

Regional Competitiveness: The Search for Effective Solutions in the Field of Innovative Development

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Abstract. The article is dedicated to the issues of increasing the competitiveness of Russian regions in the context of updating innovative types of development. The necessity of a differentiated approach to enhancing innovation at the regional level in accordance with the principles of "smart specialization" is well established. The basic requirements for the selection of priorities and directions of development of domestic regions are determined, taking into account the existing production potential and local competencies. Using cluster analysis, a typology of the Russian regions was carried out according to the degree of development of systemic elements of the knowledge economy and their grouping by the potential for creating and using new knowledge and technologies. Mechanisms are proposed for supporting innovation in the regions according to the profile of cluster groups. It is argued that the use of variable tools in the field of innovative development in accordance with the types of regions will contribute to increasing the competitiveness of regional economies and the formation of comparative competitive advantages.

1. Introduction

Regional competitiveness is one of the most important areas of economic research in recent decades. A significant increase in competition observed since the end of the twentieth century, the deepening of integration and regionalization processes require the search for new approaches to the study of modern socio-economic dynamics, and the development of scientific and applied recommendations for ensuring the competitive development of regional economies that are most relevant to the innovative economy.

2. Relevance

Today, the transition to an innovative type of development is becoming a key priority for increasing regional competitiveness. At the same time, the search for a new non-resource model of economic growth, the development of effective methods for creating, developing and using competitive advantages based on enhancing innovative activities, turning innovation into a permanent critical success factor [1-7] is being actualized. For Russia, which consists of 85 entities that differ in natural resource and technological potential, level of socio-economic development, historically established traditional institutions, demographic, sociocultural, geographical and other differences, the solution of these issues is of particular relevance.

3. Statement of the problem

The work is based on the assumption that the country's competitiveness can be achieved as a result of the structural diversification of the economy on the principles of smart specialization, focusing on identifying development priorities for different types of regions and developing an adequate set of tools to enhance innovation according to their profile.

In the context of the particular importance of the innovative orientation of the modern economy, the dynamization of economic growth is possible through the formation and effective use of the innovative potential of regions, the establishment of interregional interaction, and the optimization of the spatial organization of regional infrastructure. Which, in essence, involves the solution of two key tasks:

- integrated development of such types of capital as physical (industrial, financial), human and social capital;
- creation of a network of regional growth zones (RZR) as institutional innovations of state support for the development of the regional economy through the formation of conditions for attracting investments, new technologies, and innovative entrepreneurship.

The variety of approaches and the lack of consensus on issues of regional competitiveness emphasizes the complexity and multidimensional nature of the tasks being addressed.

4. Theoretical part

Currently, the transformation of the economies of the Russian regions is taking place in the face of severe foreign economic pressure. Interregional differentiation, eclecticism and unevenness of the economic space of Russia, raw material (resource) specialization of the economy, the strengthening of the trend of concentration of economic activity in the central and industrial development regions, result in an uneven distribution of investment, labor and other flows across the country's regions, thus creating real threats and risks of modernization of regional economies [8]. As a result, it is necessary to search for effective development models that can significantly increase regional competitiveness, solve the problems of creating innovative ecosystems, "growth points" especially in peripheral subsidized regions, which are characterized by a difficult socio-economic situation. To form an innovative model of competitive development of the Russian economy, which would allow taking into account emerging trends and patterns of modern social dynamics, it is necessary to:

- ensure coordination of actions of authorities at different levels to concentrate limited resources on sound regional development priorities;
- minimize duplication and fragmentation of federal funding;
- create a distinct investment profile of each subject of the Russian Federation.

For the first time, the problem of rethinking the concept of regional development on the principles of clever specialization was articulated at the political and research level in the European Union [9-11]. A decree of the European Parliament formally defined smart specialization strategies as setting priorities for creating a regional competitive advantage by matching the strengths of research and development with business needs. This allows us to respond to emerging opportunities and market development trends in a consistent manner, avoiding duplication and fragmentation of efforts [12, 13]. The mission of smart specialization is that each region must find its own reasonably unique development path. Uniqueness is achieved by combining internal knowledge (personalized, inaccessible outside the region and obtained from local communities) with external (global trends, strategies of other regions, priorities and programs at the (above) national level). This approach sets the general requirements for the regions to choose development priorities, the most significant of which are:

- reliance on local competitive advantages;
- validity using verified performance indicators;
- interdisciplinary focus (the unique competencies of the region are at the junction of specialization industries, combining them with new rapidly growing scientific fields in which the region is a leader);

- orientation to future markets and technologies;
- considering the strengths and specializations of other regions, including abroad;
- consistency with national level priorities;
- focus on solving major social problems facing the region.

In this context, federal authorities should be focused on supporting regional management in terms of:

- development of unified rules for the selection of priorities using a single system of classifiers;
- creating a database of regional priorities and projects;
- development of regional comparison tools for a wide range of parameters;
- providing methodological and expert support to regional teams, as well as the formation of effective communication between different levels of government on issues of determining / updating regional development priorities.

One of the methodological approaches to identifying innovative development priorities of the regions of the Russian Federation on the principles of smart specialization is their typology, taking into account the competitive advantages and the existing specialization of each region. Such a typology of regions was built for the USA, Canada, and the EU [14-17]. For example, for the EU, on the basis of a group of indicators, three main groups of regions were identified using cluster analysis: knowledge centres, industrial and production regions, and regions whose economic development is not based on the creation or implementation of new technologies.

In relation to the regions of Russia, the results of similar calculations are presented in [18, 19]. At the same time, in domestic practice, analysis mechanisms based on the principles of smart specialization, which would make it possible to identify the most promising areas of activity and focus specifically on them, have not received proper distribution.

The goal of our typology was to identify regions of different innovative potential with varying degrees of development of systemic elements of the emerging knowledge economy and different positions on the axis "supply — demand for new knowledge and technology". Clustering was carried out in two stages. At the first stage, the values of domestic regional demand and domestic supply of new knowledge and technologies were calculated, at the second, a grouping of Russian regions based on quantitative homogeneity (by the value of supply and demand for new knowledge and technologies). The calculation of the demand and supply indicators for new knowledge and technologies in the Russian regions was carried out using the multidimensional average of the private indicators given in table 1 according to the Federal State Statistics Service for 2017 [20]. As a method of clustering homogeneous groups of regions, the method of a given number of groups was used according to the criterion of minimum Euclidean distance.

Table 1. Indicators for assessing the demand and supply of knowledge in the regions of Russia.

Demand indicators	Supply Indicators
Import of technology and technological services	The number of organizations providing training for undergraduate / graduate students / doctoral students
Number of organizations performing research and development	Number of staff that busy with research and development
Internal research and development costs	Number of researchers with advanced degrees
Number of advanced manufacturing technologies used	Number of issued patents
Technology Innovation Costs	Number of advanced manufacturing technologies created

Such systematization is aimed at solving the problems of expanding the possibilities of qualitative and quantitative analysis of the identified homogeneous groups of regions and identifying on this basis the priority directions of their development.

Table 2 presents the selected five clusters of the regions of the Russian Federation, differing both in the values of the demand and supply indicators for new knowledge and technologies, and in the ratio of the corresponding indicators.*

Table 2. Clustering results of regions of the Russian Federation.

Cluster number	Average value demand indicator	Average value supply indicator	The regions included in the cluster
1	4,47	3,44	Moscow, Moscow Region, St. Petersburg, Nizhny Novgorod Region, Sverdlovsk Region, Novosibirsk Region, Republic of Tatarstan
2	0,98	1,37	Voronezh region, Krasnodar region, Rostov region, Tyumen region, Republic of Bashkortostan, Samara region, Saratov region, Krasnoyarsk region, Kemerovo region, Omsk region
3	1,15	0,59	Kaluga Region, Tula Region, Yaroslavl Region, Leningrad Region, Volgograd Region, Republic of Mordovia, Chuvash Republic, Perm Region, Kirov Region, Penza Region, Kurgan Region, Irkutsk Region, Chelyabinsk Region, Krasnoyarsk Region
4	0,41	0,38	Belgorod Region, Vladimir Region, Ivanovo Region, Kursk Region, Lipetsk Region, Oryol Region, Ryazan Region, Tambov Region, Tver Region, Komi Republic, Vologda Region, Kaliningrad Region, Murmansk Region, Novgorod Region, Republic of Dagestan, Stavropol Territory, Astrakhan Region, Udmurt Republic, Orenburg Region, Altai Territory, Trans-Baikal Territory, Tomsk Region, Primorsky Territory, Khabarovsk Territory, Ulyanovsk Region
5	0,13	0,14	Bryansk region, Kostroma region, Smolensk region, Republic of Karelia, Arkhangelsk region, Pskov region, Republic of Adygea, Republic of Ingushetia, Kabardino-Balkarian Republic, Republic of Kalmykia, Karachay-Cherkess Republic, Republic of North Ossetia-Alania, Chechen Republic, Republic of Mari El, Altai Republic, Republic of Buryatia, Republic of Tyva, Republic of Khakassia, Republic of Sakha (Yakutia), Kamchatka Territory, Amur Region, Magadan Region, Sakhalin Region, Jewish Autonomous Region, Chukot cue Autonomous Okrug

The first cluster consisted of the regions with the highest values of supply and demand for new knowledge and technologies, which are socially developed, positioned as centers of the new economy. The second cluster includes research and production regions that can be characterized as centres of competence in the high-tech field. The regions of the third cluster are characterized by a focus on

*As part of the study, 80 subjects of the Russian Federation were analysed. Due to the lack of comparable statistics, the Republic of Crimea and the city of Sevastopol were not taken into account. Nenets Autonomous Okrug, Khanty-Mansi Autonomous Okrug and Yamalo-Nenets Autonomous Okrug were included in the Arkhangelsk and Tyumen Regions, respectively.

domestic demand, borrowing and introducing new technologies and products more than their creation. These are centres with medium innovative potential, specialized in a number of research and production sectors. Regions with a relatively low level of both socio-economic development in general and the development of the main systemic components of the knowledge economy were included in the fourth cluster. Innovation activity and the progressive adoption of new technologies is limited in these regions. The fifth cluster was made up of underdeveloped peripheral regions characterized by low innovative potential. He united almost all the underdeveloped peripheral regions of Russia.

Table 3 summarizes the most appropriate innovation support tools for the regions included in a particular cluster.

Table 3. Types of regions and instruments for enhancing innovation.

Cluster number and type	Instruments
1 - Centers of the new economy	Active support and the formation of innovative clusters. The policy of creating an interactive innovation infrastructure. Support for technology transfer from research universities and research centers. Support for high-tech and intelligent small and medium enterprises.
2 - Competence centers in the high-tech field	Active support and the formation of innovative clusters in the areas of specialization, diversification of industry competencies. Purchase of high-tech products. The development of entrepreneurial universities. Training of technical specialists, engineers. Modernization of fixed assets. Support for entrepreneurship, support for creative industries.
3 - Centers with medium innovative potential	Support for the formation of new cluster initiatives, industrial clusters in traditional sectors. Private initiative support. Creation of industrial parks, ready-made investment sites. Diversification of the economy, support for small and medium enterprises.
4 - Centers of secondary cooperation with research activities	Active social policies aimed at increasing human capital. Diversification of the economy. Modernization of fixed assets, support for SMEs. Improving the business climate. Support for intelligent and creative industries.
5 - Centers with low innovation potential	Active social policy measures aimed at increasing human capital. Improving the business climate. SME support. Intensive monitoring of industrial policy. Social innovation. Support for the distribution of ICT, network structures.

The results of the given clustering of the Russian regions make it possible to identify possible directions for intensifying innovative activities common for cluster groups, and to determine measures to increase their competitiveness in the context of updating the innovative type of development.

5. Practical significance and results

The proposed clustering of domestic regions is aimed at creating a differentiated approach to the subjects of the Russian Federation, searching for each of them the optimal combination of the factors that have developed in the region that allow them to be noticeably more effective in one direction or another of development. The use of variable tools to enhance innovation in accordance with the types of regions will contribute to the development of the most effective mechanisms for increasing competitiveness, the formation of comparative competitive advantages, as well as increasing the efficiency of spending budget funds by prioritizing recipients of state support (i.e., participants in those types of activities where the development potential maximum), which is especially important in conditions of deteriorating financial and investment potential ion sphere of the country.

For specific regions, the typology presented can be clarified provided that the scientific and industrial specialization of the region is previously identified, followed by scientific and technological forecasting and the development of relevant measures to support innovation.

6. Conclusion

Crisis phenomena in the economy require a transition from the paradigm of the widespread creation of innovative infrastructure to measures to stimulate innovative activity in accordance with the specifics of regional economies. Thus, the effective use of local competencies and the implicit knowledge of regional communities about their own production potential, applied technologies and market niches creates the possibility of creating a unique profile of the region, and the concentration of resources in selected areas of excellence provides a high level of production efficiency and competitiveness.

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