

System specifications of transboundary development of industrial clusters

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Abstract. This article examines the specifics of the formation and development of cross-border industrial clusters as a system-specific configuration of the spatial forms of economic space regions, defined by their system characteristics considered. In the article featuring cross-border industrial clusters of vertically integrated structures and special economic zones, identifies sources of competitive advantage such clusters within international integration of the Euro region.

[Galazova S., Panfilova E. **System specifications of transboundary development of industrial clusters.** *Life Sci J* 2014;11(11s):403-407] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 91

Keywords: industrial clusters, cross-border integration, Euro regions

Introduction

Dynamic advantages in competition between countries for reduction of transaction costs for accumulation, combining, mobile shifting of agents of production for organizational coupling the phases of product life cycle make cross-border industrial clusters are one of the main factor of spatial regions' development. It allows European countries concentrate up to 38% of EU industrial potential on the base of cluster integration [1].

Scientific interest for cross-border cooperation research determines plurality of theoretical approaches to definition of essential characteristics and economic nature of cross-border industrial clusters. One group of scientists consider cross-border industrial clusters as specific “quasi-firms” [2], second group – as “industrial networks” [3,4], third group – as “an instrument of forming corporate innovation strategy” [5,6], fourth group – as a sort of “state-private partnership” [7], fifth group – as “regional cluster strategies” [8], sixth group – as a form of internationalization of production [9], and seventh group – as cross-border projects [10].

Undoubtedly cross-border industrial clusters have similar characteristics with vertically integrated and networked structures. They act a special “sites” of international regional cooperation but at the same time have specific features as system and spatial phenomenon of development of regional economies. The latter is the object of the present research.

Evolution of theoretical school of thought of industrial clusters research

Phenomenon of clustering of industrial regions in England was described by representative of “classic” economical school A. Marshall at the end of XIX century. He introduced the term cluster and examined specifics of functioning of textile manufacture cluster in Manchester region (British

tweeds) and metal-working industry cluster in Sheffield (British argents and tea-service). Marshall was the first to notice that besides market function locally compact cluster configuration has informational function. Local configuration defines to cluster geography, dense manufacturing placement and settling of craftsmen. It promote rapid distribution of information about the product and more flexible balancing of demand and supply in local markets.

According to Marshall *geographical* density, flexibility of market prices, foreign trade, mutual trust and “industrial atmosphere” are the sources of competitive advantages of industrial cluster. It promotes additional investments inside cluster [11]. At the same time Маршалом highlighted “natural historical order” of forming a cluster in localized space [12].

M. Porter, M. Scott belonging to “California” economic school studied the problem of clustering of industrial regions of the USA. Porter added the feature of *networking* of industrial and infrastructure companies (vendors, third parties, service companies, financial institutions, Universities and scientific institutions, governmental agencies, etc.) to geographical feature of clusters [13]. Scott stressed the role of disintegration and market contracting in forming of inter-company industrial networked structures, that reduced external transactional costs of interacting between the members of cluster production chains [14], including savings due to informal “clubs” [15].

Main sources of competitive advantages of inter-industry clusters according to “California” economic school are local networking of vertical disintegration of cluster, reduction of operational and transactional costs of interactions between its members under the effect of specialized local labor market as well as informal rules and habits of

members of cluster integration such as the institution of “clubs”.

“Scandinavian school” has slightly different view on the nature of clustering processes and the sources of their competitive advantages, especially in high tech industry [16]. Scientists belonging to this school criticized “California” school and stressed that paying too much attention to purely “organizational and economical” conditions of clustering and underestimating “cognitive” factor of cluster forming from the position of the theory of personal knowledge does not promote reliability of competitive advantage of cluster. It relates to specifics of functioning of knowledge component of innovation processes due to existence of “silent” knowledge and in codifying nature of knowledge (i.e. implicit knowledge — inalienable knowledge that are impossible to move from the person – knowledge bearer). According to M. Polanyi, implicit knowledge is impossible to transfer by educating but they are the instrument of explicit knowledge transfer [17].

In general according to “Scandinavian” school, main competitive advantages of forming and functioning of effective inter-industry cluster are *cognitive* innovation factors. These are staff education in the scope of local process due to the importance of implicit, in codified knowledge. Realization of this process is affected by local competition in labor market, local clients and external economic factors. Theoretical approaches to research of industrial clusters and sources of spatial disparity are shown in Figure 1.

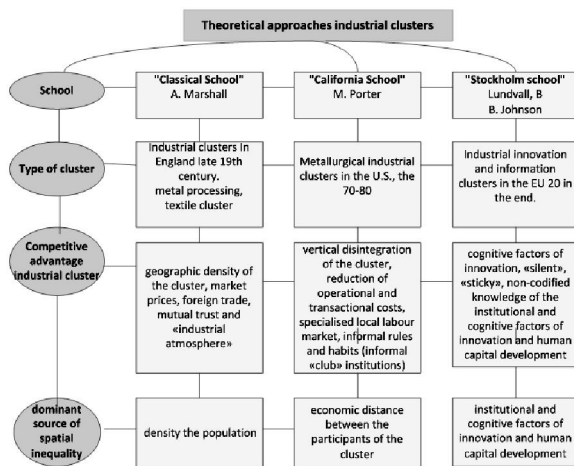


Figure 1. Theoretical studies of the school of industrial clusters and sources of spatial inequality

Evolution of theoretical schools of thought of industrial clusters research demonstrate that in defining competitive advantages of cluster integration

scientists turned from pure geographical, external economic sources (“classic” school) to technological, networking and organizational factors (“California”) school. It was followed to a shift to cognitive terms of cluster functioning (“Scandinavian” school) that was related to changes in the nature of clusters themselves. Type and functional role of cluster as a factor of elimination of spatial disparity of regional development has changed.

Cross-border industrial clusters are formed on base of regional clusters so besides geographical density, compact organization of production live cycle and cognitive component of innovation processes sources of their competitive advantages are inter-regional form of industrial activity organization in the scope of Euro regions.

System characteristics of cross-border industrial clusters in the scope of Euro region

Well-known researcher of cross-border integration M. Perkmann notes that cross-border regions has special functions as new hierarchical “territorial entities” in the context of multilayer management of European economy [18]. There are 182 Euro regions on the territory of EU. Dozens of cross-border industrial clusters actively function here: Domal Valley (Belgium, Netherlands), automobile cluster (Spain, Portugal), BioValley (Switzerland, Germany, France), glass cluster (Austria, Germany, the Czech Republic), biomedicine and metallurgy cluster (Germany, Netherlands), Medicon Valley (Denmark, Sweden) and others [19].

Cross-border cluster is a group of interconnected companies in near border regions that form suprastate and supraregion integration structure. These are industrial companies, equipment and components vendors, specialized services providers, infrastructure companies, Universities and research centers as well as wide number of interested organizations of small and middle-sized innovative business. These companies act as complementary for each other and increase competitive advantages both of individual company and of cross-border cluster as a whole.

Unlike the known organizational model of triple helix of clusters described in [20] cross-border industrial clusters in Euro regions feature special multilayer management process and semi-subjectivity of members because they are complex system formations with multidimensional structure, flexible and functionally open. Governing on several layers is typical for such formations. It is comprised of the following layers:

– firstly, *suprastate* level – suprastate bodies that govern development of cross-border cooperation and cross-border industrial clusters in the scope of

Euro regions - Association of European Boundary Regions (AEBR); Committee of the Regions; Assembly of European Regions; Congress of the Council of Europe; etc.

– secondly, *state level* – governmental bodies, represented by relevant Ministries of regional development of the states-members of cross-border industrial clusters of Euro region;

– thirdly, *inter-regional level* – inter-regional body – the Euro region Council;

2. fourthly, regional level – regional bodies of the Euro region Secretariat in near border territories.

Cross-border industrial clusters have system characteristics – State system, institutional structure, multilayer structure, streaming character, geographical concentration, polysubjectivity, multiformity and versatility. So these organizational forms of industrial integration may be considered as special system and spatial phenomenon of regional development of territories (see Figure 2).

Diversity of European cross-border industrial clusters is caused not only by geographical specifics of distribution of regional resources but also qualitative parameters of the state of institutional environment of near-border territories capable to support inter-regional “corridors” of agent of production movement. It has significant effect on the level of streaming costs of resource movement in inter-regional space.

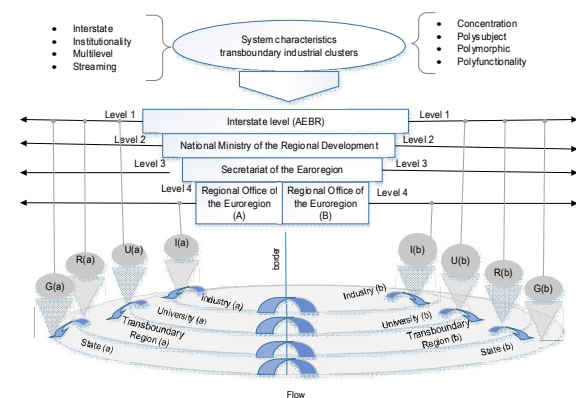


Figure 2. System characteristics transboundary industrial clusters

New competitive advantages of members of cross-border industrial clusters (states, regions, Universities, enterprises, small and middle-sized business of local communities) increase positive effects of cross-border integration and promote elimination of spatial disparity of regions.

For Russian economy and the economy of CES cross-border clusters in the scope of Euro

regional integration have their own advantages comparing with vertically integrated structures and special economic areas (SEA).

Cross-border industrial clusters have similar features with vertically integrated structures but unlike the latter cross-border cluster organization is more flexible and has combined networked character both in vertical and horizontal direction of integration interactions of subjects of economy. Members of vertically integrated structures unlike cluster members are dependent enterprises and organizations joined into the unified structures according to the decision of shareholders of parent company. For vertically integrated structures space and time of economic activity is not limited and for clusters geographical and spatial factor are critical. Besides cluster forms of cross-border integration have cross funding from suprapstate (EU) and state sources of their development.

Another alternative of cross-border industrial cluster is special economic areas (SEA) but they have some limitations resulting from the following: *firstly*, limitation of activity types (restraint on some types of industrial specialization in extractive, secondary, metal-working industries); *secondly*, funding limitations – required investment are relatively high – not less than ten million Euro that hampers active participation of small and middle-sized innovative business; *thirdly*, complicated and long-lasting character of special economic area establishment, great number of documents required that make this variant much more over organized and less attractive comparing with cluster; *fourthly*, high level of state involvement in special economic area that on one hand provide guarantees to residents but in the other hand limits the freedom of entrepreneurship; *fifthly*, strict spatial limitation – 20 km² for industrial and production SEA and 3 km² for technological and deployment SEA is grave drawback of special economic areas.

So both vertically integrated structures and special economic areas has a certain cluster features that affect regions' economical space but at the same time effect of cross-border industrial clusters has its specifics that makes them different from both these forms of international integration and purely regional clusters.

Economical and technological unity of cross-border industrial clusters is being created by industrial bounds of enterprises, universities, small and middle-sized business using available natural, financial, organizational, transport and information resources. Cross-border industrial clusters provide substantial economic benefit due to combining and cooperation of enterprises in the base of development of industrial outsourcing including rational using of

natural and labor resources, recycled resources, transportation networks, reduction of costs for building supporting structures and facilities erecting engineering communications and social and cultural objects.

Cross-border industrial clusters form complicated multilayer mechanism of integration interaction of economical subjects on the base of correlating of social and economic interests, state, near-border regions and business oriented on innovative development both of separate territories and country as a whole.

Conclusions

Unique characteristics of cross-border industrial clusters as organizational complexes of industrial integration make them multidimensional, flexible and open in functioning in regional economic space. Cross-border industrial clusters feature multilayer character of management process and semi-subject members' body. These organizational forms of industrial territorial potential are characterized by inter-state system, institutional structure, multilayer structure, streaming character, geographical concentration, polysubjectivity, multiformity and versatility. So they integration may be considered as special system and spatial factor of international integration and configuration of economic space of near-border territories in the scope of Euro regional cooperation.

Unlike vertically integrated structures and special economic areas cross-border cluster organization is more flexible and has combined networked character both in vertical and horizontal direction of integration interactions of subjects of economy with wide engagement of small and middle-sized innovative business. Modern cross-border industrial clusters are one of the main factor of Eurointegration development on the base of territorial division of labor and competition between countries for accumulation, combining, mobile shifting of agents of production for organizational coupling the phases of product life cycle.

Further research in this area is required for development of system methods of functioning of cross-border industrial clusters for evaluating extent and the character of relations between members of cluster both at the level of inter-state interaction of Euro regions and at the level of separate subjects of cluster initiative.

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7/9/2014