International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

http://TuEngr.com

PAPER ID: 11A13P

ASSESSMENT OF INNOVATIVE DEVELOPMENT DIFFERENTIATION OF RUSSIAN REGIONS

Ol'ga P. Smirnova [1*], Alena O. Ponomareva [1]

[1] *Laboratory of Modeling the Spatial Development of Territories, Institute of Economics of the Ural Branch of the Russian Academy of Sciences, RUSSIA.*

ARTICLEINFO

Article history:
Received 06 April 2020
Received in revised form 01 July 2020
Accepted 15 July 2020
Available online 21 July 2020

Keywords:
Innovative activity;
territorial potential;
Imbalances in regional development;
Technology imports;
Scientific and industrial cooperation.

ABSTRACT

The introduction of advanced technologies in the real sector of the economy is becoming a determining factor in advanced development. Under these conditions, the role of innovation is steadily increasing in identifying the level of investment attractiveness of regions and their competitiveness. With a case study of Russian regions, the growth rates of the development and use of advanced production technologies have been analyzed. The purpose of this study was to assess the unevenness level of the innovative development of the Russian regions. For this, the methods of economic-statistical and correlation analysis, the methods of standardization and aggregation of indicators were used, an integral indicator of changes in the innovative potential of the region was proposed. The calculated values of innovative potential were identified for 84 regions of Russia. From the result, it was found that the distribution of science and innovation resources in Russia is extremely uneven, and a trend has been revealed of a growing increase in imbalances in the innovative development of regions. The presence of industry's dependence on technology imports was noted.

Disciplinary: Development, Technology, and Innovation Policy.

1. INTRODUCTION

Advanced development of the society of any country is currently impossible without special attention to the development of science and innovation. Innovation-based modernization of all sectors of a national economy is becoming a determining factor in competitiveness (Goncharenko *et al.*, 2019). The boom in the innovation industry and services began in the 1990s and is still gaining momentum. Today, industries producing high-tech goods and services account for about 27% of global Gross Domestic Product (Hill, 2020). This process has positive effects – the development and realization of new ideas, their commercialization and implementation in the form of technologies are

*Corresponding author (Ol'ga P. Smirnova). Tel: +7 343 3714536. Email: olygsmirnova95@gmail.com

becoming the main source of increasing employment, increasing real investment in the economy, improving the quality of products.

In this regard, issues in evaluating the effectiveness of innovative development are becoming relevant. Differentiation of the socio-economic situation of countries and regions creates the complexity of their comparative analysis in terms of the value of innovative potential, requiring consideration in a methodological aspect. A good example of an assessment of the innovative potential of polydifferentiated regions is the case of Russia. The complex federal structure of Russia, the scale of its territory, the localization of many types of resources, and other features make it necessary to use special approaches to assess various indicators of socio-economic development.

These circumstances allow outlining the goal of this study, which is to identify the imbalance in the development of regions in terms of comparing the level of innovative potential and the level of a territory's activity. This involves solving the following tasks: to consider indicators of innovative development characterizing the potential and activity of a territory; to assess the level of the unevenness of the innovative development of regions; to conduct a review of the forms and methods of the most efficient use of resources in the field of science and innovation.

2. LITERATURE REVIEW

The concept of "a territory's potential" is a complex, dynamic, and capacious category, which does not have a constant structure of indicators. The main characteristics of the innovative potential are seen in the systematic unification and connection within the framework of a territorial formation of all entities with the specification of innovatively active entities, engaged in innovative activities, and generating innovative ideas and solutions (Tatarkin, & Novikova, 2015).

When considering the problem of increasing the innovative activity of Russia, it is necessary to take into account the heterogeneous development of its regions by most socio-economic indicators. According to the World Bank, Russia is a leader in regional inequality and is ahead of countries such as India, Brazil, and China in development inequality (In Russia, the Situation with Regional Inequality is Worse Than This in India and China, 2018). The imbalances in socio-economic development between regions can be caused by many factors.

From the neoclassical point of view, the reasons for the differentiation of regions are explained by the insufficient mobility of the production factors. To smooth out interregional imbalances, complete mobility of labor and capital is required, which will ensure free competition. The opposite point of view on the interregional mobility of the production factors is given in the theory of "cumulative causation" (Myrdal, Hirschman, Krugman) (Myrdal, 1957; Vasilieva, 2013). According to this theory, interregional imbalances in the development of regions are explained by the movement of resources and capital from underdeveloped regions to those more attractive for development. As a result, the leading regions are becoming even stronger while interregional development imbalances are becoming increasingly stronger. A similar point of view is confirmed by the model of "total cumulative causation" (Richardson, 1973). The model shows that the regions initially being in a favorable position receive new benefits, and any inflow of investments into the regions to stimulate their economic growth will not smooth out, but further increase imbalances.

From regional specialization, the causes of development imbalances are considered in the

resource base theory (Ciriacy-Wantrap, Perloff, Wingo) (Filippov *et al*., 2013). The closer a region's specialization to export-oriented products, the faster a region develops, but this development is short-term and cannot ensure the stability of a territory's development (Kleiner, 2011). Some modern theories connect the development of a region with its ability to restructure the economy and respond to scientific and technological progress (Gurieva, 2005).

The considered theoretical approaches confirm the decisive role of innovative activity. A comparison of the level of innovative development of both individual countries and regions seems possible based on generally accepted indicators. This assessment uses indicators such as the number of registered patents, the number of publications, the share of high-tech products in the structure of Gross Domestic Product or export of territory, etc. (Kovalev, 2016; Romanova *et al*., 2017). The quantitative characteristics of the innovative activity of territories, according to modern researchers, include such indicators as the amount of Research & Development funding, the number of staff engaged in research, the number of scientific and educational institutions of the territory, the availability of infrastructure (Gokhberg *et al*., 2019).

A feature of assessing the effectiveness of innovative activity of territories is the nonlinear dependence of the resources spent on the development of innovations and the results obtained in this area. In addition to the direct costs of innovation, such as Research & Development financing, costs of technological innovation, financial support for the creation and development of high-tech industries, factors such as the culture of the population, mentality, ability of the population to accept innovations and people's attitude toward science affect the level of innovative activity (Kovalev, 2016). Undoubtedly, such factors as the level of freedom and democracy, corruption, and other indirect factors, the effect of which is difficult to evaluate objectively, do have an impact.

The issue of comparability of the indicators used is of great importance. Here, researchers propose various approaches. For example, Pogodina (2004) offers to evaluate the level of innovative activity and competitiveness of regions using a system of statistical indicators. There are also many other methods based on the aggregation of various statistical indicators from the standpoint of assessing the scientific, human resources, technical, and financial potential of a territory (Zausaev *et al*., 2005; Orekhovsky, 2007). These methods allow assessing the level of innovative development relative to other territories and make a certain rating.

The review led to the conclusion that it is necessary to use the indicators of innovative development in this study, which would allow comparing the level of potential of a territory and the level of its innovative activity.

3. METHOD

For a comprehensive assessment of the innovative potential, it is proposed to use several indicators characterizing its various components. Figure 1 shows the structure of the integrated indicators for assessing the level of innovative activity and the innovative potential of a territory. The choice of components for integrated indicators is based on the experience of modern researchers in this field and is adjusted from the perspective of replacing certain indicators, for example, the share of fixed assets of scientific organizations to their number in a region, etc.

*Corresponding author (Ol'ga P. Smirnova). Tel: +7 343 3714536. Email: olygsmirnova95@gmail.com Volume 11 No.13 ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 Paper ID:11A13P http://TUENGR.COM/V11A/11A13P.pdf DOI: 10.14456/ITJEMAST.2020.262

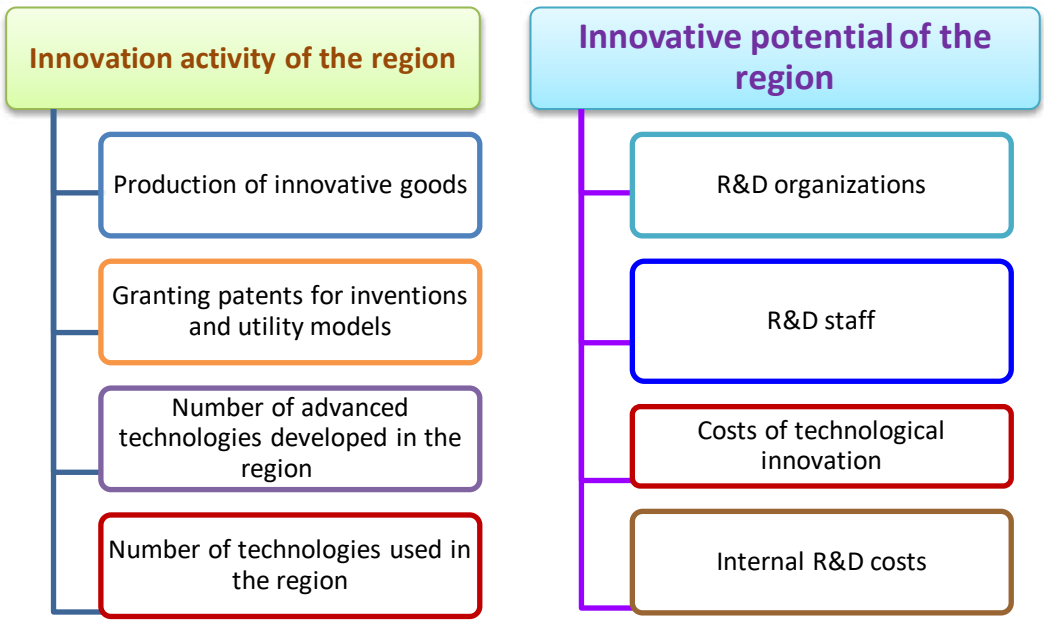

Figure 1: Structure of indicators of innovative activity and innovative potential of a region

The indicators are considered in dynamics and comparison between regions. To assess the heterogeneity of innovative development in Russia as a whole, the authors propose to evaluate the degree of variation in different periods (as of 2007, 2012, 2017).

The coefficient of variation (CV) allows estimating the degree of relative spread of the random variable:

$$CV = \frac{\sigma}{\overline{x}}, \quad (1)$$

where σ – SD for ungrouped data; $\overline{x}$ – the average value of the indicator; $(x_i - \overline{x})$ – absolute values of deviations of individual variants of x_i from the arithmetic mean; n – sample volume.

The indicators are normalized and combined into a single integral indicator:

$$\hat{X} = \frac{X - x_{min}}{x_{max} - x_{min}}, \quad (2)$$

$$I = \sum_{i=1}^{n} \overline{x}_i a_1 \quad (3)$$

where $\hat{X}$ – normalized value of the indicator; x – actual value of the indicator; x_{max}, x_{min} – maximum and minimum values of the indicator; I – integral indicator of innovative potential/activity; a_1 – weight of the i-th parameter; n – number of parameters.

The weights of the parameters are usually set by experts. In the authors' opinion, such an assessment is quite subjective in nature, and at this stage of the study, the authors have taken all the components of the integral indicator as equivalent.

The calculated integral values can be graphically visualized on a map, which will reveal the

regions that can use the innovative potential of territory with the greatest effect.

4. RESULT AND DISCUSSION

In earlier studies (Smirnova, & Ponomareva, 2019), the authors modeled the innovative activity of regions in terms of comparing the costs of technological innovation and the output of innovative products. The heterogeneous development of regions with atypical economies was taken into account (the so-called leaders and outsiders of innovative development were not included in the sample). If one evaluates the impact of costs of technological innovation and innovation output in all regions of Russia, a rather low correlation of these indicators is noted (R^2=0.44) (Figure 2). It was previously revealed that the greatest correlation between the costs of technical innovation was achieved with a time lag of 3 years. The innovative potential broadly understood, namely, as a set of factors that form the institutions of innovative development, in the authors' opinion, has a higher time lag for efficiency, and in this study, the authors have taken the time lag more than 10 years. The authors assess how the innovative infrastructure formed in 2007 affects the level of innovative activity in 2018. As one can see, the correlation of these indicators is quite close (R^2=0.79) (Figure 3).

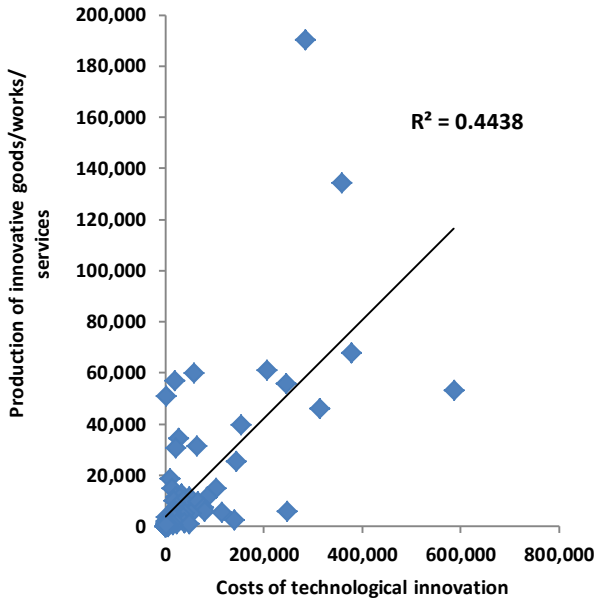

Figure 2: The dependence of the production of innovative goods on the level of costs of technological innovation, a time lag of 5 years (2013/2018)

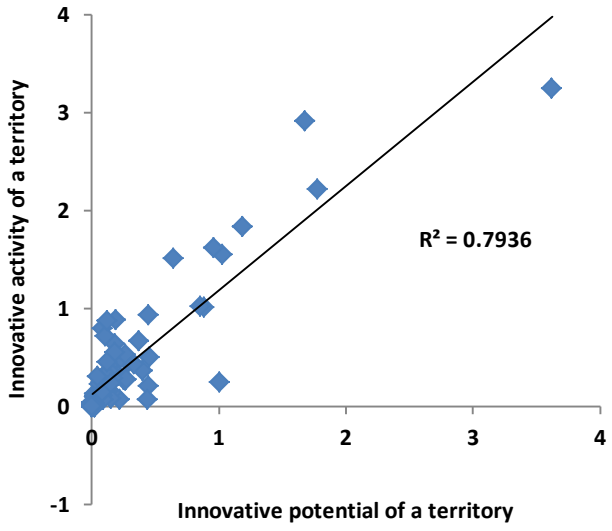

Figure 3: Dependence of the level of innovative activity on the innovative potential of a region, a time lag of 10 years (2018/2007)

At the first stage, the authors evaluated the indicators of innovative development from their heterogeneity. For this purpose, the authors calculated the variations for some indicators of innovative development by regions at different periods (as of 2007, 2012, 2017). For calculations, the data from Rosstat (the Federal State Statistic Service) were used (Rosstat, n.d.). The results are presented in Table 1.

*Corresponding author (Ol'ga P. Smirnova). Tel: +7 343 3714536. Email: olygsmirnova95@gmail.com Volume 11 No.13 ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 Paper ID:11A13P http://TUENGR.COM/V11A/11A13P.pdf DOI: 10.14456/ITJEMAST.2020.262

Table 1: Analysis of variation of innovative activity indicators by the regions of Russia

Indicator	Year	Difference by regions	Variation factor	Average value
R&D organizations, number (P1)	2007	837 times	884%	50
	2012	710 times	912%	43
	2017	374 times	920%	47
R&D staff, people (P2)	2007	6,973 times	309%	10,102
	2012	12,334 times	324%	8,857
	2017	1,969 times	317%	8,832
Internal costs of R&D, million rubles (P4)	2007	16,120 times	362%	4,625.99
	2012	7,039 times	349%	8,540.18
	2017	5,768 times	348%	12,475.27
Granting patents for inventions and utility models, number (F1)	2007	7,501 times	250%	347
	2012	10,557 times	295%	405
	2017	3,908 times	257%	359
Costs of technological innovation, million rubles (F2)	2007	4,294 times	146%	3,039.71
	2012	23,259 times	209%	11,307.02
	2017	31,323 times	191%	16,927.53
Volume of innovative goods/works/services, million rubles (F3)	2007	76,456 times	214%	12,138.34
	2012	1,236,331 times	226%	35,839.57
	2017	19,103 times	175%	49,607.13
The portion of organizations engaged in technological, marketing innovation (F4)	2007	15 times	40%	9.5
	2012	21 times	45%	10.1
	2017	14 times	57%	7.8

Table 1 shows that no single indicator of the innovative activity represents a homogeneous population across regions. The normal value of the variation factor for a homogeneous population is 33%; in this case, it varies from 40-920%. It should be noted that the regions are more heterogeneous in terms of such an indicator as “R&D organizations”. The variation factor of this indicator in 2017 shows that the deviation from the average value will be 900%.

To analyze the innovative activity of the Russian regions, the authors examined the indicators of the availability of innovative infrastructures in a region, such as the number of researchers in the region, the number of R&D organizations, the internal R&D costs, and the technological innovation costs. Also, the indicators characterizing innovative activity are as follows: the volume of output of innovative products and services; the number of registered patents; the portion of organizations using innovation in their business activities, etc.

Considering the shares of these indicators by the federal districts of Russia (Table 2).

Table 2: Structure of indicators of innovative potential by the federal districts of Russia

Federal district	P1, %		P2, %		P3, %		P4, %	
	2007	2017	2007	2017	2007	2017	2007	2017
Central FD	38.8	36.6	51.9	51.2	19.7	32.6	55.6	52.0
Northwestern FD	15.3	12.1	13.0	13.4	12.3	10.2	13.0	13.7
Southern FD	6.5	7.7	3.8	3.8	5.4	5.9	3.0	6.8
North Caucasian FD	2.5	4.1	0.8	1.0	0.8	0.6	0.4	0.5
Volga FD	14.8	16.8	15.8	14.8	30.4	24.0	13.8	15.8
Urals FD	5.9	6.3	5.9	6.4	21.3	13.3	5.7	7.0
Siberian FD	10.3	11.9	6.9	7.6	8.5	9.2	4.8	6.5
Far Eastern FD	5.4	4.6	0.9	1.8	1.6	4.4	5.0	2.0

Note: P1 – R&D organizations; P2 – R&D staff; P3 – Costs of technological innovation; P4 – Internal costs of R&D; FD – federal district.

Note the high centralization of innovative resources in their spatial distribution. More than 50% of all scientific organizations are located in the Central and Volga Federal Districts. The leader in this indicator is Moscow and the Moscow Region – in total, more than 25% of all scientific organizations in the country are located there. The same situation is observed in terms of the number of R&D staff – more than 51.2% of researchers are concentrated in the Central Federal District, of which almost 44% are in Moscow and the Moscow Region.

The authors also analyze the costs of technological innovation. If in 2007 the Volga and Urals Federal Districts were the first in terms of costs, then in 2017 the largest share of all costs of technological innovation was accounted for by the Central Federal District alone. In particular, this indicator in 2007 in Moscow amounted to 5% of all Russian costs of technical innovation, and by 2017 it increased to 13.8%. At the same time, the share of the Urals Federal District, on the contrary, decreased from 21.3 to 13.3%. The indicator of internal R&D costs in the spatial aspect has the largest concentration. The share of the Central Federal District is 52%, of which 46.8% are costs in Moscow and the Moscow Region.

Consider the structure of indicators characterizing innovative activity (Table 3).

Table 3: The structure of indicators of innovative activity of territories by federal districts of Russia

Federal district	F1, %		F2, %		F3, %		F4, %	
	2007	2018	2007	2018	2007	2018	2007	2018
Central FD	44.7	45.7	23.4	26.9	36.4	34	35.6	30.0
Northwestern FD	9.9	11.4	8.3	11.0	15.0	12	6.5	9.5
Southern FD	6.2	6.8	1.9	7.3	5.0	7	5.2	5.5
North Caucasian FD	-	2.0	-	0.8	-	2	-	1.2
Volga FD	19.1	17.6	46.8	34.7	23.5	17	33.2	29.9
Urals FD	7.1	5.4	12.4	12.2	11.3	17	10.5	11.7
Siberian FD	9.3	8.8	5.0	4.8	7.8	8	6.6	8.6
Far Eastern FD	1.9	2.3	0.9	2.3	1.0	3	2.4	3.6

Note: F1 – Granting patents for inventions and utility models; F2 – Volume of innovative goods/works/services; F3 – Number of advanced manufacturing technologies created; F4 – Number of advanced manufacturing technologies used.

Based on the methods of rationing and aggregation, the integral values of innovative potential and innovative activity for 84 regions of Russia were calculated. Note that in this study, the time lag of more than 10 years was used (an indicator of the innovative potential of territory according to the 2007 data, an indicator of innovative activity according to the 2018 data). Integral indicators are conventionally divided into three groups (low, medium, and high level), which allows comparing their values by the regions (Figure 4).

*Corresponding author (Ol'ga P. Smirnova). Tel: +7 343 3714536. Email: olygsmirnova95@gmail.com Volume 11 No.13 ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 Paper ID:11A13P http://TUENGR.COM/V11A/11A13P.pdf DOI: 10.14456/ITJEMAST.2020.262

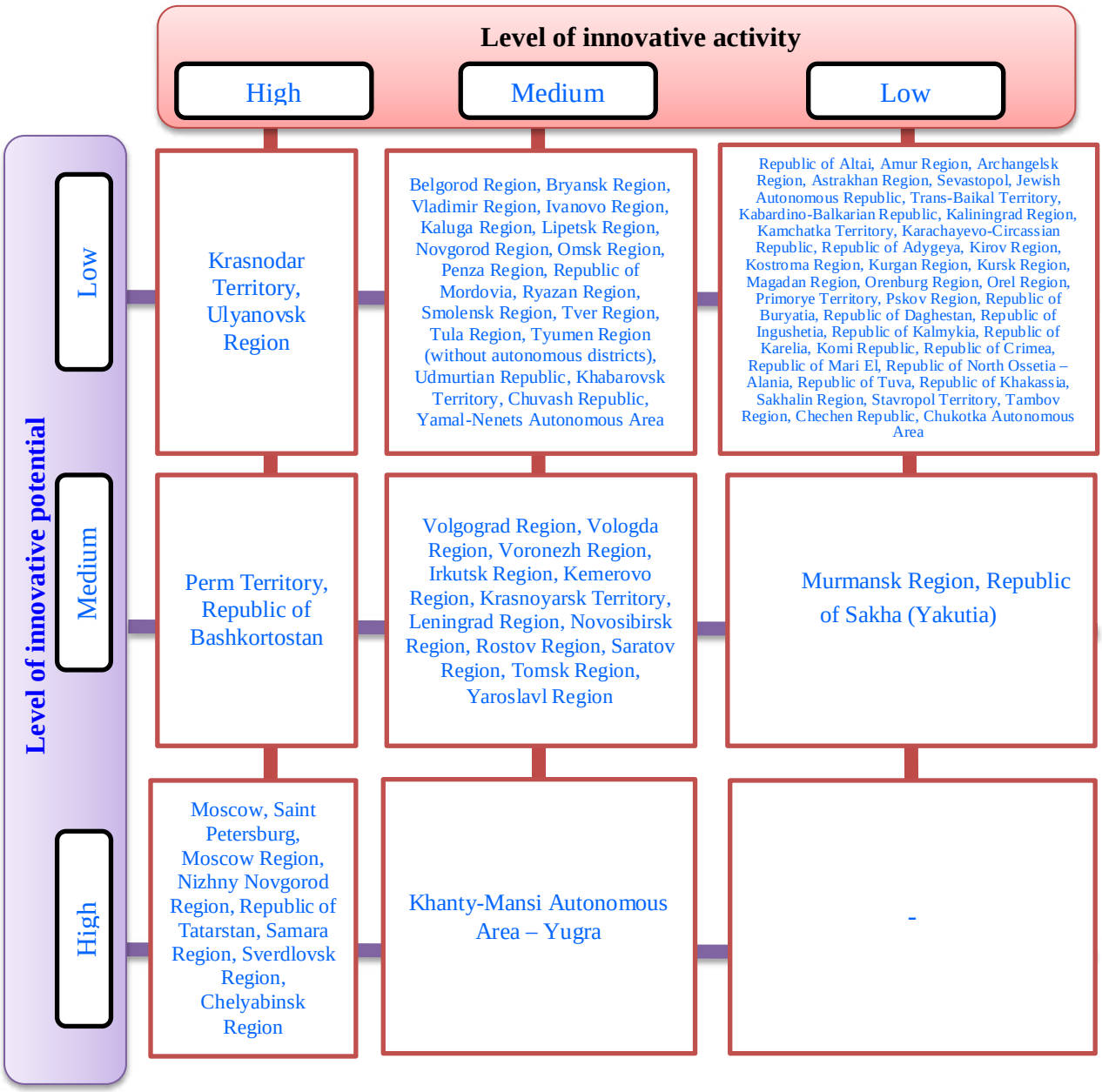

Figure 4: Comparison of Russian regions by integrated indicators of innovative potential and innovative activity.

As can be seen from Figure 5, the majority, namely 58 of 84 regions correspond to the general trend – the higher the level of innovative potential of the territory, the higher the level of its innovative activity. The leaders in both innovative activity and innovative potential are industrially developed regions of Russia e.g. Moscow, Saint Petersburg, the Moscow Region, Nizhny Novgorod Region, Republic of Tatarstan, Samara Region, Sverdlovsk Region, Chelyabinsk Region. Regions with a low level of the considered indicators relate mainly to the North Caucasian and Far Eastern Federal Districts (Figure 1A).

Among the regions that use innovation potential inefficiently (the level of potential is lower than innovation activity) are the Khanty-Mansi Autonomous Area – Yugra, Republic of Sakha, and Murmansk Region. Note the regions with an effective ratio of potential and activity – these are the Krasnodar Territory and Ulyanovsk Region, Perm Territory, and the Republic of Bashkortostan. Compare the values of the obtained integral indicators on the map (Figure 5).

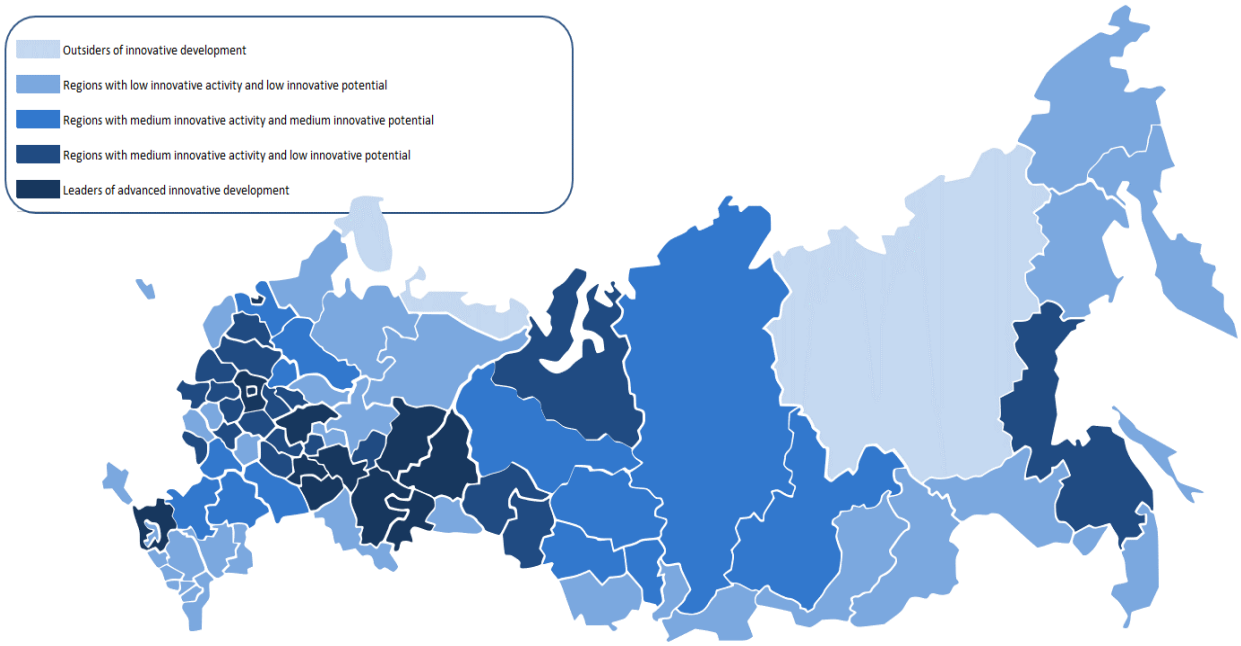

Figure 5: Spatial modeling of uneven innovative development of Russian regions.

A graphical interpretation of the data allows concluding about the extremely uneven innovative development of the regions of Russia. Most of the regions have low innovation potential and low activity. The analysis shows a high centralization of these indicators. There is a tendency towards a greater increase in imbalances in the innovative development of regions, which hinders economic development.

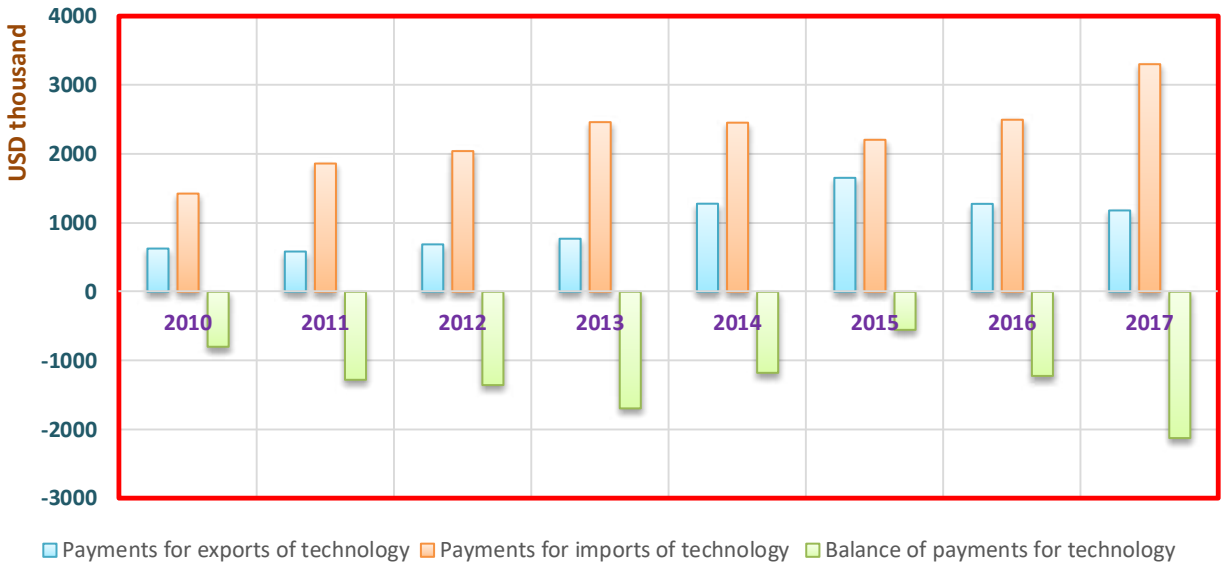

Figure 6: Balance of payments for international technological exchange (Russia), thousand USD (Source: Gokhberg *et al.*, 2019)

To smooth out imbalances in the innovative activity of regions, it is important to note the importance of such a form of interaction as scientific and industrial cooperation. The need for interaction between industrial enterprises, scientific and educational organizations is becoming increasingly relevant. According to studies conducted by the Higher School of Economics, the

*Corresponding author (Ol'ga P. Smirnova). Tel: +7 343 3714536. Email: olygsmirnova95@gmail.com Volume 11 No.13 ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 Paper ID:11A13P http://TUENGR.COM/V11A/11A13P.pdf DOI: 10.14456/ITJEMAST.2020.262

number of organizations performing research and development in 2017 decreased by 2.8%. In the general structure of these organizations, industrial enterprises occupy only about 9%. About 11% of all organizations carrying out specialized research are engaged in the development of technologies for the Russian industry (Gokhberg *et al.*, 2019). The growth rate of the development of production technologies lags behind the growth rate of their use, and the existing technological demand for production technologies is currently not met either qualitatively or quantitatively. The balance of payments for international technological exchange is negative (Figure 6).

The dependence of the Russian industry on technology imports becomes apparent. In this regard, the importance of increasing innovative activity is growing. The current problems in the field of development, update, and use of innovative developments cannot be resolved in a natural market way, which means that the state should play a special role in this process (Kuznetsov, 2020; Smirnov, 2017). The innovative policy of the state, as part of the industrial policy, should flexibly respond to the needs of the real sector of the economy and form instruments that promote interregional scientific and industrial cooperation between science and business (Batkovskiy *et al*., 2017).

5. CONCLUSION

From this study result, it shows the problem of increasing innovative activity in Russia is complicated by the barrier of heterogeneity in the development of its regions by most socio-economic indicators. An important issue in this context is the correctness of evaluating the effectiveness of innovation. This is confirmed by the growing dependence of the Russian industry on technology imports.

The results of this study indicate a high degree of centralization of resources that stimulate local innovation growth. The data allows concluding about the uneven innovative development of Russian regions. Most of them correspond to the general trend – the higher the level of innovative potential of the territory, the higher the level of its innovative activity. Moreover, most of the regions have low innovation potential and low activity. The extremely uneven distribution of innovative potential, its increasing centralization in some territories, can further contribute to growing imbalances in the socio-economic development of the Russian regions.

6. AVAILABILITY OF DATA AND MATERIAL

Information can be made available by contacting the corresponding author.

7. ANNOTATION

The paper was prepared in accordance with the Research Plan for the Laboratory for Spatial Development of the Territory of the Institute of Economics of the Urals Branch of the Russian Academy of Sciences for 2019-2021.

8. REFERENCES

Filippov, Yu.V., Avdeeva, T.T., & Lavrova, T.G. (2013). *Theories of Local Economic Development*. Moscow: Ekonomika, 130p. DOI: 10.15216/9785406010389

Gokhberg, L.M., Ditkovsky, K.A., Dyachenko, E.L. *et al.* (2019). *Indicators of Science: 2019: Statistical Bulletin*. Moscow: National Research University “Higher School of Economics”, 328p.

Gokhberg, L.M., Ditkovsky, K.A., Kuznetsova, I.A. *et al.* (2019). *Indicators of Innovative Activity:*

2019: Statistical Bulletin. Moscow: National Research University "Higher School of Economics", 376p.

Goncharenko, O., Tohochynskyi, O., Sirenko, K., Chebonenko, S., & Tretiak, H. (2019). Innovative Performance as Precondition of Sustainable and Secure Development. *Journal of Security and Sustainability Issue, 8*(3), 531-544. DOI: 10.9770/jssi.2019.8.3(19)

Gurieva, L.K. (2005). The Theory of Diffusion of Innovations. *Innovation, 4*, 22-26.

Hill, D. (2020). *Production and Trade of Knowledge- and Technology-Intensive Industries*. Retrieved January 2020, http://ncses.nsf.gov/pubs/nsb20205

Kleiner, G.B. (2011). Resource Theory of the Organization of Economy. *Russian Journal of Management, 3*, 3-28.

Kovalev, Yu.Yu. (2016). *Innovation Sector of the World Economy: Notions, Concepts, Development Indicators: Textbook*. Yekaterinburg: Publishing House of the Urals University, 180p.

Kuznetsov, D.A. (2020). Formation of the Industrial Policy of Russia on the Basis of Innovation Priorities. *Petersburg Economic Journal, 1*, 6-14.

Myrdal, G. (1957). Economic Theory and Underdeveloped Regions. In *Rich Lands and Poor*. London: Duckworth.

Orekhovsky, P. (2007). Evaluation of the Effectiveness of Innovation in the Regions: A Comparative Analysis. *Society and Economics, 5-6*, 203-215.

Pogodina, T.V. (2004). Economic Analysis and Assessment of Innovative Activity and Competitiveness of the Regions of the Volga Federal District. *Economic Analysis: Theory and Practice, 5*, 16-22.

Richardson, H.W. (1973). *Regional Growth Theory*. London: Macmillan. DOI: 10.1007/978-1-349-01748-5

Romanova, O.A., Korovin, G.B., & Kuzmin, E.A. (2017). Analysis of the Development Prospects for the High-Tech Sector of the Economy in the Context of New Industrialization. *Espacios, 38*(59), 25.

Rosstat. (n.d.). *Science, Innovation, and Advanced Manufacturing Technology*. Retrieved March 2020, http://www.gks.ru/folder/11189

Smirnov, R.O. (2017). Issues of Commercialization of Innovative Technologies in the Russian Federation in the Field of Entrepreneurial Activities. *Radio Industry (Russia), 3*, 110-112. DOI: 10.21778/2413-9599-2017-3-110-112

Smirnova, O.P., & Ponomareva, A.O. (2019). Modeling the Innovative Activity of the Constituent Entities of the Russian Federation in the Conditions of a New Technological Reality. *Economic Analysis: Theory and Practice, 18*(8), 1523-1542. DOI: 10.24891/ea.18.8.1523

Tatarkin, A.I., & Novikova, K.A. (2015). The Innovative Potential of a Territory in the Behavioral Assessments of the Population. *Economy of the Region, 3*, 279-294. DOI: 10.17059/2015-3-23

Vasilieva, M.V. (Ed.). (2013). *The New Paradigm of Management of Socio-Economic Development of Russian Regions*, 33-34. Moscow: Nauchnoye Obozrenie.

Zausaev, V.K., Bystritsky, S.P., & Krivoruchko, I.Yu. (2005). Innovation Potential of the Eastern Regions of Russia. *EKO, 10*, 40-52.

*Corresponding author (Ol'ga P. Smirnova). Tel: +7 343 3714536. Email: olygsmirnova95@gmail.com Volume 11 No.13 ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8 Paper ID:11A13P http://TUENGR.COM/V11A/11A13P.pdf DOI: 10.14456/ITJEMAST.2020.262

9. APPENDIX

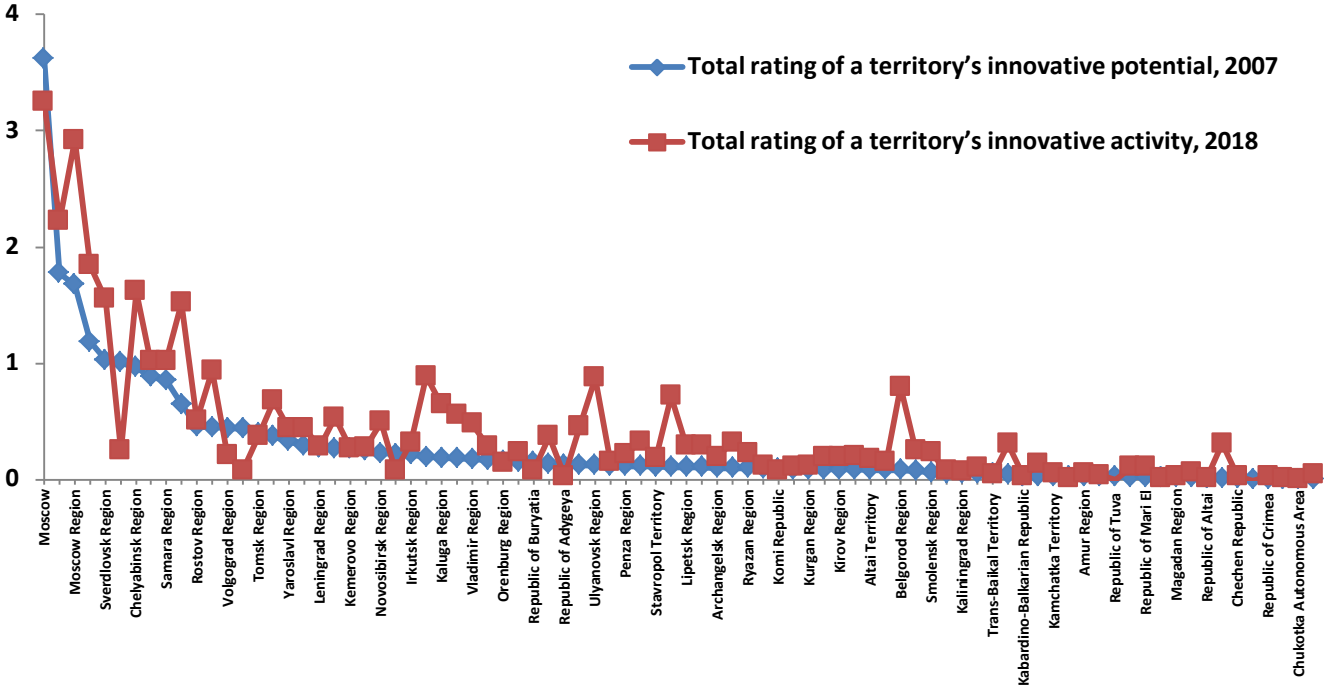

Figure 1A: Integral indicators of innovative potential and activity of Russian regions

Dr.Ol'ga P. Smirnova is a Researcher of the Institute of Economics of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia. She received a PhD in Economics and National Economic Management from the Institute of Economics of the Ural Branch of the Russian Academy of Sciences, Russia. She is a Cand.Sci. (Economic). Her works are devoted to the issues of Balanced Development of Industry and Economic Security.

Alena O. Ponomareva is a Junior researcher, Institute of Economics of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia. She received a Master's degree in Economics and Management of Metallurgical and Machine-Building Enterprises from Ural Federal University, Russia. Her research focuses on Regional Economic Development, Industrial Policy, and Innovative Activity of Industrial Enterprises.