

The significance of cluster territories in resource-driven economies

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Abstract. This article examines the evolution of the significance of cluster territories in resource-driven economies. The author provides an analysis of factors in turning a territory into a habitat for an industrial cluster. The author proposes stages in transforming an industrial cluster into an innovation cluster based on saturating the base territory with spatially affined production and scientific units, strong direct and indirect relations, and intensive knowledge flows. The outcome of geographic concentration is expected to be the cluster synergy effect, which “turns into” the cumulative territory effect with reflection in positive social-economic processes. The author has conducted the testing of particular cluster territories for the intensity of using a cluster territory.

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Introduction

An indispensable component part of a cluster is the territory it is based in. The analysis of their interaction is expectedly based on the systemic notion of locality, which comprises facilities of natural, production, and social significance and resource-product relations.

The initial interpretation of territorial localization of production in an “industrial area” [1] is predicated on natural climatic conditions which form the resource base. Growth Poles theory [2] differentiates between the functional (industrial) and geographic principles when there is drastic change in horizontal (new activity types) and vertical (new production methods) organizational-technological relations in a particular territory. The cluster analysis of the “enterprise-territory” interaction [3] relies on the effect of spontaneous coordination of mutually beneficial actions in vertical and horizontal technological chains and adequate response to intensive and differentiated demand. Here, the territory is a receptive market. Further variations of the combination of economic processes and economic-geographic characteristics of specific territories produce a range of role denotations of a cluster territory: a market niche [4], an integrator of innovation [5], an optimizer of production deployment [6], a distributor of information and competencies [7], and a competitive local market [8]. Consequently, the competitive advantages of a recipient territory are identified. In analyzing a modern cluster territory, natural properties are replaced with anthropogenic, which is dictated by present-day trends in local and interregional industrial relations [9], innovation networks of global clusters [10], territorial integrity

based on social-cultural characteristics [11], and the geographic reach of knowledge flows [12].

As a result, optimum ways of using a local territory as an active structural-functional component of a cluster are identified in practice.

Methods

The article’s theoretical and methodological basis is made up of works by scientists engaged in the study of the “cluster territory”. The cluster territory as a complex economic-geographic object of study has warranted the use of a set of methods [13].

The work employs the systemic approach to bring to light the essence of the cluster territory as a locality with diverse internal and external relations. The authors formulate a hypothesis on the innovation development of a confined industrial territory under the influence of endogenous self-organization factors. Through systematization, the authors identify the stages of positive territorial change and its characteristics. In identifying the major characteristics of the territory the cluster is based in, the authors employ the variant method based on comparison of qualitative parameters and effects to identify the most sustainable compared with optimum. The modeling method helps to reveal in practice the intensity of using the cluster territory in employing the criteria of activity concentration and specialization, the extent of inter-firm partnership and trust, and the level of internal competition.

Main part

In a resource-driven economy, the development of the cluster territory is based on geographic concentration and active interaction

between entities. Territorial-production complexes, infrastructure facilities, land property, and administrative resources become the base for the growth of industrial clusters. In forming the cluster territory through ineffective conglomerate mergers, the agglomeration effect is actualized partially. While the path of observing the boundaries of occupied habitats [14] is productive only if there is a sufficient market niche and deepening specialization; changes in territorial borders are possible through progressive knowledge transfer [15] and technology and network communication outsourcing [16] [17], which produces a considerable synergy effect [18].

Creating the competitive edge of the local territory dictates the transition to the innovation cluster, where the territory is a “platform for drawing together” and external openness, which employs co-regulation, creates the gross innovation product, spreads a sustainable system of new knowledge and technology, and produces cooperative forms of innovation creative work (mixed capital and equipment, risk sharing) [19]. The possible step-by-step procedure moves along the lines of the organizational drawing together of production and scientific units, closeness of ties, and community of interests (Table 1).

Table 1. Stages in transforming an industrial cluster territory into an innovation cluster territory

Stages in territorial transformations	Major characteristics
Geographic concentration	Uniting enterprises through technological, infrastructural, and cost relations
Transfer habitat	Informal transfer of knowledge, skills, and technology
Territory of collective bodies	“Distributed” administration and arbitrage
Territory of innovation generation	Formation and maintenance of a self-sustaining nucleus through interconnected start-ups

Source: authors

This is how the “nucleus” and “periphery” of a high-tech cluster [20] are formed, where a critical amount of conditions for self-organization in a confined territory manifest themselves through creative work as its uniqueness [21]. In such a structure, a major role is played by: a) focusing innovations through endogenous quality [22]; b) selecting strong indirect relations localized territorially within the cluster [23]; c) dampening the generation of excessive knowledge when there is a dense geographic network of firms [24].

As a result, the synergic cluster effect, which is construed as the multiplication of the result with the addition of efforts, transforms into the cumulative territory effect, while the latter, in turn, is actualized in a number of specific social-economic effects that support the region’s competitiveness and reproduction (Table 2).

Table 2. A model for the development of a cluster territory

Elementary form of territorial basing	Locality as a system of land sites/facilities (terrain, inhabited locality, firm)	
Emerging territorial-economic establishments	“Center” as base of scientific-technological complex	“Periphery” as habitat for organizational and social-cultural servicing
Factors in internal self-organization of territory	Diffusive-dispersive flows of resources, technology, information, knowledge, and competencies	
Factors in external organization of territory	Economic policy, regulatory influence of management and control, movement of resources and goods, and competition	
Components of synergic effect of territorial cluster	Short-range interaction effect (concentration of variety); Combination effect (diversity of combination); Neo-formation effect (qualitative accumulation).	
Components of cumulative effect of geographic localization	“Focus” of innovation productivity; “Center” of investment attractiveness; “Habitat” of growth in number of jobs; “Locale” of infrastructural connectedness; “Point” of socio-cultural gravitational pull	

Source: authors

In viewing the territory as the linking basis for the segments of the production hierarchy based on short-range interaction [25], the following outcomes are observed: advantageous use of natural resource potential and industrial fixed and infrastructural capital; well-defined institutional influence boundaries; growth in resource- and labor-intensive industries; a sustainable social-economic effect in the form of an increase in jobs. As a result, there is formed a combinatory and conglomeratory type “industrial cluster” with a well-defined nucleus in the form of a large specialized enterprise and a technologically ill-defined periphery that includes small and medium-sized enterprises making up the production-sales network.

The territory as an environment of exchange of resources and information [26] is characterized by: the intensive use of production and scientific potential and infrastructural and “human” capital; the productive use of all forms of ownership and formal and informal forms of management and coordination; the consolidation of transactional costs; the mitigation of “entry/exit” barriers; efficient resource-information transfer; growth in socio-cultural institutes. As a result, there is formed a “cell cluster” of uniform-sized narrowly-specialized scientific-production and sales type enterprises operating on the principles of complementarity of the network relations “concentration – cooperation – coordination – competition”.

The territory as an integrator of local markets [27] is characterized by: the integrated use of the territory’s economic potential and its infrastructural capital; the formation of a “focus” type industrial establishment with a leader-enterprise and satellites; the institutional and economic organization of the system of regional markets; the formation of logistical schemes for goods movement; the effect of sustainable demand. As a result, there is formed a “niche cluster” founded by enterprises associated through production diversification, changes in demand, and deepening specialization and servicing a number of interconnected markets of different localization levels based on a commonly significant strategy.

As a result, there arises a need for clear-cut and substantiated cluster policy with a spatial-economic emphasis [28].

The testing of local territories was performed through the example of four constituents of the Russian Federation: the “Lipetsk” special economic zone (Lipetsk Oblast), the “Rodniki” industrial park (Ivanovo Oblast), the “Grabtsevo” automobile cluster (Kaluga Oblast), and the technopark of the Institute of

Applied Physics of the Russian Academy of Sciences (IAP RAS) (Nizhegorodsk Oblast) [29], [30].

The development of clusters in the first two cases was initiated by the regional administration, while in the third and fourth by a large production and scientific organizations respectively. Reductions in the amount of and waiting times for bureaucratic procedures result in: a comparative, 30%, decrease in residents’ costs (OEZ “Lipetsk”), an increase in the number of potential investors (“Grabtsevo”), the possibility of being included in the federal program for the development of technoparks (“Rodniki”), the expansion of promising world-class topics (IAP RAS). The attractiveness of the local territory is governed by the cheapness of resources (land, electricity) (“Rodniki”, “Grabtsevo”), provision of a tax relief package (OEZ “Lipetsk”), or financial support from field-specific federal authorities (the IAP RAS technopark).

The study revealed the following: in all the cases, the concentration of small enterprises is weak: 18 (OEZ “Lipetsk”), 7 (“Rodniki”), 10 (“Grabtsevo”), and 3 (the IAP RAS technopark). This is much less than in the territory of receiving regions. Of note is the concentration of specialized manpower in the Nizhegorodsk Oblast technopark, which is associated with the transfer of employees from the head institute. The accessibility, reliability, and intensity of the use of infrastructure directly depend on the degree of interest on the part of the local authorities and the level of lobbying and the financial state of the owner of the local territory.

The specialization of the clusters is represented by: the dominant industry in the clusters of “Rodniki” (textile production) and “Grabtsevo” (automobile manufacturing); registered profiling at OEZ “Lipetsk” (machinery manufacturing, construction materials, alternative power generation); actualized diversification (gyrotrons, ultrasound equipment, medical devices) at the IAP RAS technopark.

Inter-firm relations at OEZ “Lipetsk” and “Rodniki” are formed based on the use of a single compact infrastructure and mutual sporadic demand for products and semi-finished products. At the IAP RAS technopark, the scientific-training base, pilot production, and external demand for unique products serve as the integrator. The extent of partnership and trust is limited to relevant production and technological contact with considerable external coordination of activity, which is expressed in selecting cluster participants (OEZ “Lipetsk”), maneuvering available tax and customs benefits (“Grabtsevo”), and external economic support from federal authorities (IAP RAS). The dominant strategy

manifests itself everywhere as long-term with objectives of import substitution (OEZ “Lipetsk”), export orientation (“Rodniki”, “Grabtsevo”), and maintaining global competitiveness (IAP RAS).

In these examples, internal competition turns out to be negligible, since the local territory is used as a “shelter” from adverse external conditions. The inclusion of foreign manufacturers in the clusters’ line-up (Germany, Japan, Belgium, and Turkey) is associated with their search for preferential conditions for production and desire to draw near to new non-stagnating markets. The small enterprises GIKOM, “Meduza”, and “Biomedtekhn” (IAP RAS) are offering unique products competitive on the global market.

In all, the use of the cluster territory appears to be: intensive (“Grabtsevo”, IAP RAS), optimum (OEZ Lipetsk), and incomplete (“Rodniki”).

Conclusion

The local territory becomes a crucial element of the cluster, since the effects of the interaction are defined by compactness and short-range interaction. Under strictly determined external institutional influence, both the habitat of the production territory and the role fulfilled by the territory become defined.

Thus, we can say that the cluster territory as an economically reclaimed space is evolving progressively (based on the quality of internal relations and external effects) in the chain of the following interconnected notions: “source of raw materials and processing base” => “production node” => “growth pole” => “integrator of competitive advantages”.

Inferences

Our assessment of the territory on the “optimum-actual parameters” scale leads us to draw the following inferences:

- the creation of cluster territories is initiated by the regional and corporate governing bodies;
- territories endowed with preferential resources and conditions become “attraction zones” – not the entrenched production aggregates;
- the conglomeratory type of production cooperation dictates the truncated radius and horizon of yield effects;
- the pressure of negative institutional conditions does not let small enterprises-leaders actualize their potential through development.

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