Concentration and Spatial Distribution of Economic Entities under Innovative Development of the Region

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Abstract The special issue on the "Geography of Innovation and Economic Clusters: Evidence from Russia" is held in order to provide insights on the theoretical elaboration and practical implementation of the cluster concept in the regions of the Russian Federation. Multidimensional nature of the phenomenon of economic clustering has led to the need for a transdisciplinary approach in studying the features of spatial distribution of regional economic entities and institutions of the region in the framework of knowledge economy. We therefore invite scholars to consider the development of the cluster concept by taking into account the impact of the neighboring areas of science, focused on in-depth study of each of the three key features of the cluster concept – interconnectedness, systemic properties, and spatial proximity. The eight articles of the special issue uncover the aspects of the innovation process in the regional context, the factor of international inter-cluster collaboration, the methods of cluster mapping and identification of the early indications to track the emergence of a cluster, as well as the case studies on the industry cauterization in various parts of the country.

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In an increasingly globalized world and a strong differentiation of the economies of certain regions (regional level) and countries (international level), becoming more and more important the issues to find effective forms of spatial distribution of economic entities in order to improve the overall competitiveness of the territory (i.e. country or region). M. Porter, in his book "On Competition" shows that a high degree of localization of production not only provides a competitive advantage to economic actors involved in the cluster, but also macroeconomic benefits for the region. Increase in the number of clusters on a global scale in conjunction with the transition to an economy based on knowledge, caused interest of the scientific community in the cluster concept as promising method for constructing an efficient economic system.

The founder of this concept is considered to be Michael Porter. However, the emergence of the idea of the economic clustering refers to the earlier period and is associated with the work of D.F. Darwent, N. Hansen, R.P. Misra, and the famous Spanish scholar H.R. Lasuen. The contribution of M. Porter to the development of the cluster concept can be predominantly expressed in the empirical and methodological substantiation rather than in the development of theoretical foundations. Despite this fact, the most popularity the term "cluster" has received in the definition of M. Porter as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions (e.g., universities, standards agencies, and trade associations) in a particular field that compete but also cooperate" [[7]; 197-198]. The complexity of the phenomenon under study led to the introduction of a number of additional definitions by M. Porter, focusing on individual features of a cluster:

1) interconnectedness of actors in a cluster: "cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by communities and complementarities" [[7]; 199];

2) systemic properties of a cluster: "[cluster as] a system of interconnected firms and institutions whose value as a whole is greater than the sum of its parts" [[7]; 213];

3) geographical proximity: "a cluster is a form of a network that occurs within a geographic location, in which the proximity of firms and institutions ensures certain forms of commonality and increases the frequency and impact of interactions" [[7]; 226].

The basis for the formation and development of the cluster concept was grounded in the works of many prominent scientists in the field of economics, regional economics and economic geography (A. Amin, P. Aydalot, M. Weber, E. Hoover, R. Kamagni, A. Marshall, R. Nelson, K. Sabel, M. Storper, N. Thrift, S. Winter, E. Champ, K. Arrow and others). Multidimensional nature of the phenomenon of clustering of the economy has led to the need for a transdisciplinary approach to the study of the features of the spatial distribution of economic actors in terms of innovative development of the region. We therefore invite scholars to consider the development of the cluster

concept by taking into account the impact of the neighboring areas of science, focused on in-depth study of each of the three key features of the cluster concept mentioned above – i.e. the interconnectedness, the systemic properties, and the spatial proximity (Figure 1).

Period from 1799 to 1890 characterized by the formation of the fundamental basis of the theory of territorial development, theoretical innovation and economic growth. In the early 20th century, a significant impact on economic science had technological progress. The concepts of "innovation" (Schumpeter J.A., 1934) and "modernization" (Lewis W.A., 1952) were introduced. The innovative theory of long waves and the concept of technological development were elaborated at that time. The key areas of research in the field of economic localization became the factors of industrial development of the area and the diffusion of innovation. The second half of the 1900s was marked by the emergence of neoclassical theories of economic growth, which address the issue of scientific and technological development of economic processes (e.g. theory of the technological gap, the neoclassical growth models, etc.).

In the period from the 1970s to the 1980s, the spatial location and concentration of economic activity has been extensively studied in the framework of regional studies and geo-economics. Introduced the concept of "development corridor" (P. Pottier, 1970) and "internationalization" (P. Barkley and M. Casson, 1976). The main areas of study in the theory of innovation advocated the concept of scientific and technical progress, the generation and commercialization of innovations and wave fluctuations of the economy. Widely applied interdisciplinary approach to the study of the mechanisms of innovation management and the concept of institutionalism.
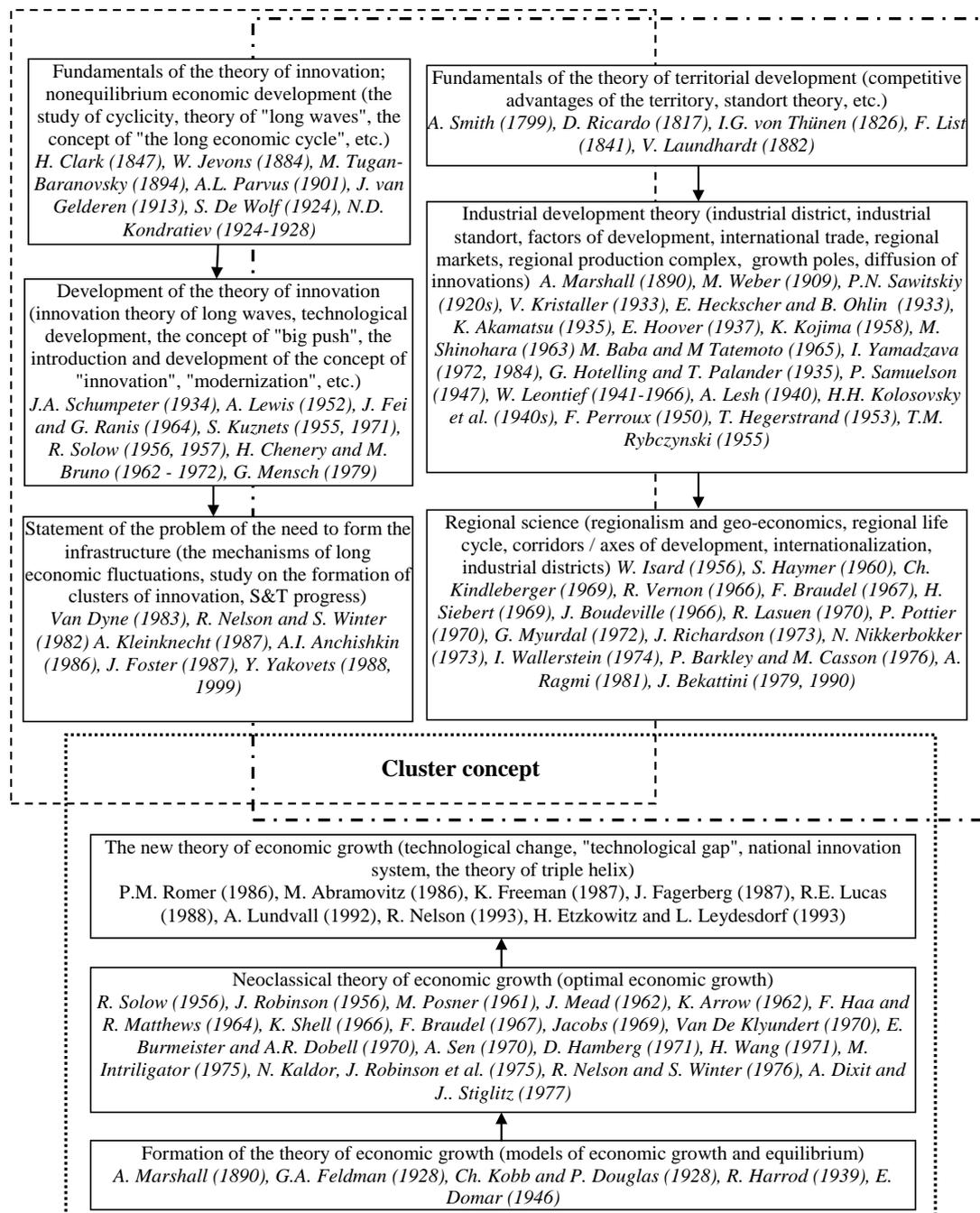

Figure 1. Place the cluster concept in the system of scientific theories, concepts and views on the spatial distribution of economic actors in terms of innovative development of the economy

Thus, three areas of economics influenced the formation of the cluster concept:

First, theories of innovation, based on the ideas of Joseph Schumpeter – innovation and R&D are the basis of corporate competitiveness, the role of innovator-entrepreneurs is the commercialization of scientific research;

Second, theories of economic growth within the concepts of F.A. Hayek, who highlights the special role of knowledge in economic development (the 'knowledge economy', learning creative corporation) and D. North, who studied the role of the institutional environment (as a system of formal relationships and mechanisms) in ensuring the efficiency of markets;

Third, within the framework of theories in agglomeration economies and interactions within the spirit of T. Palander, O. Englender, G. Ritschl and others, who note the need to consider the linkages between separate (previously assumed to be isolated) enterprises, thereby combining the theory of agricultural and industrial standort.

Development of the cluster concept in the XXI century is associated with the names of such scientists as T. Andresson, R. Brough, R. Brown, E.M. Bergman, K. Ketels, M. Lorenz, D. Maillat, P. Maskell, M. Porter, V. Price, S. Rosenfeld, M. Storper, O. Williamson, E. Feser, M. Feldman, P. Fisher, J.. Humphrey, H. Schmitz, M. Enright, D. Jacobs, A. Young and others.

However, despite the active development of the cluster concept in recent decades, there is still no common approach to define an economic cluster [5,6]. Scholars stress to the point that specific characteristics of a cluster are not yet set; hence, there is no clear understanding of the essence of the phenomenon. Using the geographical approach (A. Marshall, E.M. Bergman and E. Feser, M. Enright, K. Crouch and H. Farrell, J. Swan and M. Prevezer) does not define the criteria of geographical proximity and does not consider the relationships between firms. The industrial approach (H. Schmitz, J. Swan and M. Prevezer) often results into the substitution of the notions of "cluster" and "industry". An approach based on the relationship of individual firms (T. Egan, W. Elzner, E.M. Bergman and E.J. Feser, M. Steiner and K. Hartman, O.G. Kofanova) does not take into account the quality of the relationships between cluster members. Using an approach based on the criteria of geographical localization and the close relationship between companies (S. Chamanski, L. Ablas, M. Porter, B.A. Raizberg and L.S. Lozovskiy, V.P. Tretiak, T. Anderson, H. Schmitz, L. van den Berg, E. Brown and W. van Winden, S. Rosenfeld) leads to a blurring of the spatial boundaries of the cluster.

A certain solution to this problem would be to represent the essential set of cluster characteristics. For example, the concept of "4K" of the National Institute of Competitiveness (Competition, Concentration, Cooperation, Competitiveness), the concept of "5-E" of M. Voynarenko (Integration, Initiative, Interest, Innovation, Information), the concept of "5K" of T.R. Gareev (Concentration, Competition, Cooperation, Communication, Competence), etc. However, this approach equally does not show any methodological unity.

Most scientists mark the degree of geographical localization of actors as one of the distinguishing characteristics of the cluster. However, the issue of cluster boundaries is ambiguous, and largely depends upon the disciplinary orientation and the aims of study. The terms "geographical proximity", "close arrangement", "close proximity" or "geographic concentration" is considered in two aspects: first, in order to study the effects of placement of production facilities; second, to figure out the influence of these geographic clusters on the formation of a business environment (in later works the "innovation environment"). A significant influence on the understanding of the boundaries of the cluster had research finding on the joint use of labor, raw materials, and information resources within specific geographic areas. Thus, the later studies introduces the terms "territorial commonality", "spatially limited" and "localized territory". The progressive approach based on the mobility of cluster boundaries is reflected by [7]. While [1,2,3,8] specifythe networked nature of a cluster, thus provide no reference to the degree of geographical boundaries.

The variation of the completeness of the records of participants, interacting within the cluster is associated with a broader interpretation of industry specialization and technological specifics of individual businesses and the expansion of the interacting entities by including representatives of the different institutional spheres. Initially, the publications on the cluster concept involved such characteristics as "group of enterprises / companies / firms". Later on the description of the cluster structure was extended and detailed, by including "universities, standardization agencies, trade associations", "non-profit organizations", "public sector institutions", "legislatures at various levels, research institutes and educational institutions", "all stakeholders", "group of agents", "bonding market institutions and consumers", "infrastructure facilities, financial institutions", etc.

The causes of clustering have also changed towards the understanding of the need for such an association. The classical approach is based on industrial commonality of the cluster members that is expressed in the exchange of specialized knowledge and benefits gained from "economies of scale". A broader interpretation takes into account not only horizontal but also vertical linkages, based on the complementarity of technological companies of one or more interdependent and complementary industries within the value chain. The most modern approach considers the reasons for clustering as an attempt to co-create competitive market offerings via mutually beneficial cooperation of actors that belong to different institutional spheres.

In recent years, we have seen an active development of the cluster concept, both due to the inclusion in a larger number of interacting stakeholders involved, and through the blurriness of the geographical boundaries and economic cohesion of its members. Geographical proximity is considered in conjunction with the organizational, cognitive, social and institutional proximity between the participants. Has increased the role of sustainable networking between actors that define the configuration of the cluster's structure and ensure the derivation of a synergistic effect. Thus, in a general sense, economic cluster is a localized concentration of a wide range of interrelated, interdependent and mutually reinforcing stakeholders, competing and cooperating with each other in the framework of a single technological chain or networked interconnectedness in order to achieve the development of each cluster member with a simultaneous

display of a synergy effect in the development of the territory.

Theory suggests that virtually any metropolitan area, given a proper governance, has prerequisites for the formation of clusters, regardless of the industry sector. The determining factor is the ability to maintain a continuous process of generation and commercialization of innovations through the integration of the actors of at least three institutional spheres – university, business, and government [4]. In turn, this requires the construction of a sustainable system of interactions, capable of self-governance and synergy. A cluster, from this point of view, is an instrument of formation of this kind of systems, but not the final form of this initiative. The essence of the cluster can be expressed in the ability of continuous generation and commercialization of innovations, which is achieved by speeding up the process of exchange of new knowledge (both codified and tacit) and the emergence of the synergies from the complementarity of competences of interacting actors.

Creation of a network of territorial-production and innovation clusters is identified as one of the government priorities of the Russian Federation. The "Concept of Long-Term Socio-Economic Development of the Russian Federation for the period till 2020" sets out the basic tasks of the elaborated cluster policy:

1) create an enabling environment for the organizational development of clusters;

2) support the projects aimed at improving the competitiveness of cluster members, taking into account the priorities of development and economic policy measures;

3) ensure the efficient and methodical information consulting and educational support for the implementation of cluster policy at the regional and sectoral levels, and coordinate the activities of executive authorities at different levels.

The main measures of state support for the formation and development of clusters to be used are: inter-governmental grants, tax incentives, targeted federal and state programs to attract developmental institutions and companies with state participation.

Legal and regulatory framework that provides support of cluster initiatives and emerging clusters at the federal level include: the "Concept of Long-Term Socio-Economic Development of the Russian Federation for the period till 2020", the "Strategy of innovative development of the Russian Federation for the period till 2020", the "Guidelines for implementation of cluster policy in the Russian Federation " and other legal acts.

In 2010, the Russian Ministry of Economic Development initiated the creation of the "Centers of cluster development", established with a public funding on a competitive basis in order to facilitate the decision-making and coordination of projects on the formation and development of clusters in the regions of Russia. The cluster initiatives have to ensure the economic growth of the respective regions and satisfy the interests of all businesses that contribute to the production of import-substituting products. Among the main objectives of the Centers is to identify the naturally evolved clusters, do their benchmarking, assist to their development, do the marketing and promotion of cluster companies on to new markets, facilitate the networking process. A total funding of the creation of such centers has amounted to 160 million rubles of the state budget and 60 mln.rub. of the budgets of Perm, Kaluga, Samara, Ulyanovsk, Tomsk regions, the Republic of Tatarstan and the city of St. Petersburg.

In March 2012, the first phase of the national cluster program was launched, the aim of which is to select the most promising cluster initiatives of the country. In just one month, 94 applications were filed from all regions of Russia. Most cluster initiatives occupy the specialization areas of life sciences (18% of all applications) and ICT (about 13%). The share of other areas is insignificant – from 1 to 4% of the total volume.

Projects were evaluated based on 11 criteria, the most important of which are (in order of importance): the scientific potential, production capacity (sales), quality of infrastructure, and the level of institutional development. The estimation was made from the perspective of the value of the existing facilities, the outlook for the next 5 years (until 2017) and the quality of the action plan.

Further screening of the applications was held in two stages. In the first stage, 37 applications were selected based on evaluation of experts – representatives of the federal authorities, the leading educational and research organizations, federal development institutions, consultants and business community (a total of 100 experts). The second stage involved presentations of projects to the committee of public-private partnerships for innovation – the Government Commission on the Development of High-tech and Innovation, which reduced a number of application to just 25. A number of similar regional cluster initiatives were proposed to merge in one project. Out of the 25 cluster initiatives, the most widely represented were the ICT sector (7 projects) and life sciences (6 projects).

The expected results of the implementation of activities of the cluster policy is to accelerate economic development through the growth of entrepreneurial activities of small and medium-sized business entities, including in the sphere of innovation, and increase the flow of direct investments in the regions. However, one of the key priorities for the regions of Russia should be building their own scientific - technological potential, especially through activation of innovation activities of the business sector and to strengthen the cooperation with international actors. Reducing the backlog in the level of scientific – technological development, requires the development and implementation of a comprehensive policy aimed at both strengthening the socio – economic situation, and at the development of R&D in key areas identified in the "Strategy of innovative development of the Russian Federation for the period till 2020".

The special issue on the "Geography of Innovation and Economic Clusters: Evidence from Russia" is held in order to provide insights on the theoretical elaboration and practical implementation of the cluster concept in the regions of the Russian Federation. The eight articles of the special issue uncover the aspects of the innovation process in the regional context, the factor of international inter-cluster collaboration, the methods of cluster mapping and identification of the early indications to track the emergence of a cluster, as well as the case studies on the industry cauterization in various parts of the country.

A.A. Mikhaylova from the Immanuel Kant Baltic Federal University has given a comprehensive literature review of the innovation process in the scope of the

innovation economy. She defines the nature of innovation process in the modern economy, which is based on a as a complex, non-linear process of localized mutual learning process.

N.S. Askerovfrom the Dagestan State University has shown the role of the cluster concept in implementation of socio-economic development strategy of the region. His article has a practical orientation, based on the evidence from the Republic of Dagestan.

The article of A.S. Huhrin and his colleagues from the All-Russia Research Institute of Economics, Labor and Management in Agriculture have elaborated a comprehensive conceptual basis for the development of agro-industrial clusters in Russia using a synergetic approach. Authors argue that the cluster concept and synergetics have many things in common and demonstrate how the transdisciplinary approach can enhance the theoretical and empirical basis of clusters.

S.Yu. Soboleva and P.V. Tereliansky from the Volgograd State Medical University and the Volgograd State Technical University respectively are developing an applied technique capable of identifying a cluster at the early stage of its establishment. Authors use nonparametric technique of examination while analyzing the formation of the pharmaceutical cluster in Volgograd region.

V.A. Omelyanenko from the Sumy State University addresses the issue of the international inter-cluster cooperation in high-tech industries (nuclear energy and space technology in particular). He suggests, that inter-sectoral collaboration between the regional clusters located in different territories and possess different competitive advantages can significantly upgrade an innovative collaborative ecosystem.

A.N. Dyrdonova and N.Y.Fomin from the Kazan National Research Technological University have proposed a methodology to define the rationale of regional clustering. Authors demonstrate an empirical approbation of their development, and advocate the possibility of predicting the level of synergetic effect of the clustering, and evaluate its economic effectiveness.

T.Yu. Kovaleva and V.G. Baleevskih from the Perm State University have set the task to identify the educational clusters in the Perm region. Authors analyzed a large statistical baseusing quantitative Shift-Share analysis and the localization coefficient. Additional qualitative diagnosis enabled to reveal substantial basis for educational clusters' development in the region.

N.V. Rubtsova from the Baikal State University of Economics and Law located in Irkutsk held a study on tourist clusters in the Pribaikal region. The specialty of this research paper is the analysis of the seemingly ditto contextual factors of the formation of tourist clusters at the two sides of the Baikal lake – the Irkutsk region and the Republic of Buryatia. Research results suggest an uneven success of the cluster policies of the two regions, allowing to propose a number of recommendations.

References

[1] Bergman, E.M., Feser, E..J., *Industrial and regional clusters: concepts and comparative applications*. Regional research institute. WVU, Morgantown. 1999.

[2] Brown, R., *Cluster Dynamics in Theory and Practice with Application to Scotland: Regional and Industrial Policy Research Paper*. European Policies Research Centre, Glasgow. 2000.

[3] Egan, T., *Toronto competence: an assessment of Toronto's global competitiveness*. Economic development office, Toronto. 2000.

[4] Etzkowitz, H., Leydesdorff, L., "The dynamics of innovation: from national systems and ''mode 2'' to a triple helix of university – industry – government relations", *Research Policy*. 29.109-123. 2000.

[5] Hoffe, R., Chen, K., "Whither or not industrial cluster: conclusions or confusions?", *The Industrial Geographer*, 4. 2-28. 2006.

[6] Martin, R.,Sunley, P., "Deconstructing clusters: Chaotic concept or policy panacea?", *Journal of Economic Geography*. 3(1). 5-35. 2003.

[7] Porter, M. E., *On competition*. Harvard Business School Press, Boston. 1998.

[8] Roelandt, T., den Hertag P. Cluster analysis and cluster – based policy making in OECD countries: an introduction to the theme. In *Boosting innovation: the cluster approach*. OECD, Paris. 9-23. 1999.