Cluster	2007	association	association	56
8	Polski Klaster Linowy Polish Wire Rope Cluster	2012	association	association	9
9	Polski Klaster Aluminium* Polish Aluminium Cluster	2011	limited liability company	agreement	58
10	Klaster Metalowy METALIKA METALIKA Metal Cluster	2011	limited liability company	limited liability company	38
11	Radomski Klaster Metalowy Radom Metal Cluster	2011	chamber of commerce	agreement	22

Source: Own elaboration, *National Key Clusters

4. CONCLUSIONS

On the base of presented research we can formulate the following conclusions:

1. Chosen organizational form for clusters depends mainly on needs and expectations of the cluster members. In case of planned joint project financed by public funds the form of limited company is chosen. In the situation when business supporting institution (e.g. science and technology park) plays the role of cluster coordinator, the organization form of the cluster plays a minor role.
2. In metal manufacturing sector in Poland clusters are in very similar situation than in other sectors, considering formal aspects of cooperation. Relationships within the clusters are independent of capital relations in the sector. In many cases the cluster coordinator has a form of company, being itself business support institution subordinated regional administration. Project for the cluster members are realized by the cluster coordinator, which is very useful model of activity corresponding to Polish cluster an innovation policy.
3. Transparency, good structuring, and good understanding by business members are the advantages of the clusters in the form of limited companies are. However the cluster coordinator must provide not-for-profit services for the cluster members. Cluster coordinator in these case is the owner of the shared resources (tangible and intangible). Need to ensure financing of company activity is main disadvantage of such organizational form. The most flexible organizational form of the cluster is an agreement which

allows cluster members suspension of financing cluster activity and flexible definition of cluster tasks and the competence its bodies.

4. Clusters seem to be interesting form of cooperation in case of implementation of innovation, however according to present European cluster policy creation of new clusters will not be supported. We can expect the intensive development of existing clusters in the field of new product development or implementation of new technologies.

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