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Fostering the Engagement of Corporate Establishments in the Innovation-Driven Development of Russia's Regions

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Abstract

This paper addresses the need for the innovation-driven development of the Russian economy in reliance on large business and regional innovation-driven development. The authors provide a rationale for the need to develop the national and regional innovation systems and bring to light their strengths and weaknesses based on assessments by experts from around the world; conduct an analysis of innovation activity within the corporate sector, provide a description of the architectonics of innovation activity by corporate establishments amid the impact of global challenges, and stress the need to develop the nation's open innovation model and put together a wide field of communications encompassing small and medium-sized enterprises within the area of presence; conceptualize a cluster approach to boosting regional innovation activity and its feasibility in Russian reality; provide a characterization of the key preconditions for the formation of innovation clusters, their structure, objectives, and principles of operation; conduct a comparative analysis of the major types of clusters as production agglomerations and as network ecosystems and stress the promise of the innovation mechanism of clusters' operation based on the Triple Helix model; provide a description of the top priorities for Russia's cluster policy and touch upon its transformation amid the current complicated geopolitical situation and sanction restrictions; come to the conclusion about the inevitability of Russia becoming one of the world's top innovatively developed economic powerhouses and propose a set of activities aligned with the ideology of the upward-trending development scenario that are aimed at creating the optimum conditions for the engagement of all economic agents in innovation activity and filling the economy with innovation-related content.

Keywords: innovation; cluster; innovation; innovation-driven development; modernization of the economy; corporation

JEL Classification: O10; O14; O31

Introduction

Amid a globalizing economy and the simultaneous occurrence of the processes of intensifying competition among the national economies and their integration, scholars, economists, and politicians are getting increasingly focused on addressing the latest issues in scientific-technical, economic, and social progress and ways to resolve them. Without question, an effective instrument for comprehensive modernization is innovation processes across industry, the financial sphere, and the science-and-education environment. The acceleration of the pace and expansion of the scale of innovation transformations is inevitably leading to the need to give up on outmoded products and technology employed in activity, which may now be regarded as a sort of barrier in the path of the progressive development of human civilization. In a climate like this, it appears to be highly important for all subjects of economic relations to realize the significance of fostering innovation transformations and stepping up their innovation activity.

The purpose of this paper is to analyze the country's national and regional innovation systems and establish the role of corporate establishments in the innovation-driven development of the area of presence, as well as to explore the mechanism underpinning the operation of innovation clusters directly influencing the efficiency of innovation transformations in a climate of Russia's economic instability.

The work owes its relevance to the need to find a way out of a unique situation in which Russia has found itself on the highway to an innovation-driven economy, the cause whereof being the confluence of a set of negative factors of an internal and external nature. Thus, by the late 2014 the Russian economy started to clearly show signs of a slump. Things have only gotten worse since then, with the nation's GDP shrinking 3.7% and the price of the ruble dropping 127% at year-end 2015. Today, Russia is at the height of a severe economic recession. The aggravation of the nation's economic problems has been facilitated by a variety of factors, like dropping oil prices, economic sanctions, as well as a weakened internal market. In a climate of this kind, there is a clear awareness of the need to take urgent measures aimed at creating the conditions necessary to resolve Russia's innovation-based objectives of modernizing the domestic economy in reliance on large business and innovation-driven regional development.

1 Methods

In conducting the study, the authors summarized the major approaches taken by foreign and domestic researchers specializing in corporate management, innovation activity, and regional development. The study relies on the concept of national innovation systems (C. Freeman), the theories of innovation (J. Schumpeter), territorial development (A. Markusen), integration (F. Machlup), competitive advantage (M. Porter), etc. The cluster-based theory of economic development has been explored from the standpoint of the economic schools of M. Porter and P. Krugman. Works by a number of domestic scholars (N.V. Kiseleva, M.P. Merzlova, E.G. Popkova, N.V. Smorodinskaya, A.V. Sharkova, etc.) have helped conceptualize the characteristics of Russia's cluster policy and gain an insight into the specificity of the operation and trends in the development of innovation clusters in Russia.

To formalize and summarize the results of this study, the authors employed a set of general scholarly methods of cognition, as well as special methods of empirical cognition, like scientific modeling, analysis of economic-statistical indicators, expert evaluation, etc. Theoretical methods were utilized in analyzing the literature, which made it possible to identify some of the problem areas in the innovation-driven development of Russia and its regions.

2. Results

2.1 Relevance of creating the country's national and regional innovation systems

The 21st century, marked by processes of economic globalization taking place amid intensifying competition and, at the same time, integration among the national economies, is vividly attesting to a number of changes taking place in the paradigm of global development. Among the most crucial components of the realities of today's global economy is the shift to a new way of coordinating the operation of subjects of economic activity – from the

market-hierarchical to the cluster-network form of interaction. In a climate of the economic repartition of the world and formation of a global economy (Krugman 2008), as a single planetary network economy, what is becoming the only technology for being able to integrate into the geo-economy is the innovation sphere. This suggestion is predicated on acknowledging that at the hubs of the network economy are large multinational corporations, their branches and groups of companies, which are engaged in dividing the world market. Furthermore, the market for traditional goods is virtually entirely divided among the more technologically advanced nations of the world and it appears to be impossible to get into it. Under today's conditions, creating novel, cutting-edge technologies and products is something that can be done only within the innovation sphere and only companies that can create such products can become real subjects of the global economy. Thus, a top priority on today's agenda is putting together the country's national and regional innovation systems goal-oriented toward the creation of the optimum conditions for the efficient operation of business entities.

The emergence of the concept of national innovation systems (Nelson 1993) has led to innovation activity being construed as a multi-sector process involving the interaction of numerous participants with different interests, competencies, and potential that are continually engaged in the exchange of knowledge and interaction with a view to creating innovations – novel products or technological processes (Schumpeter 1995).

The term 'national innovation system' was first introduced into scholarly discourse by C. Freeman in 1979 (Freeman and Soete 1997). The national innovation system is construed as a network of institutions created within the public and private sectors to help organize activity and interaction on initiating, modifying, and diffusing new technologies. Among the definitions of the national innovation system proposed by Russian scholars of particular note is the one suggested by Ivanova (2010): "The national innovation system is a set of interrelated organizations (establishments) engaged in the production and commercial realization of knowledge and technology within the limits of the national borders... Within the framework of the national innovation system, science is to be viewed not as a closed system isolated by academic institutes, universities, and scientific centers but as an organic element of economic processes taking place within national states, economic sectors, large corporations, and small companies".

The innovation system is to be viewed as a subsystem of the national economy alongside its traditional systems – production, financial, HR, marketing, social, etc. The interaction and mutual fit between all of the above subsystems act as a factor for the success of the entire economic system as a whole. The major objective for the innovation system is to ensure making it efficiently through the entire lifecycle of the innovation process, and there is a set of legal, economic, organizational, and financial measures aimed at achieving it.

A bit later – in the early 1990s – there emerges the concept of regional innovation systems. Among the objective preconditions for its emergence are a sharp intensification of the competitive struggle in the global market and boosts in scientific-technological potential in conjunction with the development of novel instruments for exploring and applying the results in the practice of economic activity. These processes facilitated the accurate identification of issues with traditional models for regional economic development. Concurrently, it is them that stimulated the creation of new clusters in the sphere of high technology at the regional level (Popkova 2013).

Among the major reasons that triggered the exploration of innovation processes at the level of regions are: 1) the possibility of using a set of unique local advantages favorable for the operation of enterprises and/or their divisions that could be set up in the area in a climate of intense global competition; 2) the greater efficiency of the regional level of management in creating a supporting environment, including in developing non-trade relations; 3) the commonality of economic interests and close social-economic ties between subjects of innovation activity within the boundaries of a region may ensure a synergetic effect from their activity (Markusen 1987).

The concept of regional innovation systems was recognized and given wide use in the practice of numerous nations. EU members alone are currently implementing over 150 programs for the development of regional innovation systems. The efficient application of the concept of regional innovation systems as part of economic policy has been exhibited today by many dynamically developing nations, like China, India, and certain Latin American countries.

During the last decade, research into regional innovation systems has been taken up by Russian scholars as well. Thus, for instance, Ivanov (2006) construes the domestic innovation system as a federal-regional economic system the formation whereof involves integrating macro-level innovation systems – created in the nation's regions and expected to ensure the development of relevant territories – into the nation's single innovation hyper-system.

Thus, research into innovation processes – those of creating, assimilating, spreading, and utilizing innovations – has been carried out in today's science in all their complexity and across a variety of dimensions:

- the macro-level – innovation processes and managing them at the level of the country;
- the meso-level – innovation processes and managing them at the level of the region;
- the micro-level – innovation processes and managing them at the level of the enterprise.

The unifying definition from most of the research into the stratification of innovation processes construes the innovation-driven type of development as a purposeful continual process of searching for, preparing, and implementing innovations that would enable the subjects (the country, region, and enterprise) to boost production efficiency and, ultimately, satisfy most of society's needs (Mendell and Ennis 1985). It is the innovation-driven type of development that is conducive to boosts in people's quality of life and competitiveness in all developed countries across the world. Considering innovation's strategic significance to the nation's social-economic development, there is a greater level of state responsibility for fostering innovation entrepreneurship and its investment support and developing promising mechanisms for innovation-driven development (Merzlova and Sharkova 2013).

The efficiency of Russia's national innovation system is emphatically reflected in the dynamics of its ranking indicators in the Global Innovation Index (Table 1).

Table 1. Russia's ranking in the Global Innovation Index

| | Global Innovation Index | Innovation Input Sub-Index | Innovation Output Sub-Index | Innovation Efficiency Ratio | State of cluster development | Innovation linkages | Intensity of local competition | University/industry research collaboration |
|------|-------------------------|----------------------------|-----------------------------|-----------------------------|------------------------------|---------------------|--------------------------------|--|
| 2016 | 43 | 44 | 47 | 69 | 101 | 112 | 74 | 67 |
| 2015 | 48 | 52 | 49 | 60 | 118 | 118 | 106 | 62 |
| 2014 | 49 | 56 | 45 | 49 | 117 | 126 | 60 | 126 |
| 2013 | 62 | - | - | - | 108 | 109 | 52 | 109 |
| 2012 | 51 | - | - | - | 93 | 118 | 43 | 118 |
| 2011 | 56 | - | - | - | 82 | 83 | 37 | 83 |

Note. Data from Suslov (2015) and Higher School of Economics (2016).

As is evidenced from Table 1, the weakest aspects of the domestic innovation system are: its state of innovation linkages, state of cluster development, intensity of local competition, innovation efficiency ratio, and university/industry research collaboration. It is worth noting that these indicators constitute a problem field with respect to organizing scientific research to come up with solutions to existing problems acting as barriers in the path of the innovation breakthrough of the Russian economy.

Since the innovation-driven type of development depends on not just the capacity of a country or a region to generate knowledge but also their potential to implement scientific achievements in the economy (Szanto 2005), *i.e.* the capacity of specific enterprises for innovation, much significance is getting attached to exploring the role and interaction of enterprises with different production volumes within innovation systems. It is also worth noting that a standalone regional enterprise representing small or medium-sized business that is engaged in implementing a strategy for innovation-driven development may oftentimes lack the potential necessary to resolve problems and deal with restrictions that may arise under conditions of economic turbulence. A possible

solution to this is to set up an innovation cluster in the region that would rely on corporate establishments, one that is capable of boosting the business activity of the regional business community and, as a consequence, the territory's investment attractiveness.

2.2 State of innovation activity by Russia's corporate sector

The current stage in the development of corporate establishments is demonstrating to the world a process of serious transformations in the business strategies of the largest companies. These changes are due to the corporate sector shifting from the long-entrenched "closed" model for the conduct of research-and-development and experimental-design activity to a new model – the open innovation model, which is based on active interaction with external sources of novel ideas and technology. It is worth noting that the open innovation model may not only ensure the influx of new knowledge and technology into the corporation by way of their direct purchase but may also help effectuate the reverse process – *e.g.*, during the active commercialization of its own technological solutions by the company (through licensing them) or during the process of open exchange of knowledge between economic entities interested in them.

There are a great many scholarly publications on open innovation currently known to us that provide a description of the various forms and practices of active employment of this novel business model, like: strategic alliances/partnerships, joint ventures, and standalone companies based on universities, sub-contracts and outsourcing, technology licensing, and joint use of technological equipment. Among the most common types of open innovation are outsourcing of innovation processes, aimed at moving some of the crucial business functions, including R&D, out of the company with a view to enlisting the services of foreign partners prepared to perform them.

It appears to be worth conducting an analysis into the way global development trends are reflected in the activity of Russian corporate establishments and the way they react to global challenges from a perspective of their innovation activity.

There is a belief that, when it comes to R&D, Russian companies are quite inert and tend to purchase all their technology from foreign partners, without making a personal effort to develop innovative products. Below are some of the findings of a special quantitative research study conducted by a group of Russian researchers (Kuznetsov *et al.* 2011). The study featured 100 domestic companies representing large, small, and medium-sized business and involved a total of 29 expert interviews with members of the senior management of 22 companies. On processing the results, it was found that large businesses evinced a clear interest in research and development, as well as implementation of innovations. A major reason behind the increased interest in innovation activity was a decline in the competitiveness of products turned out.

About 84% of respondent executives of large companies stated that a major objective for the R&D block of a large business is to enhance existing and develop new products (goods and services). A mandatory condition for the active implementation of innovations in enterprises was stated to be the completion of the ongoing modernization process with a view to reducing the technological gaps, minimizing production costs, and bringing the quality of the company's products to relevant competitive levels. Companies characterized by major technological lags may consider as the most preferable form of modernization the purchase of ready-made technology, which may help minimize risk, reduce production costs, and boost competitiveness – but will only enable you to close some of the gap on your competitors without actually moving ahead of them. Victory in the competitive struggle will only be with companies that will be capable of getting into the market totally novel products, achieving major cuts in production costs, achieving significant boosts in labor production, and creating new markets. Such results must be a consequence of the company developing a research and development system of its own.

About 87% of respondent executives of large companies acknowledged that at the present time a top priority for Russia's large business are innovations aimed at enhancing products and technologies that already exist in the market, while 78% voiced the need to create totally new products. It is worth noting that already today many Russian companies are laying down the groundwork for an upcoming innovation breakthrough. Based on the findings of this study, a large portion of production companies operate their own research-and-development

institutions and centers. In the machine-building and metallurgical industries, such centers are in place in 90% of respondent companies and in 85% in the manufacturing industry. A personal R&D center is in place in less than 50% of respondent companies, more specifically – in the fuel-and-energy sector (40%) and in the sphere of commerce and professional services (38%). The opinions of respondents obtained during depth interviews were found to substantiate the trend in question – personal R&D centers are in place in 14 companies out of the 22 surveyed. All the companies exhibited positive dynamics for such centers – there was not a single corporation that had closed down or reduced the work volumes of their R&D divisions during economic crisis periods.

The active formation of corporate R&D centers in companies and the fast pace at which their heft is built are becoming today a major trend in the development of large Russian corporations. It is worth noting that corporate R&D centers do not engage in competition with outside research-and-development centers. On the contrary, apart from performing their own work, these centers perform a really important function of initiating orders for the conduct of research by outside developers. Consequently, corporate R&D centers are not an alternative to the open innovation model – they form an indispensable part of it, playing the role of an interface for interaction. Companies that do not have personal R&D centers can only purchase readymade innovative solutions and are incapable of becoming a competent orderer of novel solutions and carry out custom R&D.

Most respondent corporation executives arrange work related to research and development on the object of interest in accessible form, open to the possibility of engaging in the process competent specialists from partner organizations. Thus, for instance, leading the way as partners to large business are universities and enterprises formed on their basis – engaged in interaction with these are 67% of respondent large companies. Universities are followed by sectoral research-and-development institutes and enterprises representing medium-sized business (56%), which are followed by enterprises representing large business and independent developers (53%). In addition to Russian companies, domestic corporations are known to also enlist the services of foreign partners to conduct R&D. This type of interaction was found to be popular with 78% of respondent companies representing large business, 10% ahead of universities, the most popular Russian partner.

Without question, the process of interaction with outside suppliers of innovative solutions will enrich Russian corporations with positive experience. However, there may also be certain complications and issues to deal with. In this respect, just 2% of companies representing large business stated there were no difficulties of any kind that they faced. Among the rest of the problems, cited among the touchiest issues were developers being unprepared to meet the requirements set by the client company (noted by 51% of respondent companies representing large business) and there being a shortage of outside developers with the required level of qualification prepared for and capable of producing innovative solutions (47%). The causes of this situation, according to representatives of large business, are lack of qualified personnel responsible for interaction with developers (42%) and lack of funding for the generation of innovative solutions by the actual corporation (33%).

Government support aimed at stimulating innovation activity among domestic companies, provided over the last decade, has extended to the sphere of large business as well. However, most members of the senior management of corporations, along with members of the nation's bodies of state authority, have found these measures of support to be lowly effective. The findings of this research study indicate quite an insufficient degree of interaction between Russian large business and development institutions set up by the state. Thus, for instance, less than half of the respondent companies representing large business (48%) are currently interacting, or planning to work, with the Russian Corporation of Nanotechnologies, a government-owned company that is currently among the nation's most popular development institutions. 40% of respondents were found to be interacting with Vnesheconombank (VEB), the rest of the nation's development institutions accounting for 20% – the Russian Venture Company (RVC), 16% – the Russian Bank for Development, and 12% – the Foundation for Facilitating the Development of Smaller Forms of Enterprise in the Scientific-Technical Sphere. The results from the survey of respondents by way of depth interview revealed an even more unsettling picture – none of the respondents admitted to ever having requested any kind of state support or stimulus for innovation. That being said, the respondents brought forward a set of recommendations for the bodies of state authority containing proposals that may be structured into two groups: 1) improving the general conditions of economic activity in the

country and 2) fostering the development of innovations in companies, enhancing technical policy, etc. Those within the 1st group proved the more active respondents – with 28 proposals versus the second group's 13.

A generalized analysis of the study's findings suggests that we may expect boosts in interest in innovation on the part of Russian corporations, which is due to the completion of the mass modernization of production operations, intensifying competition in the national and global markets, and rivalry for investment. What is becoming a top priority for the corporate sector is the formation of personal R&D centers, although there is also the danger of these centers "closing in on" themselves while following the sustainable trend of conducting R&D using internal resources exclusively. To prevent this from happening, it may be worth for the founders of R&D centers to plan out, at the initial stage of formation of corporate innovation systems already, the "open interface" format and put in place relevant communication channels that, going forward, will be used by the company to interact with outside developers. A promising area for developing the domestic sector of applied research on the basis of corporations is creating on their basis sets of innovation clusters based on the open innovation model.

2.3 Cluster-based approach to boosting a region's innovation activity

It has been proven by the world's top technologically developed nations, like the US, Sweden, France, and Germany, that, in light of the current shift in the paradigm of global development (Porter 1987), it is innovation clusters that are expected today to become the most effective form of organizing innovation activity. It is worth noting that there are kindred definitions of this category suggesting the existence of intellectual-innovation and innovation-industrial clusters, while there are certain differences between them, too (Kiseleva 2016). Thus, for instance, an intellectual-innovation cluster implies organizing intellectual cooperation among subjects of innovation activity aimed at minimizing production costs, exchanging productive experience, achieving a synergetic effect from joint activity, and making active use of and building up intellectual capital with a view to boosting the business activity of regional companies.

Innovation-industrial clusters are, normally, created and developed in areas where the nation enjoys technological leadership in production of a certain product – so, consequently, a cluster may be created here to help maintain leadership in an already existing sphere (e.g., clusters across Sweden and Germany).

An innovation cluster is a non-formal association of various organizations, like research centers and universities, industrial enterprises and sole entrepreneurs, bodies of state governance and nonprofit organizations, and appears today to be the most efficient form of achieving a high degree of competitiveness for its participants. The synthesis of scientific-industrial, economic, and social policies cultivated within the framework of innovation clusters is aimed at putting together and maintaining an environment that ensures the production and active use of innovations. The key strategic objective behind the creation of innovation clusters covering as much of the nation's territory as possible is to boost the competitiveness of the present-day domestic economy. Note that the success of achieving this goal may depend on not just creating and implementing knowledge with a view to attaining an effect in the form of achievements in the area of inventions – a major role in this process is played by organizational transformations intended to ensure the commercialization of innovative results and scientific-technical solutions.

The basic premises underlying the formation of innovation clusters (Smorodinskaya 2015) include the following:

- most clusters are created in the high-tech sector – this is due to the fact that this is the only sphere where it is possible to create novel products and technologies, conducive to the creation of new markets and new companies;
- most clusters are created based on the Triple Helix model, with interaction among participants within the "government – business – university" triad undergoing modification and new platforms getting created for the conduct of scientific-technological research based on the consolidation of the resource base of science-and-education organizations and business and comprehensive government support;
- interaction within the cluster ought to be organized based on collaboration and the relationship contract (horizontally);

- the cluster's network nature implies that its participants can interact using information-communication technology both in a traditional way – by being territorially/regionally sited – and via the Internet;
- the creation of cross-network cluster establishments amid integration processes taking place in the global economy;
- the possibility of building a model for interaction in the cluster based on the principles of public-private partnerships, which, in turn, begets a totally new corporate establishment.

An innovation cluster may incorporate:

- industrial enterprises specializing in one particular field or forming part of an integrated establishment, oriented toward innovation-driven development;
- organizations that make up the cluster's business entourage (consulting and engineering firms, educational institutions of higher learning, business incubators, technoparks and technopolises);
- organizations interacting with cluster participants by way of outsourcing or franchising;
- bodies of state authority and municipal institutions that have established ties with enterprises within the cluster;
- financial establishments acting as sources of funding.

An analysis of the structure of clusters as *production agglomerations* reveals two of their distinctive attributes, which are as follows. Clusters are (1) special multi-sectoral establishments incorporating newly-formed groups of interconnected industries – new production sectors and, at the same time, (2) dynamic glocal establishments wherein there takes place the circulation and intertwinement of local and global flows of resources (Figure 1).

Figure 1. Clusters' glocal nature

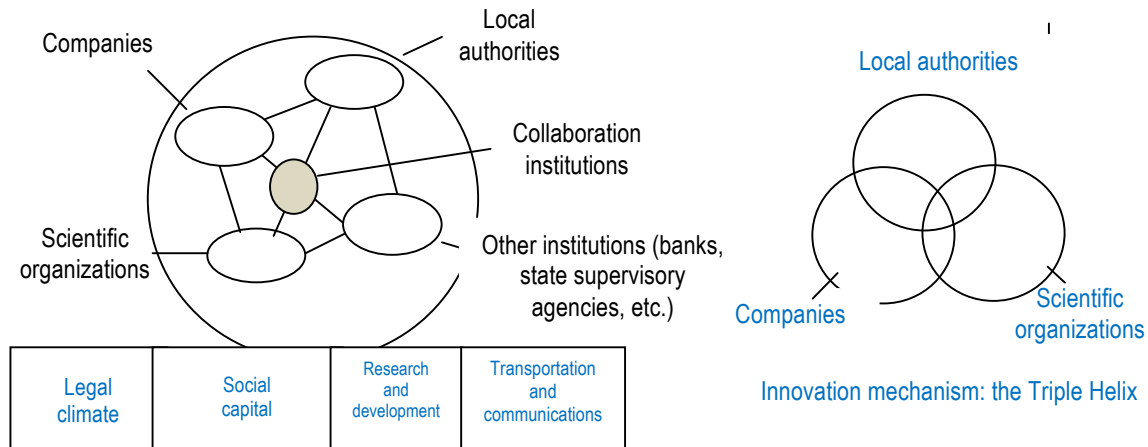
| | Local level | Global level |
|--|--|--|
| Financial capital and factors of production | | Components Equipment Patents Technology |
| Human capital | Qualified personnel | Foreign specialists Scientific personnel |
| Social capital | Collaboration institutions Network linkages | |

This combination enables clusters to structure globalized economic space with quite some success – there is a greater concentration of present-day production in global value chains, which horizontally permeate production sectors and various countries, while acting as localization hubs for these chains are highly-specialized clusters distributed territorially across various geographic areas.

Territories with newly-formed cluster networks continually witness the deepening of specialization with the focus on new, more sophisticated types of activity. As a consequence, both the territory and investors coming into the region stand to reap mutual gains: the territory gains a unique specialization and special investment attractiveness for global investors, while investors gain certain competitive advantages, as entering a cluster and engaging in the process of glocal resource circulation facilitates a flexible combination of sources of development and boosts in the pace of upgrades. Evidence from practice indicates that, in planning the deployment of resources and business processes in specialized clusters in various spots around the world, international companies try to pick for each functional objective a cluster that will be most efficient in resolving it.

Another type of clusters is *network ecosystems*, which encompass quite a wide network of independent, yet inter-supportive, agents with different specialties (sectoral, functional, and institutional), whose lineup and roles may be determined by the nation's characteristics, as well as the stage of the cluster's lifecycle. A distinctive characteristic of this type of clusters is the presence of collaboration institutions coordinating the activity of agents via network platforms (Figure 2).

Figure 2. Clusters as a network ecosystem.



Of critical significance to creating a mature cluster and getting it to achieve innovative results is collaboration among agents representing the 3 major institutional sectors – the government, business, and scientific organizations (universities), which involves interactive cooperation and drawing together among their functional spheres engaged in the process of co-evolution, which, in the end, ensures the cluster dynamic self-development. This mechanism is known as the *Triple Helix model* (Etzkowitz and Leydesdorff 2000), whereby the functional concatenation of the institutional sectors ensures the coordination of their interests and becomes a universal institutional matrix for innovation-driven growth.

It is worth noting that, regardless of the type of establishment, integrating into an innovation cluster does not lead to a spontaneous chaotic concentration of various technological inventions – there forms a strictly oriented and ordered system of diffusion and translocation of new knowledge, technologies, and innovations. It is the making of a network of sustainable ties within the cluster's boundaries that ought to be regarded as the necessary and crucial condition for being able to efficiently turn inventions into innovations with a view to gaining indisputable advantage in the competitive struggle. The generation of ideas and production of innovations occurs across virtually all areas of the cluster's operation, involving technology, goods and services, marketing, and organization of work. In addition, a clear advantage that is provided by the network structure of innovation clusters is simplified access to monetary resources, knowledge and technology, and new information on the market situation and the expectations of product consumers.

There is a totally new objective that gets resolved in putting together an innovation cluster – to form, based on existing breakthrough areas of research, a new market and, consequently, put together an establishment that would ensure its operation. In this situation, the cluster is regarded as a technology for entering the global economy with a view to structurally reforming the national economy itself and developing it going forward. The cluster drives changes to approaches to putting together industrial policy, requiring that totally different information be used to make macro-economic decisions – not across sectors but across markets and companies, which, in turn, may help improve the work of supplier companies, innovation organizations engaged in adjacent research, banks, engineering companies, etc. These processes may set the stage for the structural rebuilding of the national economy and its sectors (Popkova 2013).

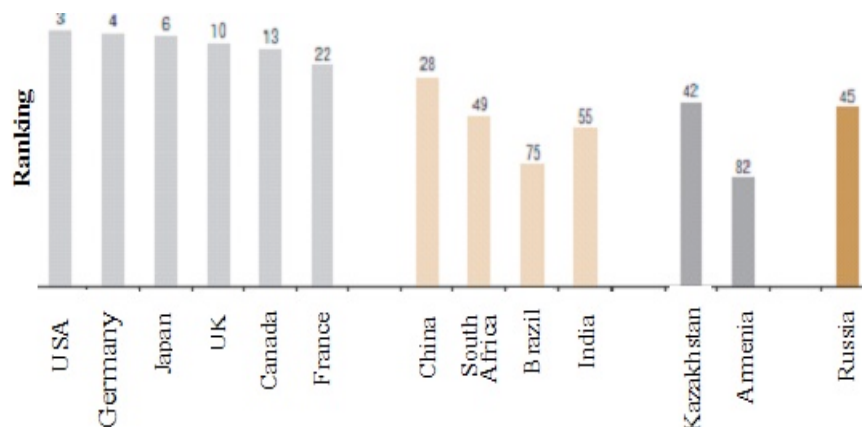
Relations within an innovation cluster are built based on the following principles: freedom to enter and exit the cluster; openness and transparency; proportionality; equilibrium; freedom of contract; cooperation and collaboration. Implementing project strategy as part of the first stage in putting together an innovation cluster requires properly establishing the cluster participant lineup and organizing the corporate management system. Achieving a successful transition to process strategy – the second stage in creating a cluster – requires establishing sustainable linkages between cluster participants. This needs to be done in order to determine – during the subsequent development of the cluster – all relevant business processes via the creation of a sort of map of cluster linkages featuring their confluences and starting and ending points. The coordination function in the cluster is performed by the Cluster Coordination Center, which is formed of members of innovation organizations, making up the cluster's core, the process engaging members of science-and-education centers, business establishments, and members of authorities (e.g., the Ministry for Science and Technology - formerly the State Committee on Science and Technology). The major objective for the Coordination Center is to select projects by way of screening and put together systemic projects within the framework of research being conducted at the moment.

2.4. Top priorities for Russia's cluster policy

By the 2010s, clusterization was practiced by about half of the world's top economies, with over 100 countries and regions engaged, to one degree or another, in implementing cluster policy (Bortnik *et al.* 2015). The degree of successfulness of the implementation of these transformations may be judged by a nation's ranking in the Global Competitiveness Index (Figure 3), which since 2008 has been compiled using an assessment methodology developed by Porter (2011).

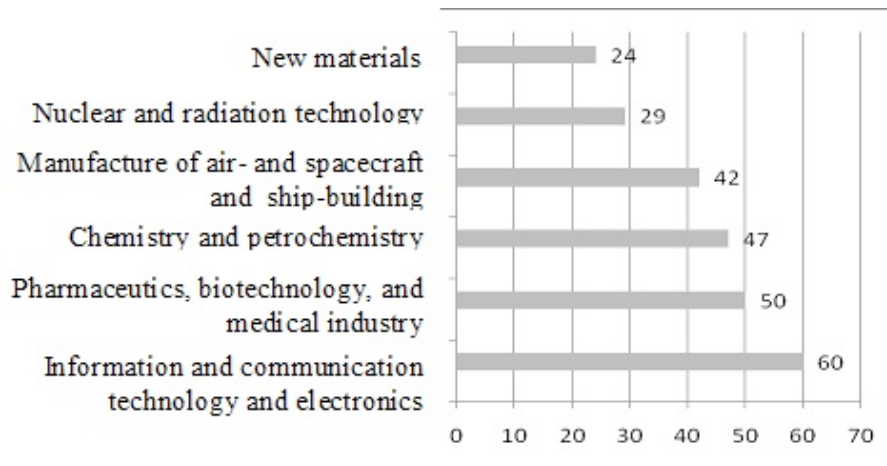
Russia entered the group of nations implementing cluster policy in 2012. A basis for this was the government's so-called 'Roster of Pilot Programs for the Development of Innovation Territorial Clusters', centered around the idea of selecting a number of promising projects on a competitive basis. As a result, a total of 25 cluster projects with high scientific-technical potential were selected. At present, most of these projects are implemented in the territory of science cities, closed administrative-territorial units and technology implementation areas called 'innovation enclaves', which enjoy special preferences (Gokhberg and Shadrin 2015).

Figure 3. Ranking of certain nations in the Global Competitiveness Index, 2015–2016 (World Economic Forum: The Global Competitiveness Index 2015–2016, 2015).



An analysis of the sectoral presence of official participants in innovation territorial clusters indicates that most of them are from the sphere of information and communication technology and electronics and the pharmaceutical, biotechnological, and medical industries (Figure 4). This may be due to the active development of innovation-driven small and medium-sized entrepreneurship, leading to growth in the overall number of companies.

Figure 4. Average number of official participants in pilot innovation territorial clusters across Russia's sectors (ea.) (Kutsenko 2015)



The Russian government has plans to provide innovation clusters with extensive support via subsidies, state programs, development institutions, and additional concessions. To be specific, over the period 2013–2017 as much as 25 billion rubles worth of federal subsidies will have been extended to 14 out of 25 cluster projects. Support for the rest 11 cluster projects will be provided at the first stage through participation in the implementation of federal targeted programs and interaction with development institutions and state-run companies. Subsidies are provided toward a specific cluster project upon request from the Cluster Coordination Center, with the costs getting reimbursed by way of co-financing: 33% – central authorities, 14% – RF constituents, and 53% – participants (Merzlova and Sharkova 2013).

What makes the issue fundamental is that the efficient operation of cluster networks is impossible within a business environment that is not adequate to their objectives and is characterized by the prevalence of monopolized establishments, lack of horizontal relationships, and maximum social disintegration. In the institutional aspect, the Russian economy has yet to attain maturity in terms of its market system, which continues to be dominated by the state over science and business and where the Triple Helix model is just starting to gain a foothold (Popkova 2013). In this situation, the development of innovation processes and processes of diversification is becoming problematic, with the conditions of catch-up industrialization making it extremely hard to implement cluster projects aimed at the making of an innovation-driven economy (Kiseleva 2016).

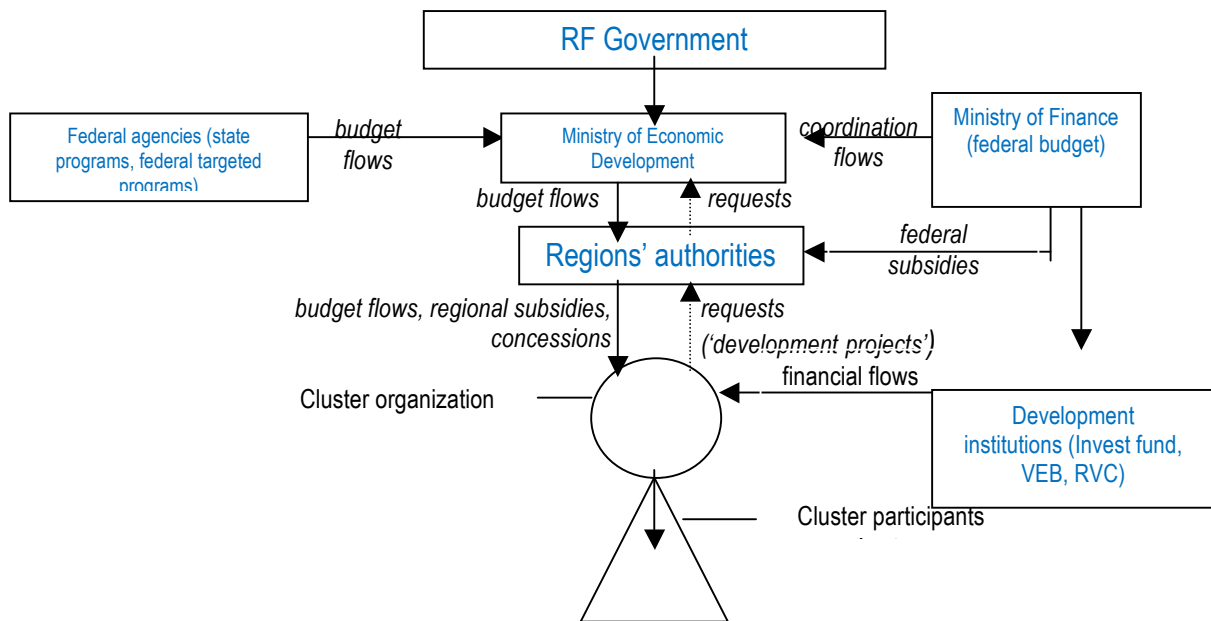
It is worth acknowledging that domestic cluster programs are grounded in the logic of industrial growth and linear innovation, which is not very attractive for investors interested in long-term strategy. This suggestion is predicated on the following circumstances:

- Russian clusters that have made it through a competitive selection process tend to be created based on decisions made by the central authorities – without undergoing the so-called preliminary “trial by the market”, which is mandatory as per the methodology established by M. Porter’s school of thought. In addition, most special regimes – like, say, that of closed administrative-territorial units – are little aligned with the principles of open network ecosystems prepared for unconstrained information and knowledge translocations beyond their boundaries;
- there is a possibility that unique network effects from innovation clusters may be replaced with classic agglomerative ones as a consequence of “concentration and cooperation”, and unique cluster projects within the Triple Helix model – with production-infrastructure complexes. An effective cluster policy ought to begin with the creation of open social platforms for interactive dialogue between parties interested in innovation transformations, whilst in practice it is only managing cluster organizations that

- are created. The issue of establishing and expanding the horizontal communications of participants in innovation processes is often resolved in the aspect of infrastructural development of cluster territories;
- the principle of selectivity of financial support for innovation clusters, which implies the selection of key participants in a cluster, determination of their activity specialization, and establishment of their production plans by government officials, contravenes the principles of present-day cluster policy, its “golden rule” being that the state: should not selectively pick potential cluster participants and pass judgement on what their projects and development priorities must be for them to receive the subsidies; may participate in co-financing a cluster and initiating its creation; ought to support existing and emerging clusters – without any exceptions and without any priority – in all sectors of the economy and ensure accessible statistics at the level of each cluster. Evidence from practice indicates that to assess the outcomes of activity by domestic clusters they use the parameters for economies of scale, as opposed to the methodology of identifying competitive innovation establishments commonly employed in developed countries (Smorodinskaya 2015).

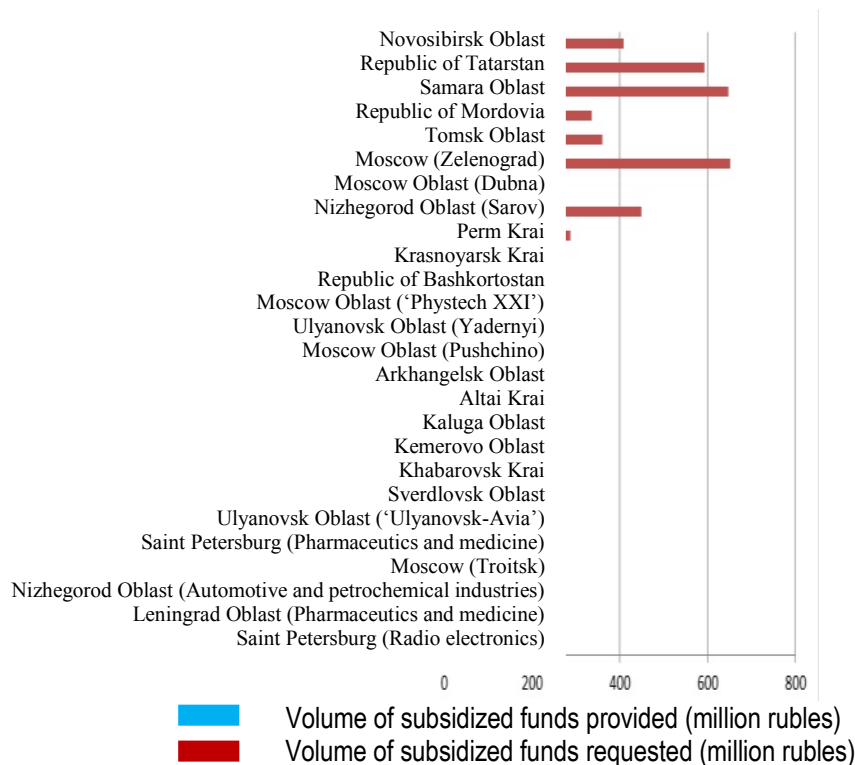
Issues related to getting all barriers in the path of cultivating an environment for the self-generation of cluster networks removed ought to be addressed as a top priority on the agenda of the development of cluster policy. The process of implementation of plans by the Ministry of Economic Development in the area of clusterization of the economy is, unfortunately, demonstrating a sustainable vector in the direction of the formation of a series of inter-agency minivericals, where the network partnership of the key institutional participants – the state, business, and science – comes down to just the process of co-financing the costs (Figure 5).

Figure 5. Flowchart illustrating Russia’s inter-agency miniverical in the implementation of a cluster program (Smorodinskaya 2015)



It is worth noting that, despite the fact that no purposeful assessment of the outcomes of using state funds allocated for the development of regional cluster programs has been conducted, just comparing requests for co-financing put in with the regional authorities’ points to a considerable increase in their volume – in 2013 it was 1.9 billion and in 2014 – 5.2 billion rubles (Figure 6).

Figure 6. Volume of federal subsidies requested or planned to be provided to be used for the implementation of activities under regional programs for the development of innovation territorial clusters (Russian Cluster Observatory, 2014).



In 2015, amid a complicated geopolitical – and, as a consequence, economic – situation in the country, cluster policy underwent a certain degree of modification, which brought it more in line with Russian reality. The key idea underlying cluster policy, which is about the development of innovation territorial clusters, has been transformed into the one of creating and developing just territorial clusters as a wide association of enterprises and organizations within the industrial complex, including its hi-tech sectors. The major purpose of territorial clusters, which are retaining innovation clusters within their structure, is to create a closed production chain in a particular industry or a number of industries with the focus on implementing import substitution programs, making up for declines in the import of foreign technology, and minimizing the effects of restrictions imposed by the sanctions.

3. Discussion

This research study into Russia's innovation development is based on the methods of empirical and theoretical cognition. Through their analysis and systematization of economic information and summarization of statistical data, the authors have found it to be possible to substantiate the hypothesis that the success of Russia's innovation-driven economic development depends on the degree to which each of its economic agents realizes their role and their place in the system of economic relations, including innovation territorial clusters, and on their choice of unique path of innovation-driven development adequate to Russian reality. In conducting their theoretical analysis, the authors highlighted a primary objective of the Russian government to be the innovation-driven modernization of absolutely all spheres of activity, involving not just making timely decisions within the production complex but also organizing economic management at a totally different level.

The high credibility of this study's results is predicated on works by scholars as: Porter (1987), Etzkowitz and Leydesdorff (2000), Krugman and Obstfeld (2008) from EU or USA and inland as: Kiseleva *et al.* (2016), Merzlova and Sharkova (2013), Popkova *et al.* (2013), Smorodinskaya (2015). A distinctive characteristic of this

research study is the attempt to view the current issues in the innovation-driven development of Russian regions through the prism of fostering the engagement of large domestic business – corporations – in the process amid restrictions imposed by the sanctions, including technology import constraints and the pressure of external economic conditions. Among the non-alternative objectives aimed at restoring Russia's former capacity for dynamic economic development are searching for new instruments for stimulating innovation activity by business entities (from small to large business), developing a new efficient mechanism for the interaction of the nation's institutional sectors (state – business – science), and ramping up investment activity over the coming years.

Conclusion

Thus, the research study reported in this paper cogently attests to that imparting an innovation-driven nature to the Russian economy requires the large-scale implementation of scientific, technical, and technological innovations, which may be regarded as true attributes of an innovation-driven economy. This requires carrying out a set of measures, including: developing existing and creating novel hi-tech production operations aimed at turning out competitive products; shifting to non-resource-based economic development, including via the creation of hi-tech lines of business; implementing import-substitution programs with support for domestic manufacturers, boosting the efficiency of exports against the backdrop of declining imports, and stimulating increases in internal consumer demand for domestic products; boosting energy and resource efficiency and the efficiency of managing property and fostering the development of infrastructure capable of minimizing transaction costs in all sectors of the economy; creating territorial clusters where it would be possible to implement mega- and infrastructural projects; attracting internal and external investment based on well-reasoned decision-making and implementing efficient investment projects based on the principles of private-public partnerships; creating incentives for the innovation activity of enterprises, reducing the polarization of regions based on the development of the system of strategic management of regions, and boosting the potential of subsidized regions; boosting the sustainability of the financial system, putting together flexible tariff, customs, and tax policies, and fostering budgetary financial support for small and medium-sized business.

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