Methodological aspects of economic security of territories in the context of socioeconomic development of regions under uncertainty

Aspectos metodológicos de la seguridad económica de los territorios en el contexto del desarrollo socioeconómico de las regiones bajo incertidumbre

6 Anna Viktorovna ORLOVA 1; Julia Vladimirovna LYSHCHIKOVA 2; Yevgenia Viktorovna NIKULINA 3

Contents

ABSTRACT:
The goal of the study is to develop economic and mathematical methods for quantitative assessment and classification of the regions of the Central Federal District (CFD). The authors have formed a theoretical and methodological foundation for the research of regional development in the context of ensuring the economic security of territories. During the research, a methodological basis was defined to identify and specify certain groups of indicators that describe the level of regional development in the context of economic security. Applied aspects and key perspective trends of modern regional development of Russia were revealed. The authors tested the proposed methodology for assessing the economic security of territories in the context of their socioeconomic development under uncertainty using economic and mathematical modeling methods. Findings of the study can be used to identify spatial features and substantiate priority areas for ensuring economic security, taking the regional factor into consideration, and as regional interests in the formation of a development strategy for territories.
Keywords: economic security, region, regional strength, socioeconomic development, uncertainty.

RESUMEN:
El objetivo del estudio es desarrollar métodos económicos y matemáticos para la evaluación cuantitativa y la clasificación de las regiones del Distrito Federal Central (CFD). Los autores han formado una base teórica y metodológica para la investigación del desarrollo regional en el contexto de garantizar la seguridad económica de los territorios. Durante la investigación, se definió una base metodológica para identificar y especificar ciertos grupos de indicadores que describen el nivel de desarrollo regional en el contexto de la seguridad económica. Se revelaron los aspectos aplicados y las tendencias clave de la perspectiva del desarrollo regional moderno de Rusia. Los autores probaron la metodología propuesta para evaluar la seguridad económica de los territorios en el contexto de su desarrollo socioeconómico bajo incertidumbre utilizando métodos de modelado económico y matemático. Los hallazgos del estudio pueden usarse para identificar características espaciales y fundamentar áreas prioritarias para garantizar la seguridad económica, teniendo en cuenta el factor regional, y como intereses regionales en la formación de una estrategia de desarrollo para los territorios.
Palabras clave: seguridad económica, región, fuerza regional, desarrollo socioeconómico, incertidumbre.

1. Introduction

The established practice of regional development and publications on this topic allow to conclude that the theory of assessing the level of socioeconomic development and security of the regions, as well as efficient management of the socioeconomic filed of the region, is in a formative stage.

Critical analysis of the existing toolkit for quantitative assessment and management of socioeconomic development of the regions allowed to identify significant shortcomings in the available methods, which include the following (Freedman, Rechto, Pisarev, 2015):

- subjectivity in the selection of indicators; insufficient methodological validity of methods for the formation of an integral assessment of the level of socioeconomic security of the region;

- lack of the substantiated method of ranking (clustering) regions for homogeneous classes by levels of socioeconomic security;

- lack of scientifically substantiated methods of selection and budget funding of investment social projects.

The above has negative impact on the quality of forecasting the socioeconomic situation in Russian regions and revealing the socioeconomic differentiation of regional development, leads to mistakes in determining the priorities of the regional policy of the federal center and to the low efficiency of spending centralized investment funds.

All this led to the fact that Russia faced a set of challenges in new political, economic and social conditions, the most significant being the following:

- growth of disproportions in the socioeconomic development between Russian regions;

- critical deterioration of national and regional infrastructure caused by a constant shortage of public and private investment;

- decrease in the level of economic, social and partly cultural and mental interconnected relationships between the territories of Russia, emergence of "discontinuity line" between the European and Asian parts of Russia, between Russia and the North Caucasus.

The regional component of economic security is of particular importance in this case, as it is inextricably linked to the key problems of internal social and regional development, up to the formation of a new role of regions, especially Siberia and the Far East, and change in their significance in the country's economy (Ulyukaev, 2016). Modern regional development of Russia takes the path of concentration of economic power in certain territories and formation of macroregions, the centers of which are large mega-cities and areas rich in resources.

The theory of economic security of the state was widely covered in the domestic economic science. Active scientific research in this field was reflected in publications, monographs and collective works of such scientists as L.I. Abalkin, V.K. Senchagov, E.A. Oleinikov, G.M. Lonskoy, S.V. Stepashin, A.I. Illarionov, V.I. Lisov and others (Senchagov, 2005; Oleinikov, 1997; Abalkin, 1994). The works of S. Afontsev, D. Lvov, A. Kuklik, V. Tambovtsev, K. Samsonov, N. Kosolapov, A. Zverev, S. Glazyev are devoted to the study of economic security (Tatarkin, Kuklin, Mysin, 2001). Mechanisms for ensuring economic security are studied by A. Mikhailenko, B. Mikhailov, A. Arkhipov, A. Gorodetskiy, K. Astapov (Geitsya, 2006; Tkachenko, Bogachev, 2007). Certain aspects of Russia's economic security are revealed in the works of B. Milner (managing the economic activity), V. Presnyakov, V. Sokolov, A. Seleznev (problem of technological security), V. Borovikov (threats to economic security) (Krasnikov, 2009), V. Senchagov, Yu. Lyubimtsev, A. Lavina (problem of financial security), A. Gorbaggov (protection of markets) (Flyvbjerg, Bruzeliu, Rothengatter, 2003), V. Studentsov, M. Ilyin (problem of foreign investments in the

system of economic security) (Goridko, 2016; Rudneva and Kudryavtsev 2014), A. Ananyev, T. Zolotnikova (problem of environmental safety) (Zapotocny, 2003), P. Sergeev (problem of the fuel and energy security), S. Dzarasov (problem of food safety), A. Illarionov (economic security criteria) (Prokhorova, 2010) and other authors. The works of V. Obolenskiy, I. Faminskiy, V. Studentsov and other authors are devoted to highlighting and analyzing the problems of economic security in the field of foreign economy. General theoretical issues of studying the economic security of regions – regional economic security – are dealt with by such academicians as A.I. Tatarkin, A.A. Kuklin, D.S. Lvov, E.A. Oleinikov (Tambovtsev, 1994). Russian academicians also develop some other problems of economic security.

Despite a large number of works devoted to the development of regional economic security, there are still a significant number of problems related to transformation of its place and role in spatial economic systems, including in the process of socioeconomic development of the region.

2. Methods

Differentiation of the level of socioeconomic development has long been a very acute problem for the Russian economy. This problem has still not lost its relevance due to the fact that the economy of individual regions generally shapes the economy of the country. Social development of the regions of the Russian Federation has long been described by increased unevenness, disintegration of the single economic space and formation of disproportionately developing "depressed" territories, which see stable negative dynamics of social indicators. This is why studies aimed at researching the differentiation of the level of social development of regions acquire special significance.

The economic security of any region or metropolis like Moscow cannot be analyzed without regard to the security of the nearest territories. There are no completely self-sufficient regions in the Russian Federation. Some territories are rich in natural resources (Kursk region, Voronezh region, Belgorod region, etc.), while others have more innovative technologies (Moscow, Saint-Petersburg, Vladivostok).

On the one hand, the economic security of each region relies on the available potential (level of socioeconomic development), specifics and strong components of this potential; on the other hand, it cannot be implemented without interregional, integration or network interaction and trade. Political, economic and military strength and self-sufficiency of territories are measured on the scales of federal impact and have certain quantitative indicators and indices. Both the construction methods and the domestic and foreign indices themselves (Geits V.M., Klebanova T.S., Chernyak O.I., 2006; Ermoshenko M.M., 2002) have qualitative differences, the nature of which is clearly presented below (Table 1).

Table 1
Comparative characteristics of foreign
and domestic practice of building indices

Domestic indices	Foreign indices
Indices are specific indicators defined by individual researchers whose opinions on the composition of indices and methods of their definition differ.	Theoretical basis for research has been formed: there are schools in various fields, many issues and approaches were discussed in the past, and unified positions were worked out on a number of issues.
Researchers' attention is primarily focused on the integral assessment of such general phenomena as, for instance, quality of life or investment attractiveness. More narrow problems are not taken into consideration.	Indices are being developed that address certain problems, such as public health or corruption, and are aimed at the fullest coverage of sufficiently large fields (for instance, the quality of life of the population or economic freedom in the country).
National statistical base on innovation aspects of development is extremely poor and has many shortcomings.	A sufficient amount of statistical information has been accumulated, which allows to fruitfully operate within the existing fields and move on. Indices increasingly include innovative indicators.
Indices are often very fuzzily filled with the initial indicators.	A targeted approach is widespread in building indicators of the state of the economy.
A well-considered choice of indicators is not always the case – the widest choice of indicators is practiced more often.	A well-considered attitude to the initial data for building indices prevails.
Methods are often excessively complicated, which leads to results that are hard to interpret.	Relatively simple methods for building indices.
So far, there are no examples of the use of representative polls, while there is a cautious attitude to expert opinions.	There is considerable practice of subjective opinions, obtained both through polls and from experts. This allows to analyze the phenomena at a qualitative level.
The first developers and users in authorities and public organizations have just begun to emerge.	Aside from purely academic goals, integral assessments are targeted at several groups of users: authorities, business, and public organizations.

Source: Compiled using "Higher School of Economics". Educational courses.

It follows from the table that the main problems in building indices in Russia are underdevelopment of the information base and the methods of calculation. However, these difficulties are expected to vanish after some time. It is proposed to consider the foreign practice of building indices of economic security and the state of the economies of the regions.

Japanese scientists offered an analytical method for assessing the "national strength" of the state and conducted a comparative analysis of the developed index for a number of developed countries back in the 1980s (V.K. Senchagov, 2005, International Labor Organization, 2016, Ministry of Economy of Ukraine, 2007). "National strength" of the state is defined by its ability to contribute to the international community, its economic, financial, scientific and technical fields of activity, in the first place, and by its ability to survive in crisis and extreme international conditions, in the second place. Indicators describing the country's geographic location, population size, natural conditions, economic and defense potential, national morale, diplomatic activity and performance are used to assess the ability to survive. In the third place, there is the ability to promote and defend its national interests, relying on all components of the "integrated national strength", including through the use of force. The above components are calculated as indices, and the three main indices aggregate into the general index of the "complex national strength" of the state.

As such, when applying this method at the regional level, it is advisable to define an "integrated indicator of regional strength".

In order to test the proposed method, let's differentiate the regions of the CFD by their level of socioeconomic development.

The period of 2005-2014 was analyzed to determine the integrated strength of CFD regions, highlighting the main areas describing the economic security of territories:

1. basic potential;

2. ability to survive;
3. possibility of scientific and technological development.

It is required to study the following to describe the basic potential of territories:

1. Economic power – this criterion is described by the state of per capita GRP, size of investment per capita, valuation of fixed assets;
2. Financial power – defined through income from tax revenues, balanced financial result, deposits of individuals and legal entities in rubles, consumer price index;
3. Science and technology – they can be disclosed through such indicators as the volume of innovative products, cost of technological innovation, number of organizations that have carried out scientific research and development;
4. Efficiency in the domestic market – it is determined by exports of food: meat, including poultry and wild fowl; exports of non-agricultural products: diesel fuel.

Once a scoring of each indicator is obtained, a final assessment is defined, which allows to estimate the contribution of each region over a decade. Scores are determined using the expert evaluation method. Scores have the following characteristics:

"5" – high level;

"4" – average level;

"3" – below average;

"2" – low level;

"1" – critical level.

The level of economic security of territories can be determined based on the proposed method by applying uncertainty methods.

3. Results

The CFD includes 18 regions of the Russian Federation: Belgorod, Bryansk, Vladimir, Voronezh, Ivanovo, Kaluga, Kostroma, Kursk, Lipetsk, Moscow, Oryol, Ryazan, Smolensk, Tambov, Tver, Tula and Yaroslavl regions, as well as the city of Moscow. Center of the CFD is Moscow, the capital of Russia. The district occupies 650.2 thous. sq. km (3.8% of the territory of the Russian Federation). The resident population as of 01.01.2015 was 3,895.2 thous. people (26% of the country's population), of which 80.9% are urban residents. The average population density is 57.1 people per 1 sq. km. The district has the least potential for simple resources: 0.824 hectares of farmland per inhabitant (the average Russian figure is 1.539 ha, the average for the European Union is 0.387 ha, the world average is 0.726 ha), 0.611 ha of arable land (0.868 ha, 0.221 ha, 0.208 ha), 2,955 cubic meters of fresh water per year (30.8 thous. cubic meters, 4,179 cubic meters, 6,589 cubic meters) and only 0.6 ha of forest, which is 10 times less than the national average. The CFD accounts for 37.7% of the gross regional product, 21.6% of the agricultural product and 26.5% of the industrial output of the country.

Scoring was defined for the regions of the CFD in order to determine the integrated indicator of regional strength in 2005-2014. Table 1 presents the results of the definition of the integrated indicator of regional strength of economic security in the CFD regions in 2005.

Table 2
Assessment of the integrated indicator of economic security
of the CFD regions using the scoring method for 2005

Index components	2005															
	Belgorod region	Bryansk region	Vladimir region	Voronezh region	Ivanovo region	Kaluga region	Kostroma region	Kursk region	Lipetsk region	Moscow region	Oryol region	Ryazan region	Smolensk region	Tambov region	Tver region	Tula region
1. Basic potential																
Economic power																
GRP per capita, rub.	4	2	3	4	1	3	3	3	5	5	3	3	3	3	4	4
Investment per capita, rub.	4	2	3	4	1	3	2	2	4	5	2	3	3	2	3	3
Cost of fixed assets, mln rub.	4	2	3	4	1	4	3	4	5	5	4	4	5	4	4	4
Financial power																
Proceeds from tax revenues, mln rub.	4	3	3	4	4	4	3	4	4	5	3	4	4	4	4	4
Balanced financial result, mln rub.	5	2	3	4	3	4	2	4	5	5	3	4	3	2	3	4
Deposits of individuals and legal entities in rubles, mln rub.	5	2	2	4	3	4	4	4	4	5	3	4	4	4	3	4
Consumer price index	4	3	5	5	4	3	5	5	5	4	5	5	3	5	4	4
Science and technology																
Volume of innovative goods, services, mln rub.	3	3	3	4	1	3	3	3	5	5	4	3	4	2	2	3
Costs for technological innovation, mln rub.	4	2	3	4	2	4	2	4	4	5	3	3	3	1	4	4
Number of organizations performing research and development	2	2	3	3	3	3	1	2	1	5	2	2	1	2	4	2
Efficiency in the domestic market																
Exports of food products: meat, including poultry and wild fowl, tons	5	4	4	3	2	4	2	3	5	5	1	3			4	5
Exports of non-agricultural products: diesel																

fuel, thous. tons	1				2		2	1		3	1					
Final score	**4**	**2**	**3**	**4**	**2**	**3**	**3**	**3**	**4**	**5**	**3**	**3**	**3**	**3**	**4**	**4**
2. Ability to survive																
Population, thous. people	4	4	4	5	3	3	2	4	4	5	2	4	3	4	4	4
Natural resources																
Extraction of minerals, mln rub.	5	2	3	4	3	4	1	5	4	4	1	3	3	1	2	4
Total land area, thous. ha	4	4	3	5	3	4	4	4	4	4	4	4	5	4	5	4
Use of fresh water	3	2	2	4	3	2	5	4	3	5	2	3	3	2	5	4
National morale																
Library fund for 1,000 people, copies	4	4	4	4	4		5	5	4	3	4	4	5	5	5	4
Number of sports facilities: stadiums	5	4	4	3	4		3	3	3	5	3	3	4	3	3	3
Number of museum visits per 1,000 people	4	4	5	3	4		4	3	2	4	4	4	4	3	3	4
Final score	**4**	**3**	**4**	**4**	**3**	**3**	**3**	**4**	**3**	**4**	**3**	**4**	**4**	**3**	**4**	**4**
3. Possibility of scientific and technological development																
Advanced production technologies used	3	3	4	5	2	4	3	4	2	5	3	1	3	3	4	5
Receipt of patent applications for inventions	3	1	3	4	3	3	1	3	2	5	3	3	1	1	3	3
Costs for technological innovations, thous. rub.	4	2	2	4	2	3	2	3	3	5	2	2	2	1	3	4
Number of personnel engaged in research and development, people	3	3	4	5	3	5	2	4	2	5	2	4	2	3	4	5
Final score	**3**	**2**	**3**	**4**	**3**	**4**	**2**	**4**	**2**	**5**	**3**	**3**	**2**	**2**	**4**	**4**
Integrated indicator of economic security	***4***	***3***	***3***	***4***	***3***	***3***	***3***	***4***	***3***	***5***	***3***	***3***	***3***	***3***	***4***	***4***

Table 1 shows that the Moscow region and the city of Moscow have the highest regional strength. Such regions as the Belgorod, Voronezh, Kursk, Tver, Tula and Yaroslavl regions have an average level of regional strength. The integrated indicator of the regional strength of the remaining CFD regions can be described as "below average". It must be noted that in general, there are no regions in the CFD with a low or critical level of regional strength. However, the regions of the third group (with the value of the integrated indicator below the average) are described by low and critical values in the assessment of their main development areas.

An integrated indicator of regional strength in 2006-2014 was assessed in a similar manner. Figures 1-5 present the star of landmarks of the CFD regions.

Figure 1
Star of landmarks of the integrated indicator of economic security of the CFD regions for 2005
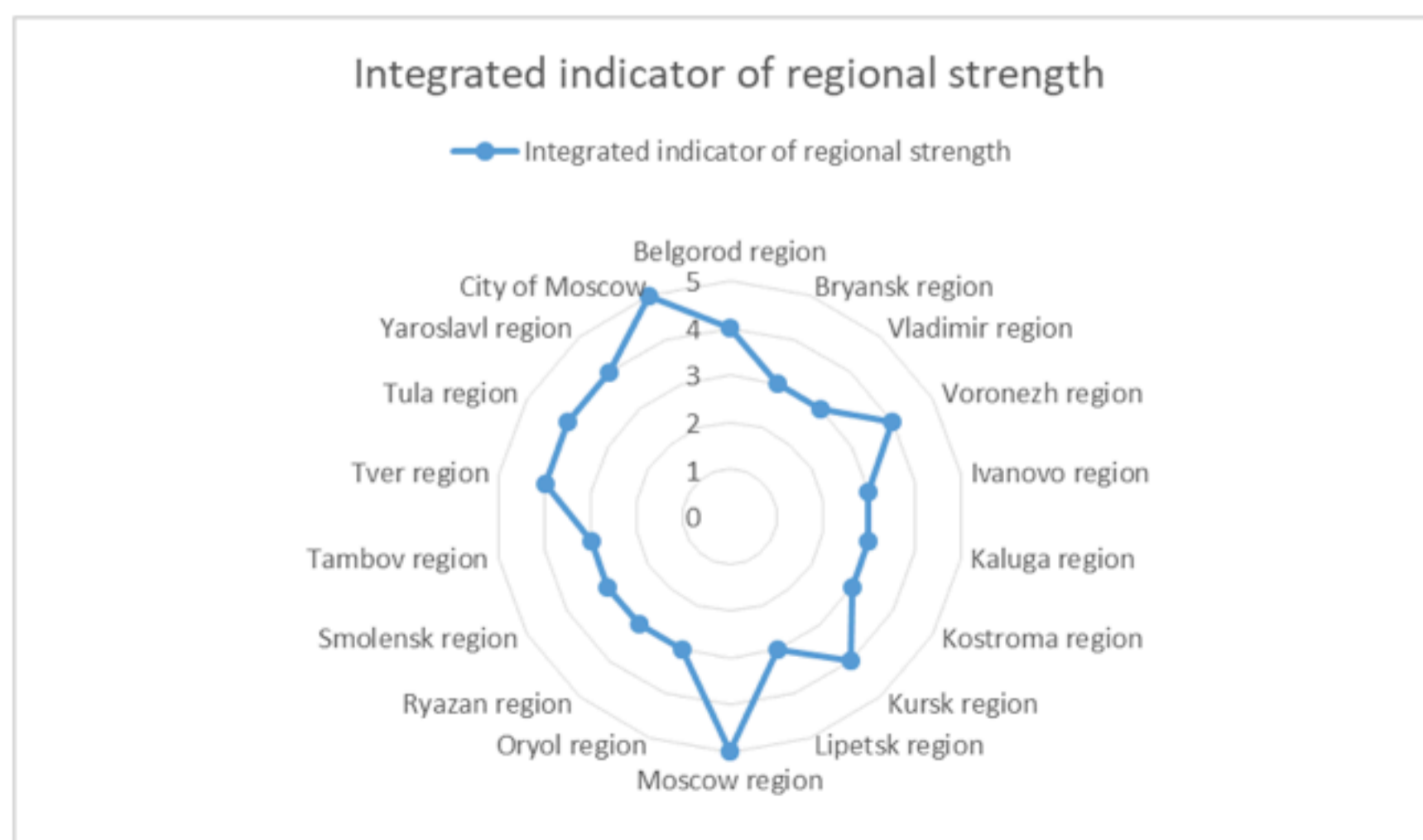
Figure 2
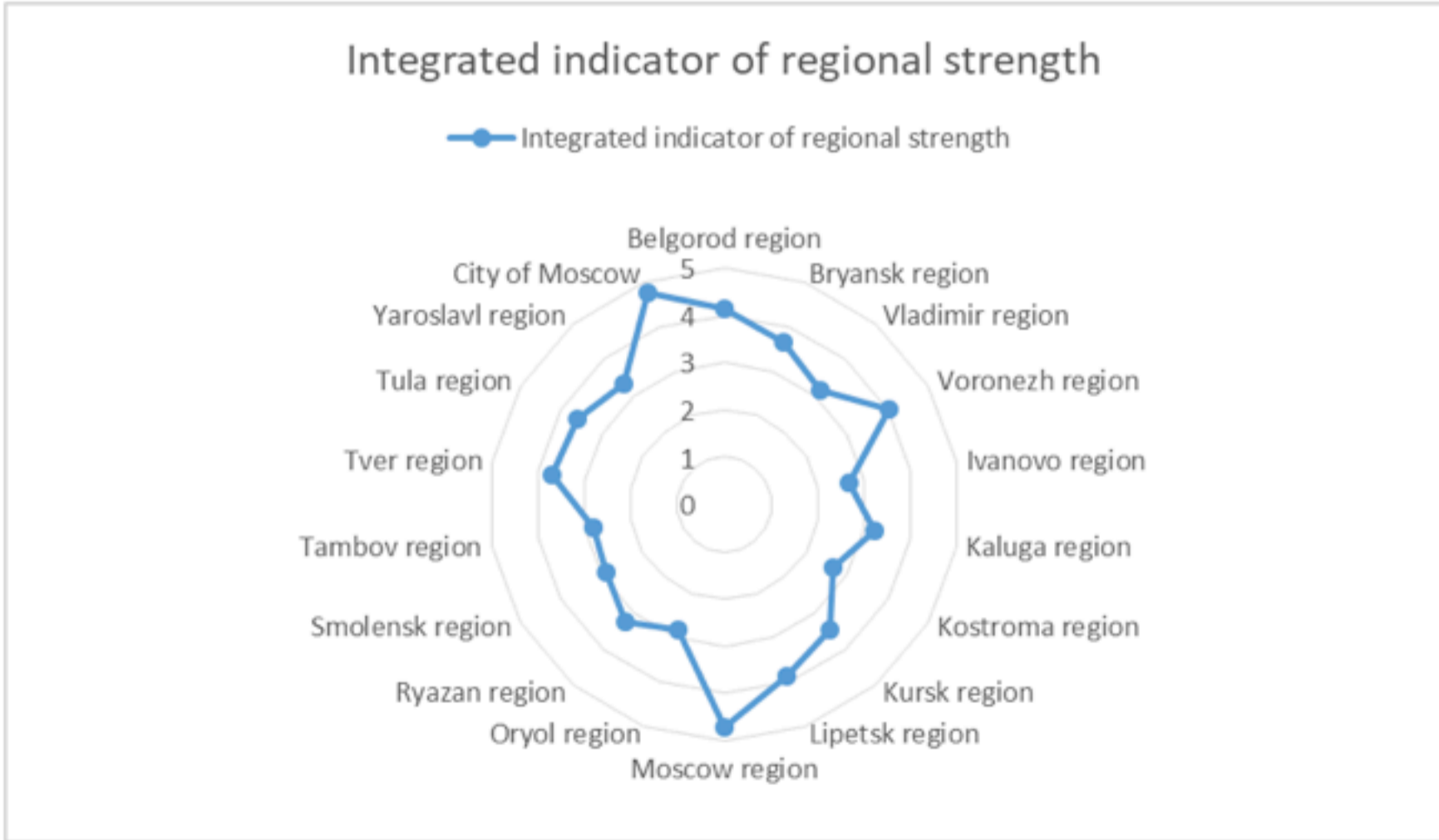Star of landmarks of the integrated indicator of economic security of the CFD regions for 2006
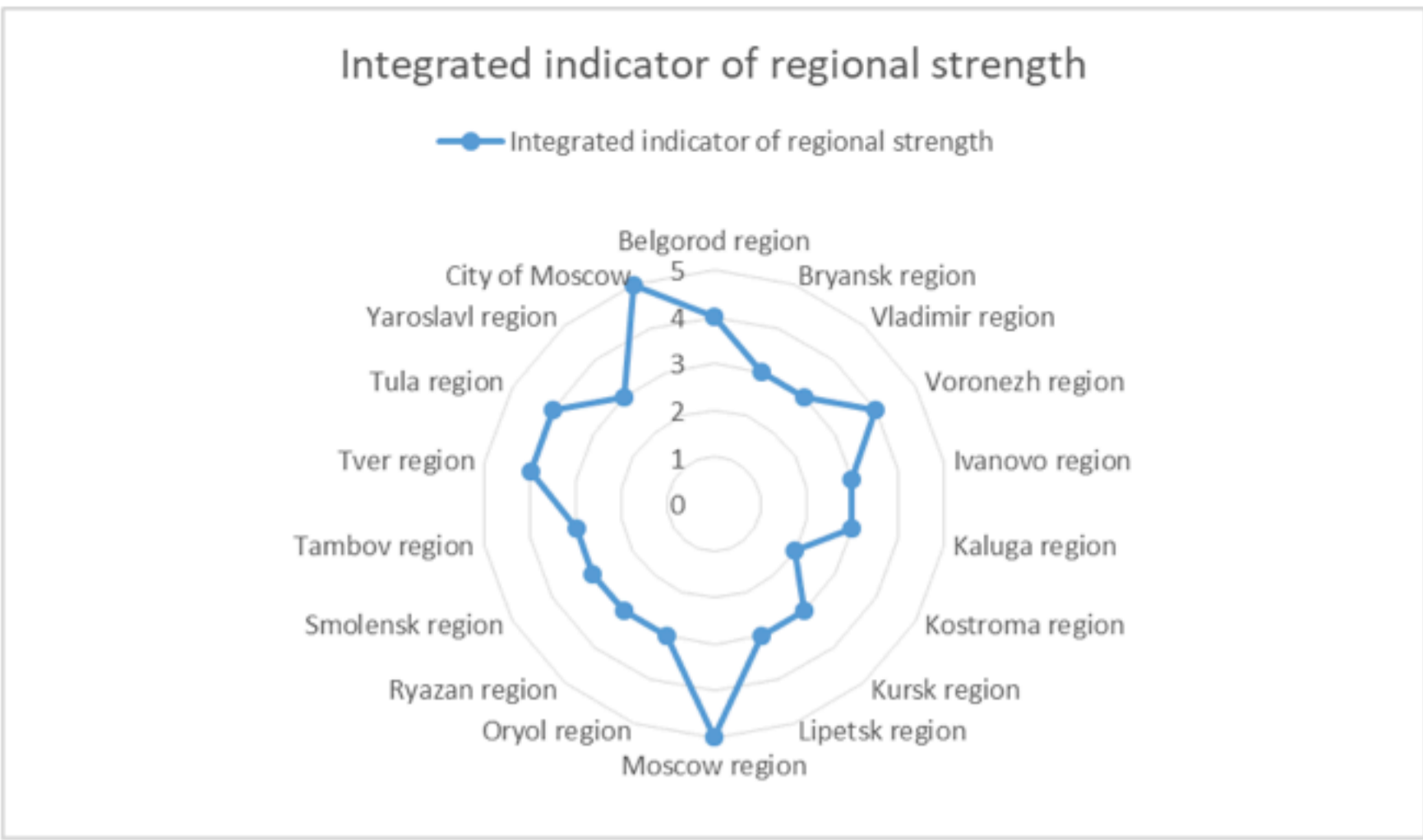
Figure 3
Star of landmarks of the integrated indicator of economic security of the CFD regions for 2007
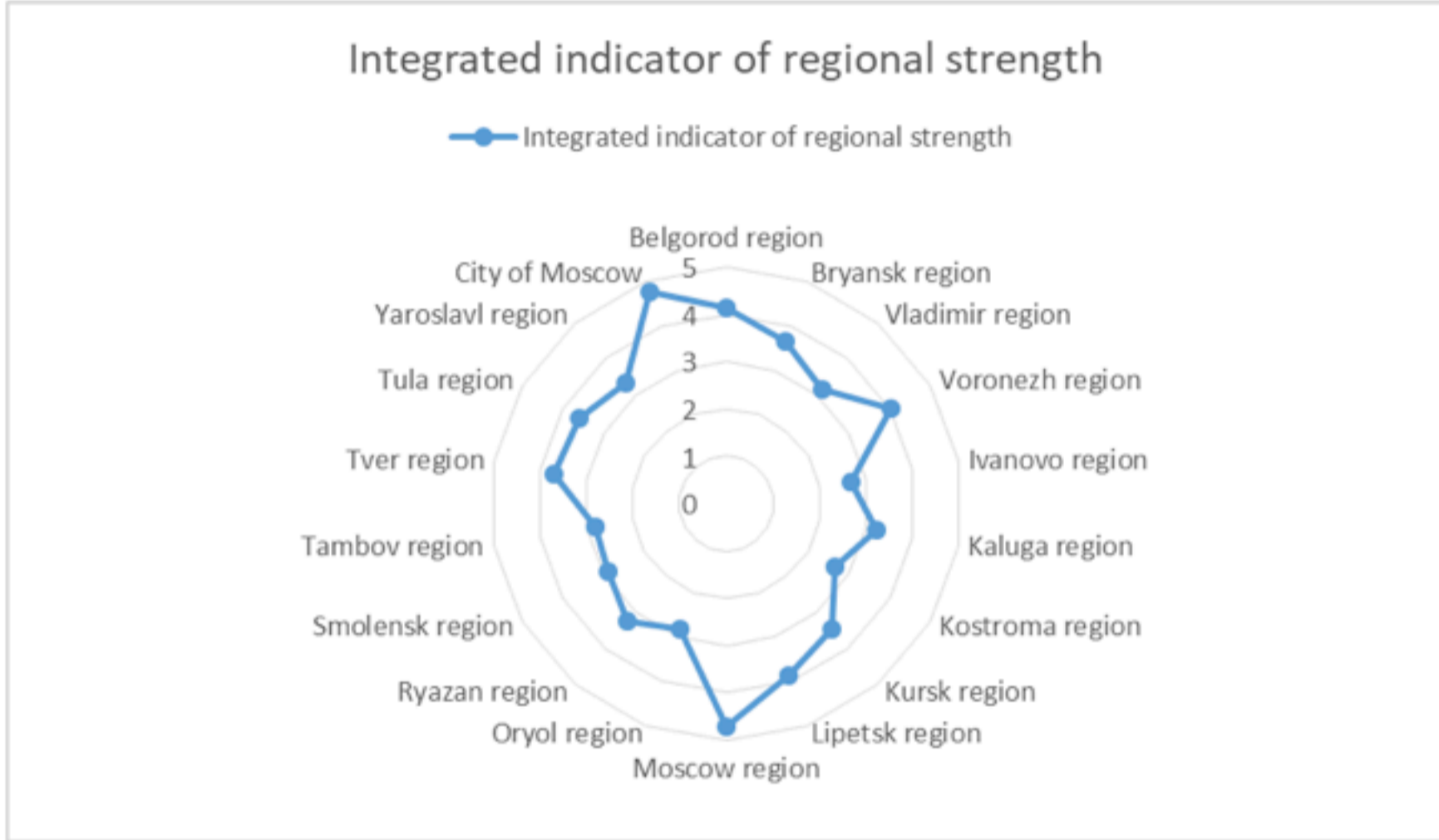
Figure 4
Star of landmarks of the integrated indicator of economic security of the CFD regions for 2013

Figure 5
Star of landmarks of the integrated indicator of economic security of the CFD regions for 2014

Figure. Integrated indicator of regional strength
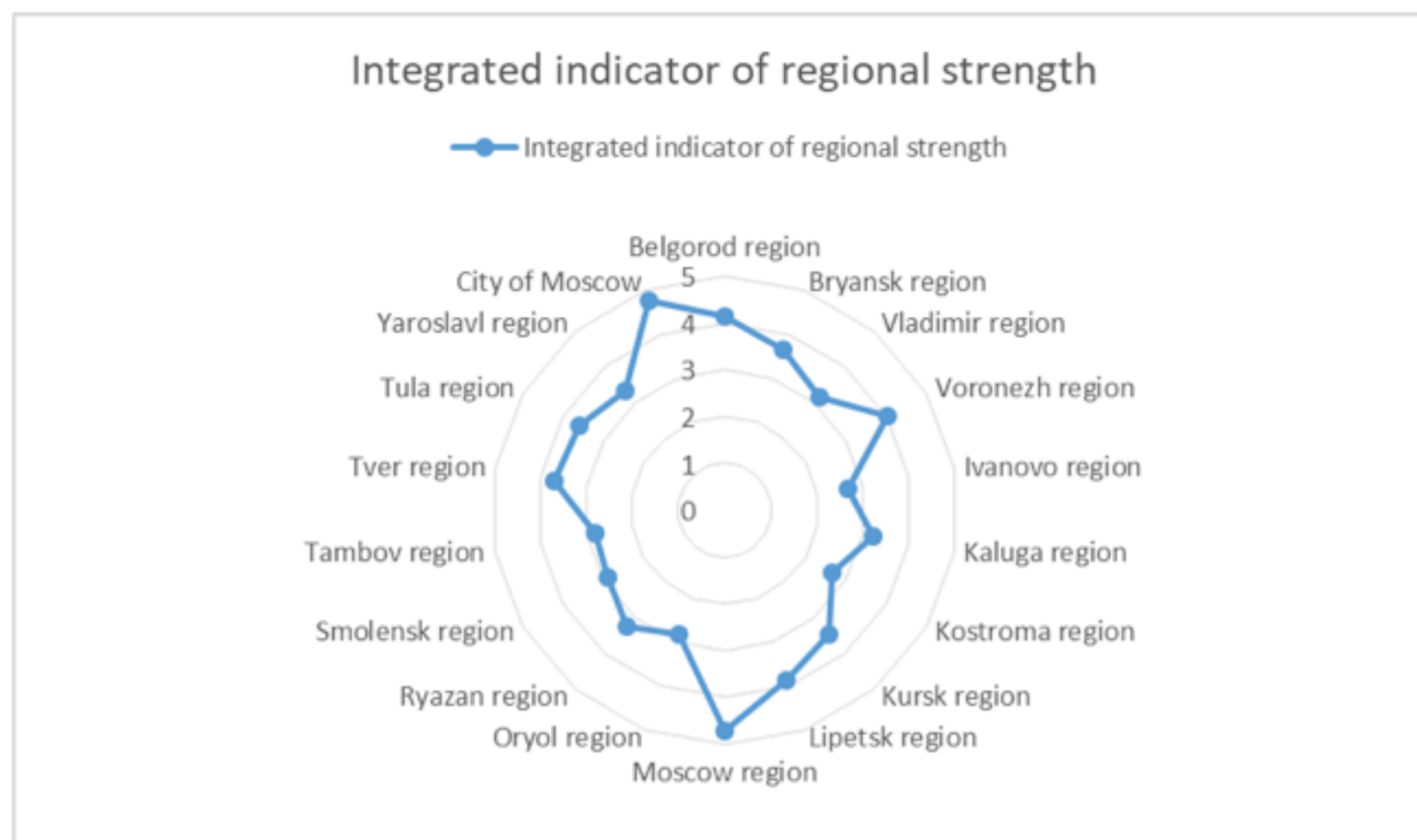
Analysis of the regional strength of the CFD reflects the overall trend towards an increase in the level of development of territories, ensuring their economic security and stabilizing the chosen strategy for socioeconomic development of regions. Besides, the analysis carried out using the proposed method revealed that the GRP structure of the district is characteristic of the macroeconomic region of industrial-postindustrial type: agriculture 2.3%, manufacturing 22.8% (including processing industries – 18.7%), construction 4.8%, transport and communications 8.6%, market services 50.2%, non-market services 11.2%. The role of the CFD is the greatest in production of electricity (22.1% of the total Russian volume), rolled ferrous metals (19.2%), steelmaking (17%), production of dairy products (35%), bakery products (29.1%), vodka, liqueurs and spirits (37.9%), various types of fabrics (30%), certain types of products of chemical and petrochemical industry. The district has a developed rocket and space industry, aircraft construction, electronic and radio industry, production of precision equipment, numerical control machines, railway machinery, robotics, defense industry complex, chemical and petrochemical industry. The leading branches of the food industry are sugar, flour, grain, butter, meat, alcohol, confectionery, fruit, vegetable and tobacco industries.

All the CFD regions differ in terms of socioeconomic development. According to the "Strategy of CFD socioeconomic development for the period through to 2020", the CFD accounts for about 33% of revenues to the budget of the Russian Federation, 43.2% of Russian exports and 57.7% of Russian imports. A distinctive feature is the fact that the city of Moscow and Moscow region are both the largest sources of revenue of the state budget and the largest consumers in all markets for goods and services. Presence of such regions in the CFD widens the gap with the rest of the regions in the district and facilitates outflow of qualified personnel to more developed regions, which worsens the socioeconomic situation not just in the CFD, but in other regions of Russia as well.

Russia's GDP and GRP of the regions of the CFD, as well as the value of fixed assets, have increased over the past decade. There was an increase in the total volume of the gross regional product of the CFD regions by 1,543.61 bln rub. or 8.85% in 2013 compared to 2012, and by 2,913.78 bln rub. or 18.14% compared to 2011. The maximum 2011 GRP was recorded in the city of Moscow (9,948.77 bln rub.), the Moscow region (2,176.80 bln rub.), the Belgorod region (507.84 bln rub.), the Voronezh region (474.97 bln rub.). The situation with the leading regions in terms of GRP remained unchanged in 2013: the city of Moscow (11,632.51 bln rub.), the Moscow region (2,551.28 bln rub.), the Voronezh region (606.67 bln rub.), the Belgorod region (569.41 bln rub.).

Estimation of GRP of the CFD regions per 1,000 people revealed an increase in this indicator by 18.54% or by 58.86 mln rub. in 2012-2014. The increase in GRP was mainly due to the growth in GRP in the Tambov region (by 37.87%), the Ryazan region (by 31.00%), the Bryansk region (by 30.42%), the Voronezh region (by 27.92%), the Oryol region (by 27.12%) and the Smolensk region (by 26.07%).

The Ivanovo region (121.95 mln rub.), the Bryansk region (137.19 mln rub.) and the Tambov region (159.54 mln rub.) were outsiders in terms of GRP per 1,000 people in 2013. The picture did not change significantly in 2014: the Ivanovo region (150.79 mln rub.), the Bryansk region (178.93 mln rub.) and the Oryol Region (212.87 mln rub.) were outsiders.

The city of Moscow (859.36 mln rub.), the Belgorod region (331.01 mln rub.) and the Moscow region (304.34 mln rub.) were leading regions in terms of GRP per 1,000 people in 2013. The leading regions strengthened their positions in 2014: the GRP per 1,000 people was 965.84 mln rub. in the city of Moscow, 369.14 mln rub. in the Belgorod region, 359.80 mln rub. in the Moscow region.

The analysis of differentiation in terms of economic development indicators demonstrates that the higher the average growth in the region, the stronger the strengthening of territorial disproportions. However, this phenomenon cannot be regarded as unequivocally negative – most likely, there is a general pattern of economic development, when a number of territories spurt into the lead in periods of intensive growth. Unevenness is later gradually smoothed out under favorable conditions, which undoubtedly requires a corresponding policy of subfederal government bodies.

Availability of significant disproportions in the regional development of the country must be noted in terms of the investment activity of the regions. Unevenness of socioeconomic development of Russian territories can be traced even within one federal district, which creates a serious problem for ensuring an equally high level of living standards in the regions. The CFD is the center of the country's investment attractiveness and ranks first in Russia in terms of investment in fixed assets and per capita, which amount to 24-27% throughout the entire period under study. However, only 3-4 regions successfully develop in the CFD. In other cases, either multidirectional development trends or the dominance of problem zones in the socioeconomic development of regions are observed. The analytical data confirmed the existence of a problem of territorial disproportions in the development of the CFD regions. For example, the city of Moscow and the Moscow region account for about 70% of the CFD investment, while the Ivanovo, Kostroma and Oryol regions are described by the lowest levels of investment attractiveness in the district – about 1%. The Voronezh region stands out, consistently ranking third in terms of investment in the CFD fixed assets since 2009. It is one of the leading Russia's regions in terms of the investment growth rate. The Lipetsk region demonstrates similar high growth rates.

There has long been a shortage of financial resources, which causes the resulting imbalances of regional and local budgets. The problem of increasing tax revenues of the budgets of territories has particularly intensified recently due to the growing crisis phenomena in the economy. The importance of tax revenues in the budgets of the regions in terms of the functions of these budgets must be noted, as regional budgets are the main sources of funds for the performance of government functions within the regions of the Russian Federation.

The CFD holds the leading position in the Russian Federation in terms of the number of created advanced manufacturing technologies. The first place among the CFD regions in terms of creation of advanced production technologies in 2011 belongs to the city of Moscow (733 developments), the second place belongs to the Moscow region (252 developments), the third place belongs to the Voronezh region (59 developments). There are more CFD enterprises using advanced manufacturing technologies in their activities, as well as the technologies used. A comparative analysis of the data reveals that there are much more enterprises consuming innovations (60,169) than those producing them (1,445). On the one hand, the fact that a large number of enterprises in the CFD use innovative technologies can be considered encouraging, but on the other hand, there are still far less newly developed innovations. This indicates that an increase in the demand for innovation will lead to intensification of the work of enterprises that create them in the near future.

Besides, innovation activity influences the process of production of finished products. The industrial production index in the CFD was higher than in Russia in 2013, but lower than in the Far Eastern and Volga federal districts.

Despite the increase in the number of innovative developments and the growing interest of industrial enterprises in their implementation, the number of developing organizations steadily declines (Figure 1). This decline is observed both in the state and non-state sector of the economy. The above negative

trends can also be found in case of consideration of how these changes influence the number of people employed in science and their share in terms of the number of people employed in economic activities. The data in Figure 2 indicate both the existence of a significant potential of academic specialists and its inexorable decline (and indirectly its aging as well) due to the lack of economic incentives for quality work.

The dynamics of the development of indicators of innovation infrastructure is not distributed among the CFD regions uniformly. In 2006, the city of Moscow ranked first in terms of the level of innovation infrastructure development, while the Kursk region significantly "lagged behind" in terms of performance but still ranked second. Negative dynamics were observed only in the Kostroma region. The dynamics changed significantly by 2007: there was a significant decline in performance in many regions – for example, the indicators improved 108 times in the Belgorod region. There was a significant improvement in performance in a number of regions in 2009 (the Ivanovo, Lipetsk, Moscow, Smolensk regions and the city of Moscow). For example, the level of development of the innovation infrastructure of the Kursk region had not changed significantly over the period from 2007 to 2009 and showed negative indicators. The indicators of the Kursk, Oryol, Ryazan and Yaroslavl regions gained a positive momentum in the development of innovation infrastructure by 2010. The Kursk region continued to improve performance and ranked second among the CFD regions in 2011. The city of Moscow has also showed a positive development trend over the past 5 years and has the highest rates relative to other regions. All regions except for the Voronezh and Oryol regions achieved positive performance in the development of innovation infrastructure by 2012.

4. Discussion

The CFD has a significant innovation potential and a fairly developed innovation complex. Demand for innovative technologies is unevenly formed and is largely defined by the impact of global processes on the economy of the country, economy of the region and its industry. According to the results of the study and official data on the CFD, the innovation leaders are such sectors of the economy as production, processing industries, services, including communications and telecommunications, as well as activities related to the use of computer technology and information technology.

Given that about 80% of scientific personnel and skilled workers are concentrated in the CFD, especially at enterprises that traditionally serve the defense industry complex, it should primarily focus on the development of an innovation economy. The CFD population has gradually decreased over the past decade. As a result, the scarcity of labor resources, primarily in highly skilled workers, is currently becoming more acute. The city of Moscow is the most prosperous demographic region in the district. Based on the strategic line of its demographic development, i.e. solution of demographic and migration problems in the context of protracted depopulation in Russia and efficient increase in the socioeconomic potential of the city, which provides more than a fifth of the growth of the gross domestic product and thereby broadens the conditions for overcoming poverty both in the city of Moscow and across the country in general, the aim of the policy can be curbing population growth, i.e. stabilization of the population of the city at the current level.

In the context of modernization of the economy branches and large-scale technological reconstruction of the industry, the human resourcing factor has a significant direct impact on the innovation-driven growth of the region and its innovation activity. The results of the conducted analysis indicate a negative trend in the reduction of scientific and educational personnel in innovation activities and, consequently, reduction in the number of organizations that carry out research and development. The special role of the CFD in the statistics of the reduction in human resourcing of innovation activity is traced when comparing indicators for 2011 and 2013:

- 49% reduction in the number of organizations that carried out research and development in Russia (reduction by 77 organizations) fell on the CFD regions (38 organizations);
- 64% reduction in the number of personnel performing research and development in Russia (reduction by 8,244 people) fell on the CFD regions (reduction by 5,276 people, of which 274 people are from the Moscow region);
- there was a decrease in the number of graduate students by 24,277 people in Russia, 37% of which fell in the CFD regions (reduction by 9,150 people).

5. Conclusion

So far, no efficient human resourcing in innovation activities has been formed in the CFD regions, innovation processes are carried out in the absence of specially trained personnel. Undoubtedly, the capital regions (the city of Moscow and the Moscow region) are exceptions, as they are regions of concentration of highly qualified human resources, primarily due to migration. A negative part of this situation is that a strong differentiation of the capital and non-capital regions is formed in terms of human resources, which contributes to social tension. Analysis of the key quantitative indicators of financial provision of innovation, scientific and technical activities in the CFD regions reveals that the costs associated with the implementation of innovation activities tend to grow. The calculated relative indicators of financial provision of the innovation sector in the CFD regions showed the following results:

- The share of domestic expenditures for research and development of the CFD regions in the CFD gross value added is double the share of domestic expenditures for research and development of the Russian Federation in the country's GDP (for example, 2.12% and 1.12% in 2012 respectively), which indicates an increased financial provision of research and development in the district;
- The share of costs for the CFD fundamental research in the CFD gross value added for 2010-2013 decreased annually by about 8%;
- The share of costs for CFD applied research in the CFD gross value added for 2010-2013 grew every year (by 7% in 2012 compared to 2011); and
- The excess of the share of costs for scientific fundamental research in the CFD gross value added, compared with the fundamental ones, indicates the priority of applied research (the corresponding difference was 1.4 times in 2012).

Analysis of financial provision of innovation activities in the context of costs for technological innovation revealed that the dynamics slowed down its growth in 2011-2013 across the CFD in general. While the growth rate was 165.2% in 2011 (i.e. the costs increased by 165.2% compared to 2010), it was 10.6% in 2012 (i.e. costs in 2012 increased by 10.6% compared to 2011) and only 0.1% in 2013 (the authors believe that it is an extremely low growth rate). A large-scale reduction in this type of costs was noted in the Belgorod, Ivanovo, Kostroma and Lipetsk regions.

According to the assigned scores, the CFD regions can be divided into three groups, among which the leading regions can be identified: the city of Moscow, the Moscow, Voronezh and Belgorod regions. The second group of regions with average indicators in terms of the level of development includes: the Yaroslavl, Vladimir, Tula, Lipetsk, Tver, Tambov, Ryazan, Ivanovo and Bryansk regions. The third group includes such regions as the Smolensk, Kostroma, Kursk and Oryol regions.

Acknowledgement

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1. Federal State Autonomous Educational Institution of Higher Education "Belgorod National Research University", 308015, Russia, Belgorod,

2. Federal State Autonomous Educational Institution of Higher Education "Belgorod National Research University", 308015, Russia, Belgorod,

3. Belgorod Institute of Education Development, 308007, Russia, Belgorod Federal State Autonomous Educational Institution of Higher Education "Belgorod National Research University", 308015, Russia, Belgoro, E-mail: nikulina_31@mail.ru

[Índice]

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