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THE DIMENSION OF INNOVATION IN THE ECONOMIC SECURITY OF RUSSIAN REGIONS

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Abstract

Economic security is a focal point for regional development in the context of the volatile geopolitical situation. Ensuring economic security requires achieving sustainable economic growth. The study focuses on the role of innovation in the system of regional economic security by considering the innovative activity as an indispensable condition for the long-term development of the regional economy. The article emphasises the significant divergence of Russian regions by the level of innovative development. The innovation space of the Western borderland of Russia is differentiated into three types of territories: growth poles, semi-periphery, and periphery. Regional innovation and economic security policies should take into account substantial variation in innovation security objectives and threats between regions.

Keywords: *economic security, economic growth, innovation development, regional policy, innovation security, competitiveness*

1. INTRODUCTION

The instability of macroeconomic and geopolitical conditions force countries to pay more attention to the status of their economic security, including maintaining economic sovereignty and reducing the dependence of critical sectors of the national economy on foreign counterparts. Ensuring the security of the national economic system is one of the most important issues for state administration. No less relevant this issue is for the regional level of public authorities with each regional administration participating in an inter-regional competition for resources (Sosnovskikh, 2017; Kryukova et al., 2016). A comprehensive, adequate and timely assessment of threats and priorities of economic development of a country and its regions is of great importance for the elaboration of effective economic policies and the adoption of appropriate measures to achieve the sustainable development goals. One of the significant elements of economic security is innovation security (Bagaryakov, 2012; Golova and Sukhovey, 2018; Kuznetsova, 2015). The innovation process is the primary driver of long-term economic development (Mikhaylov, 2018; Spolaore and Wacziarg, 2013; Thomson and Webster, 2013). Consequently, sustainable and balanced development of the national innovation system should be considered as the vital interest of the state economic security.

Considerable territorial diversity of the Russian Federation and strong differentiation between regions by the level of social, economic, as well as innovation development (Crescenzi and Jaax, 2017; Eferina et al., 2017; Popov et al., 2011) places great importance not only to maintaining economic security at the national level, but also to study the interests and threats to the economic systems of its subjects (e.g. Oblast, Krai, Okrug, Republic). At the end of the first decade of the twenty-first century, there was an update of the fundamental documents in the field of national security of Russia. In 2010, the new law "On Security" came into force, according to which the concepts of "security" and "national security" are considered synonymous. Earlier in 2009, the "National Security Strategy of the Russian Federation until 2020" was adopted, which at the legislative level establishes the definition of national security as "the state of protection of an individual, society and the state from internal and external threats, allowing to ensure [among other things] the sustainable development of the Russian Federation". However, an important issue of systematisation and disclosure of the essence of various types of security, primarily economic, remained unresolved.

After more than 20 years of terminological uncertainty – from the moment the Federal Law "On State Regulation of Foreign Trade Activity" declined in 1995, the definition of economic security was finally legislated in 2017, when the Economic Security Strategy of the Russian Federation until 2030 was adopted: "The state of protection of the national economy from external and internal threats, which ensures the economic sovereignty of the country, the unity of its economic space, the conditions for implementation of strategic national priorities of the Russian Federation".

The complexity of the economic security concept has been repeatedly emphasized by Russian scholars, especially in the context of a long period of institutional silence (Abalkin, 1994; Agarkov and Zykov, 2011; Buchwald et al., 1994; Kazantsev, 2010; Uskova et al., 2011), which found expression in highlighting a number of aspects of its provision: social, political (incl. foreign policy), environmental, scientific and technological (S&T), innovation, and cultural.

The article focuses on innovation and S&T aspects of economic security related to modernisation and technological re-equipment, ensuring industrial and technological security of production, developing and introducing advanced equipment, technologies and innovative solutions to the economy, increasing global competitiveness. The research scope is determined by the growing importance of the dimension of innovation in the national economic system of Russia in the light of increasing domestic demand for shifting the raw materials' dominant position in the national economic structure under global market fluctuations. The study aims to clarify the relationship between the concepts of innovation development and economic security and to determine the influence of innovation in ensuring the economic security of Russian regions in the context of geopolitical turbulence. The subjects of the Western Russian border regions as strategically significant regions bordering with European countries are analysed.

The paper continues with drawing parallels between economic security, economic growth as its most important factor, and innovation as the basis for long-term economic growth. The research design describes the adaption of the official state methodology of evaluating the innovation component of the economic security of Russian subjects to the assessment of innovation security as an individual index. The results of the study demonstrate the dynamics of indicators of innovative development of five borderland territories of Russia: Smolensk, Kaliningrad, Leningrad, Rostov regions, and the city of St. Petersburg. The study concludes with a discussion on the role of innovative development in ensuring the economic security of regions and policy recommendations.

2. LITERATURE REVIEW

National economic security policy primarily involves creating a favourable environment for the balanced development of the state economic system in the long run. The indispensable condition is economic growth, which has a positive impact on the entire economy of the state, contributing to the revitalisation of industrial activity and raising the standard of living of the population. Sustained economic growth is accompanied by an increase in investment and innovation, forming the basis for technological modernisation of the economy and increasing its competitive potential. Reducing competitiveness of the national economy is a direct threat to its economic security; therefore, the state is interested in pursuing an active economic policy aimed at stimulating the most important factors of economic growth – innovation and labour productivity (Andergassen et al., 2018; Fleisher et al., 2010; Morris, 2018; Ablaev, 2018; Tevdovski et al., 2017; Yen and Wai, 2017).

The relationship between innovation, economic growth, competitiveness, globalisation, national and regional security has been explored in numerous studies (Battisti, 2017; Burnasov et al., 2015; Korres et al., 2013). Corrado et al. (2005; 2009) made a significant contribution in proving the decisive importance of intangible assets for economic growth that forms the basis of any innovation activity. These include software, electronic databases, R&D, mineral resources exploration, copyright, patents, licenses, product development and design, engineering, economic competence (brand, human capital, organisational capital), etc. Empirical research held by Capello et al. (2011) demonstrates the existence of a direct relationship between the increase in R&D and labour productivity. Investments in new equipment and technology generally result in increasing efficiency of production activities, leading to an increase in overall labour productivity in the economy.

Much attention to the relationship between competition and innovation was first paid by Schumpeter (2007). He concluded that extensive competition has a negative impact on innovation. Confirmation of this thesis is found by Blundell, et al. (1999), Greenhalgh and Rogers (2006), Hall (2000), who show that with a decrease in competition as a result of market interventions, the rate of return on R&D increases, and this, in turn, is a catalyst for a subsequent increase in investment in this area. Further studies that developed the neo-Schumpeter approach demonstrate the nonlinearity of the relationship between competition and innovation (e.g. Aghion et al., 2005; Archibugi et al. 2013; Arrow, 1962). With a lower level of competition, the incentives to innovate are higher: technology leaders tend to invest in innovation to gain temporary monopoly advantage and super income, and technology followers to increase productivity and level of competence. When competition becomes too tough, the level of innovation activity falls. In this context, from the standpoint of national economic security, the state has the right to implement a protective policy aimed at supporting strategically important sectors of the economy.

In general, the relationship between the national security of the country and its innovative development has found expression in the development of the concept of innovation security as an essential element of economic security (Golova and Sukhovey, 2017; Kormishkin, et al. 2013; Sakovich and Brovka, 2016). The essence of ensuring the innovation security of a country is to maintain sustainable long-term development of the national innovation system by promoting innovation processes that meet national interests and blocking or reducing the influence of factors that destabilise, lead to degradation or disintegration of the innovation system (Mikhaylova, 2018). The implementation of the concept of innovation security should be carried out within the framework of state innovation policy. States with more active innovation policies and mechanisms for increasing human capital tend to have a more favourable environment for gaining competitive advantages not only from domestic R&D but also when absorbing external knowledge and innovation generated in other countries (Cohen

and Levinthal, 1989; Griffith, et al. 2004; Guellec and van Pottelsberghe de la Potterie, 2004; Khan and Luintel, 2006; Smith and Thomas, 2017).

Innovation activity, being associated with high risks and uncertainty, is highly dependent on the innovation environment in which it is conducted. Its success is largely determined by a set of economic, institutional, cultural, organisational, geopolitical and other factors and conditions that promote or hinder the innovation process (Boschma, 2005). The systematic generation of innovations requires a stable and favourable economic and political situation in the country in the long run. A significant role for innovation is integration into the global innovation system and the availability of international channels of knowledge flow (Bathelt et al., 2004). The ability to use external sources of knowledge (for example, through R&D collaborations, joint ventures, licenses, contracts, inter-company relations) is crucial for the internationalisation of national innovative companies and their competitiveness in the international market (Fosfuri and Tribo, 2008; Zahra and George, 2002).

The study held by Filippetti et al. (2017) revealed the relationship between foreign direct investment (FDI), innovative activity and absorbing capacity. For countries with high absorptive capacity, there is a positive correlation between FDI outflow and patent activity. Such countries benefit from investment in foreign innovative projects. In countries with low absorbing capacity, external FDI plays a negative role in local innovation processes, inhibiting the rudiments of innovation activity. Import of innovations for these countries is also crucial for enhancing innovation as well as export.

3. METHODOLOGY

The study considers the innovation efficiency as a determining factor for economic security and long-term competitiveness of the regional economy. The method for evaluating the role of innovations in the economic security of the Russian regions is based on a methodological approach enshrined in the Strategy for Economic Security of the Russian Federation until 2030. The official methodology implies an indirect assessment of the innovation component as it is regarded as part of economic security. Therefore, the indicators for the S&T potential and the competitive development of the national economy are applied. Maintaining competitiveness and a high scientific and technological level of development has been put forward as the most important goals of state policy to ensure national economic security in the long term.

The research redesigns the official state methodology from viewing innovation as a supplementary factor of economic security to setting it as an individual mode of security. Among the eight priorities for achieving strategic goals by 2030 set in the Strategy, three affect the innovation sector: 1) economic conditions for technological and innovation development; 2) human potential; 3) efficient use of competitive advantages of export-oriented industries. Characteristics of the effectiveness of public policy in these areas are presented by monitoring 6 out of 40 indicators of the state of economic security. These are:

- the share of investments in machinery and equipment in the total investment in fixed assets;
- the share of innovative goods, works, services in the total volume of goods, works, services shipped;
- the share of high-tech and knowledge-intensive industries in the gross domestic product (GDP);

- the share of organisations implementing technological innovations;
- the share of innovative goods, works, and services in the total volume of goods, works, and services of industrial enterprises shipped for export;
- the distribution of the number of people employed in the economy by the level of education in % of the total number of people employed.

All of the indicators are relative, have an annual calculation period based on official statistics of the Federal State Statistics Service of the Russian Federation (Rosstat) and are available in an aggregated form for the country and its subjects, which makes it possible to use them for regional studies in dynamics. The aforementioned indicators have been widely used in practice in assessing innovation development and economic security at the macro- and meso-levels and are part of the system of state monitoring of the national economic security of Russia – one of the tools of innovation policy. Therefore, their consideration is justified for the quantitative assessment of the role of the innovation factor in the economic security of Russian regions.

The study covers five subjects of the western territories of Russia: Smolensk, Kaliningrad, Leningrad, Rostov regions, the federal city of St. Petersburg. These regions belong to a special type of territories – borderland regions, characterised by pronounced specificity in ensuring economic security. The high sensitivity of the border economies of the Russian regions to changes in international relations with Western countries makes them vulnerable in the face of increasing geopolitical uncertainty. The innovative sector of regional economies feels the most powerful impact of the external factor as the most risky and networked. The choice of administrative and territorial entities for research purposes is due to several factors: firstly, their economic and geographical position in the border area of the European part of Russia implies closer economic, scientific and technological links with neighbouring regions of Western countries; secondly, the presence of an exclave – the Kaliningrad region, where the border specificity in ensuring economic security is most pronounced; thirdly, their strategic importance for the national security of Russia; fourthly, their regional strategies focused on developing innovative economies.

The statistical base for the regions under study is formed for the period 2011–2016. For comparative analysis, the national average values are included. The research limitations include the absence of data on the share of innovative goods, works, services in the total volume of exported goods, works, services of industrial enterprises for Smolensk region – 2015, and Kaliningrad region – 2013, 2015. The limitation mentioned above had a minor effect on the research results and did not violate the overall results due to a small share.

4. RESEARCH RESULTS

In 2011 – 2016 Russia was characterised by a negative trend in the share of investments in machinery and equipment in the total volume of investments in fixed assets: from 37.9% to 31.5%. Among the main factors – inhibitors are: the uncertainty of the economic situation in the country, incl. because of the sanctions policy of Western countries and the introduction of retaliatory measures by Russia; lack of own financial resources from companies against the background of a high percentage of commercial loans and a complex mechanism for obtaining them. The effect of these factors by 2016 was, on the one hand, a reduction in investments from attracted sources with an increase in the share of own funds of Russian companies to 51%, on the other – a decrease in the number of business entities purchasing foreign fixed assets, up to 32% compared to peak reached in 2013 at the share of 46%.

Formally, the decrease in the share of organisations introducing foreign machinery and equipment in 2011–2016 is a positive factor in strengthening innovation security due to the reduction of dependence on foreign technologies. However, its consideration in conjunction with the negative dynamics of the total investment (incl. attracted investments), the oppression of international business activity by sanctions, the decline in national currency exchange rate, as well as the decrease in companies' profits makes it obvious that the refusal to modernize fixed assets using foreign technologies was not the result of a domestic producer's gain in competition, but a decrease in access (and affordability) to foreign markets for machinery and equipment. Such difficulty in technological exchange is one of the threats to innovation security since it affects the efficiency of the production activities of economic entities, which have to revise and optimise their internal strategies for modernisation and technical re-equipment.

Most regions of the western part of Russia are characterised by a repetition of a country-wide trend in the dynamics of investments in machinery and equipment with a drop of 2015 (Table 1). The smallest share of investments in machinery and equipment among the regions of the West of the Russian Federation is in Kaliningrad, Leningrad and Rostov regions, which in 2011–2016 rarely reached the average Russian level for this indicator.

The territorial distribution of investments in machinery and equipment per capita among the Russian subjects of the Western borderland is highly divergent. The following can be distinguished: the growth pole with high economic activity – the city of St. Petersburg and the Leningrad Region (40.9 and 48.8 thousand rubles per person, respectively); semi-periphery with a significant amount of investment in the framework of federal targeted programs – the Kaliningrad region (21.2 thousand rubles per person); the periphery – Smolensk and Rostov regions (19.1, and17.4 thousand rubles per person, respectively).

Table 1. Major indicators of the innovation security of the Western borderland of Russia in 2010 – 2016, %.

Indicator	Year	Russia	Smolensk	Kaliningrad	Leningrad	St. Petersburg	Rostov
Share of investments in machinery, equipment and vehicles in total fixed capital investments	2011	37.9	38.1	33.3	36.2	46.2	38.8
	2012	37.6	48.0	29.5	25.6	43.9	42.3
	2013	38.8	52.5	36.7	32.1	53.3	36.2
	2014	36.3	50.1	32.1	37.1	44.6	33.7
	2015	31.5	43.4	32.0	33.4	40.2	29.2
	2016	31.5	52.2	28.8	35.9	43.5	34.8
Share of employed with higher education in the average annual number of employed in the economy	2010	28.9	26.7	32.1	26.7	43.8	28.6
	2011	29.5	28.0	33.0	25.3	44.8	28.7
	2012	30.4	27.9	31.3	26.1	44.6	29.1
	2013	31.7	29.9	31.4	26.6	44.4	31.2
	2014	32.2	29.3	31.0	26.5	41.1	31.3
	2015	33.0	32.0	31.1	26.1	42.6	30.9
	2016	33.5	30.3	31.0	29.3	42.3	28.5
Share of innovative enterprises that introduced technological innovations	2010	7.9	5.2	2.4	7.3	10.9	6.6
	2011	8.9	5.8	3.3	7.6	16.1	5.8
	2012	9.1	5.7	3.8	8.7	16.6	8.1
	2013	8.9	5.6	3.8	9.4	16.2	7.2
	2014	8.8	5.9	1.6	8.0	16.8	8.8

	2015	8.3	6.2	3.4	8.4	14.8	9.2
	2016	7.3	6.2	3.6	6.8	13.8	7.8
Share of innovative goods, works, and services in the total volume of shipped goods, works, and services	2010	4.8	2.3	0.1	2.4	8.0	4.8
	2011	6.3	1.5	0.2	2.5	9.0	4.9
	2012	8.0	1.9	0.3	1.1	12.1	7.1
	2013	9.2	3.0	0.1	2.8	12.2	8.9
	2014	8.7	5.9	0.1	5.9	12.0	10.9
	2015	8.4	2.7	0.4	2.0	7.3	14.3
	2016	8.5	1.8	0.2	2.3	8.7	14.5
Share of innovative goods, works and services in the total exports of goods, works, and services by industrial organisations	2010	4.5	8.7	0.5	3.4	2.9	1.7
	2011	8.8	5.7	0.1	9.0	3.8	3.8
	2012	12.1	4.2	0.0	0.4	4.3	10.6
	2013	13.7	0.7	-	6.5	14.7	13.6
	2014	11.5	0.0	-	4.2	14.7	24.7
	2015	8.9	-	-	1.9	4.2	37.2
	2016	8.4	0.0	0.2	2.4	2.1	37.5
Share of high-tech and knowledge-intensive industries in the gross regional product	2010	19.7	19.3	20.1	15.0	30.3	20.0
	2011	19.7	19.6	22.4	13.7	29.6	21.2
	2012	20.3	19.9	23.0	12.2	30.9	20.3
	2013	21.1	20.0	25.6	12.2	30.2	20.8
	2014	21.8	21.3	28.2	13.7	31.7	21.1
	2015	21.3	22.2	22.5	14.9	30.8	20.2
	2016	21.6	21.9	23.0	15.2	29.8	20.9

Source: based on Rosstat (2018)

For the intensification of innovation processes and the development of the innovation economy, not only the amount of investments, but also their sectoral concentration is of great importance. The distribution of investments in fixed capital by type of activity demonstrates that with the current structure of investments in Russia and its western regions being dominated by non-production sectors the active growth of high-tech, knowledge-intensive industries are unexpected (Fig. 1). There is a lack of investment in the real sector of the economy, incl. directed to the modernisation of production.

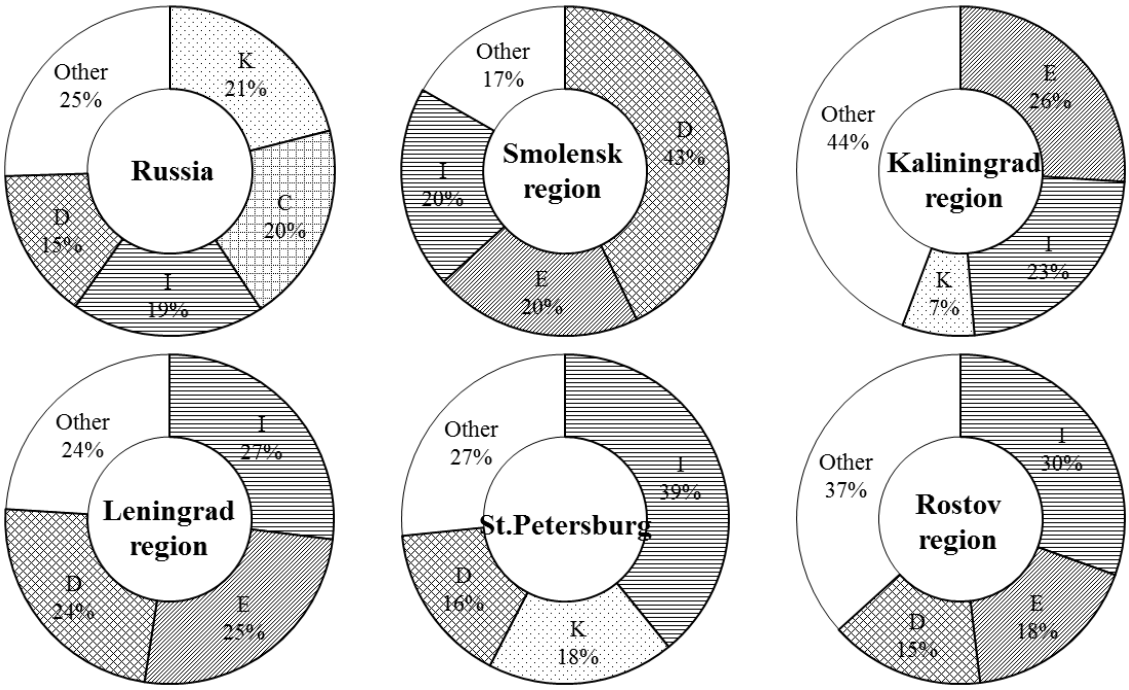

Figure 1. Distribution of investments in fixed capital of the Western borderland of Russia by type of activity in 2016, %.

Legend: C - Mining; D - Manufacturing; E - Production and distribution of electricity, gas and water; I - Transport and communications; K - Real estate operations, rent and provision of services;

Source: based on Rosstat (2017)

The 2010 – 2016 is marked by an increase in the share of persons with higher education in the economy: from 28.9% to 33.5%. Among the regions of the Western part of the Russian Federation, the highest level of education of the employed population is registered in the city of federal importance – St. Petersburg, which is explained by the urbanisation of its economy (Table 1). Three subjects (Kaliningrad, Rostov regions, St. Petersburg) are marked with negative structural changes towards reducing the proportion of those employed with higher education. The main reasons are the significant inflow of low-skilled labour and the outflow of intellectual resources ("brain drain"). In the period under review, the majority of the studied subjects are donors of labour resources with an excess of the number of people leaving for work on the number of people entering. The only exception is St. Petersburg, which is the attractor of the working population in the western part of Russia.

The economic security of the region, in the long run, is directly related to the interest of the business sector in the conduct of innovation, its involvement in the innovation process. A significant innovation pole in the Western part of the Russian Federation is St. Petersburg with a share of organisations implementing technological innovations significantly higher than the average Russian level – 13.8 against 7.3% in 2016 (Table 1). The indicators are close to the average values for Russia in 2010–2016 demonstrated the Leningrad and Rostov regions (6.8 and 7.8%, respectively, in 2016), and also with some lag – the Smolensk region (6.2% in 2016). In these three regions, the manufacturing industry as the main driver of technological innovations occupies a significant share in the structure of investments in fixed capital (see Fig. 1). The exclave Kaliningrad region is in the innovation periphery of the Western border of Russia.

By 2016, the Russian Federation and its subjects are characterised by a decrease in the share of organisations undertaking innovative activities (Table 1). The decisive factors that impede technological innovations in this period are mainly economic, related to the lack of own funds of companies with the high cost of innovations and growing economic risks (see Innovation activity in Russia, 2017). The main internal inhibitor factor is a lack of qualified personnel, and the framework factor is the underdevelopment of the legal environment governing innovation. For the regions of the Western part of the Russian Federation, where the innovative activity of economic entities is higher, the influence of these factors on the economy turned out to be more significant (Table 2).

Table 2. Factors hindering technological innovation by federal districts of Russia in 2015, by share of organisations.

Factors	Russia	Federal districts*			
		Central	North-western	St. Petersburg	Southern
Economic					
Lack of own funds	5.5	6.4	5.4	9.7	4.5
Lack of state financial support	4.1	4.8	3.9	7.7	3.3
Low demand for new products, works, services	2.3	2.8	2.4	4.6	2.2
High cost of innovation	5.4	6.1	5.0	9.6	4.6
High economic risks	4.3	5.2	4.1	8.4	3.6
Intra-firm					
Low innovative potential of the organisation	1.3	1.5	1.1	1.2	1.3
Lack of qualified staff	2.3	3	2.1	3.4	1.8
Lack of information about new technologies	1.1	1.1	0.8	0.8	1.0
Lack of market information	1.4	1.7	1.1	2.7	1.3
Underdevelopment of cooperative ties	1.3	1.6	1.2	2.3	1.1
Other					
Lack of legal framework	2.7	3.1	2.9	5.5	2.1
Underdevelopment of innovation infrastructure	2.1	2.5	2.0	3.9	1.5
Uncertainty of economic benefits from the use of intellectual property	2.5	3.1	2.4	5.6	2.3

Note*: Central Federal District includes organisations of the Smolensk region; the North-West Federal District includes organisations of the Leningrad and Kaliningrad regions, St. Petersburg; the Southern Federal District includes organisations of the Rostov region.

Source: based on Federal Research Centre for Projects Evaluation and Consulting Services (2017).

The decline in innovation activity in Russia by 2015 – 2016 reflected in some reduction in the share of innovative products in the total volume of goods, works, services: from 9.2% in 2013 to 8.5% in 2016 (Table 1). Positive dynamics during the study period is observed only in the Rostov region, where by 2016 the volume of innovative products increased by three times – up to 14.5% of the total value of goods, works, and services. The medium-tech industries have become the locomotives that ensured this growth: the production of vehicles and equipment; metallurgical production and production of finished metal products; production of coke and petroleum products.

Geographically, the leading regions for the production of innovative goods in the Western borderland area are St. Petersburg and the Rostov region, which in 2016 accounted for 6.1 and 3.1% of all innovative products in Russia. The total contribution of the rest of the studied regions to the national figure is less than 1%.

The volume of innovative goods, works, and services for export reflects the demand and competitiveness of products manufactured in the country in international markets. Less than 10% of all Russian innovative industrial products are exported to foreign countries (Table 1). In the context of high-tech industries, this figure is higher – 28.9%. The peak of exports of innovative products in the period under review accounted for 2013, followed by a decline in 2016. For most regions of the Western borderland (except for the Rostov region) the nationwide trend is typical. The most substantial reduction in exported innovative products of industrial production is registered in the Smolensk region (from 8.7 to 0%) and St. Petersburg (from 14.7 to 2.1%). In general, almost all the subjects in question are characterised by a low or zero share of innovative goods, works, and services in the total volume of goods, works, and services of industrial enterprises shipped for export. By 2016, the Rostov region became the leading export centre in the Western part of the Russian Federation, increasing the volume of exports of high- and medium-tech products by 22 times from 1.7 to 37.5%. The drivers of growth are mechanical engineering, food and textile industry, production of other non-metallic mineral products, rubber and plastic products, vehicles and equipment.

The most critical indicator reflecting the technological effectiveness of the economy of a country/region is the contribution of high-tech and knowledge-intensive industries to GDP / GRP. In 2010 – 2016 on average about 21% of Russia's GDP was provided by knowledge-intensive, high and medium-high technological level activities. The increase in the share of products of these industries over seven years is 1.1 times, which is lower than the planned indicator of the long-term state economic policy (1.3 times). The leaders among the regions of the Western part of Russia in terms of the contribution of high-tech and knowledge-intensive industries to GRP by 2016 are St. Petersburg (29.8%), Kaliningrad region (23.0%) – see table 1. In 2016 compared to 2010, a decrease in the share of products from these industries was noted only for St. Petersburg.

5. DISCUSSION

The results of a comparative analysis of the dynamics of the most important indicators of the innovation component of economic security have demonstrated a high degree of heterogeneity of the innovation space of the Western borderland of Russia. The main innovation pole and attractor of human and investment resources is St. Petersburg agglomeration. The region occupies a leading position in terms of the level of innovation activity, the production of innovative goods and the development of high-tech industries. The Rostov region is the main export centre of innovative products among the western border regions of the Russian Federation can be classified as innovative semi-periphery. The remaining subjects (Smolensk, Kaliningrad, Leningrad, regions) are peripheral with respect to the level of their innovative development. For most regions of the western part of Russia, a weak degree of internationalisation of their innovation systems is typical. The only active exporting activity of high- and medium-tech products is found in the Rostov region. The export share of four other subjects of the Russian Federation is small on a national scale.

The development of the innovation sector of the economy, and, consequently, the strengthening of economic security, is directly related to the dynamics of investment in fixed assets. An important condition for the growth of investment activity is the political and economic stability of economic conditions when investors can predict the profitability of their investments. The negative trend of investment volumes, as a rule, reflects the unfavourable economic situation in the country. Lack of investment adversely affects the technological development and competitiveness of industries, especially against the background of a high proportion of obsolete fixed assets, thereby reducing the overall level of economic security. The share of investments in machinery and equipment in the total volume of investments in

fixed assets demonstrates the degree of interest of business entities in the modernisation and technologization of their own production. The innovation of economic activity requires the growth of investments in new, more advanced machines and equipment, which allows reducing costs, increasing the efficiency of technological and organisational processes, and improving product quality.

The deterioration of the geopolitical situation in recent years has adversely affected the investment attractiveness of the innovation economy of the studied regions and led to a general decline in innovation activity in the border area of the European part of Russia due to increased economic risks. Because of the general decline in investment in fixed assets (including the reduction in the purchase of foreign technologies and equipment), the international technological exchange has slowed down – one of the most important channels of knowledge transfer. The lack of investments in the real sector, which is the leading consumer and generator of technological innovations, has become a serious limiting factor for the technological modernisation of the economies of the regions of the Russian west. This is a direct threat to their economic security, accompanied by a decrease in economic competitiveness. The economy of the exclave regions is particularly hard hit, which is partially offset by government support.

Human potential is another significant factor in the development of an innovative economy along with material and technical equipment, which characterises the capabilities of management entities in the use of labour resources in the innovation process in order to increase the competitiveness of the regional economy and the quality of life of its population. The effectiveness of the realisation of accumulated human potential is expressed in the amount of human capital as a set of individual explicit and implicit knowledge, competencies, skills, capabilities, physical abilities, concentrated on the territory of the region and involved in its economy. Education is one of the elements of human potential. The most important factors in sustaining the innovation economy are the high involvement of the population in the system of continuous education, the high volume of investment in the labour force, and the active development of human capital. Increased education of the population and expenditures on education stimulate the GDP growth.

For Russia, an increase in the share of employed with higher education is revealed; however, in the regions, there are multidirectional trends. In a number of subjects, the share of the employed population with higher education decreases annually (Kaliningrad region, St. Petersburg) or has begun to decline (Rostov region). In the Leningrad and Smolensk regions; on the contrary, there is a noticeable increase in those employed with higher education. At the same time, the outflow of labour resources and their polarisation around the major centre of urbanisation – St. Petersburg, is typical for the borderland area of the European part of Russia. The latter, in turn, face the problem of a growing influx of ‘cheap labour’, which also does not correspond to the interests of developing an innovative high-tech economy.

The existing difference in the set and strength of influence of factors on the innovation systems of the regions in the Western borderland of Russia implies differences in the systems of interests and threats to their economic security. The main threats to innovation domain of economic security that arise in the context of geopolitical instability are grouped by the types of regions identified: growth pole, semi-periphery, and periphery.

Growth Pole – St. Petersburg.

Factors negatively affecting the innovative development of the region are:

- the inflow of labour resources, whose competencies, level of education, specialisation do not correspond to the specialisation and innovative profile of the regional economy;
- the reducing level of investment in innovative projects;

- the reduction of exports of high-tech products in priority sectors against the background of repeated growth in imports;
- the prevalence of adopted innovations in the structure of innovation activity, those being new only for the national market;
- the insufficient implementation of newly developed technologies in production;
- the high dependence of innovative industries on foreign technologies;

The threats to the economic security of the region in the innovation aspect, first of all, are related to the loss of the achieved competitive position in the international innovation space due to the negative effect of the factor of geopolitical instability. This may be followed by: the decrease in GRP, incl. due to the collapse of the innovation activities of the largest innovative enterprises in the region due to the sanctions policy of Western countries (for example, in the field of the defence industry); the increased negative external pressure on the regional economy due to the high dependence of key innovation sectors on foreign technologies; the reduction of competitiveness in the international arena due to the lack of innovation in the economy and their local nature; the decrease in aggregate labour productivity and deterioration in the quality of labour resources due to the influx of low-skilled labour; the increasing gap between the developed scientific sector of the region and industry; the transformation from an international centre of innovative economy to a regional one.

Semi-periphery – Rostov region.

Factors negatively affecting the innovative development of regions:

- the shortage of qualified personnel and structural imbalance of labour resources (inconsistency with the needs of the economy of the current supply in the labour market by specialisation, level of education, competences, etc.), hampering the innovative development of the economy;
- the low returns on patents with a high level of patenting;
- the outflow of technologies developed in the regions abroad for a pittance due to the short terms of patents obtained.

The threats to the economic security of the regions in the innovation aspect, first of all, are connected with the folding of recently arisen innovation processes under negative external influence. This may be followed by: the expanding discriminatory measures applied by western countries against key innovative sectors of the regional economy; the increased competition for labour resources in key sectors for regions at the interregional and international levels; the reduction of state financial support as a result of the completion of large investment projects with state participation; the gap between the business and scientific sectors, the loss of part of the scientific and technological potential due to the lack of demand for the regional economy.

Periphery – Smolensk, Kaliningrad, Leningrad, regions.

Factors negatively affecting the innovative development of regions:

- the systematic outflow of young qualified specialists to other regions;
- the weak development of the innovation infrastructure and/or its inconsistency with the needs of innovative companies;
- the undeveloped sector of specialised business services within the region;
- the limited access to transport and energy infrastructure;
- the lack of research specialisation that could serve as a basis for the formation of a world-class competence centre;

- the strong dependence of regional companies on foreign technologies against the background of weak interest in R&D created in the region;
- the lack of necessary critical mass of companies in the region for the formation of competitive clusters (the low organisational density problem).

The threats to the economic security of the regions in the innovation aspect, first of all, are connected with the failure to realise their internal innovation potential due to strong inter-regional competition against the background of external negative impact. This may be followed by: the introduction of economic models that are not effective in the long term; the non-use / partial use of the specific resources of the region to increase the economic competitiveness; the dependence of regional economies on foreign technologies; the reducing human potential needed to build an innovative economy.

6. CONCLUSIONS

Ensuring the economic security of the region is a complex and comprehensive issue, with an innovation factor playing a significant role by affecting such aspects of the economy as cost-effectiveness directed at financing the innovation sphere; the involvement of the business sector of the region in the innovation processes, its interest in the conduct of innovation activities, the introduction of innovations and innovative solutions in the production process; modernization and technological re-equipment, ICT development; productivity increase and the use of skilled labour; reducing the role of the resource sector in the economy; inclusion of regional companies in international production and technological chains, clusters; competitiveness of products manufactured in the region and its compliance with international quality and technical standards; investment attractiveness; the development venture financing, credit, financial, insurance and other areas that provide specialized services to innovative firms, etc.

Among the regions of the Western borderland of Russia, there is strong differentiation in terms of the level of innovation development and involvement in global innovation processes. In the context of the study, the identified types are the core regions, semi-periphery and periphery, for which the role of the factor of innovation in ensuring economic security is not the same. This is especially evident in the conditions of geopolitical uncertainty. On the one hand, if a region is not deeply integrated into international innovation systems due to its innovative backwardness, in the event of a strong change in the external situation, its loss to the economy from the disruption of network connections within the framework of the innovation process will be minimal. And vice versa. More innovative regions that play a significant role in the global innovation space will be more affected by geopolitical manoeuvres and instability, which will cause a significant hit to their economic security. However, in the long run, as many scientific studies show, innovation is simply necessary for economic growth. It is impossible to build a competitive economy without promoting the development of its innovative component. The rejection of innovation and innovation backwardness has an even greater threat to economic security – the loss of competitive positions, in the long run, the transition to the global economic periphery, and as a result – the inability to maintain economic sovereignty.

At the same time, this does not mean that ‘silicon valleys' should be sculpted from all regions. It is necessary to take into account specific resources, specialisation, human capital, level of absorbing ability and other features of a particular region to answer the question "how can it effectively integrate into the global innovation space with benefits for its

economy in the short, medium and long term". It is important to assess the ratio of benefits and threats to the regional economy and society from participation in specific stages of real innovation processes. It means not only participation in the development of innovative products, but also the donation of resources, outsourcing, consumption of innovative products, the introduction of foreign technologies, the provision of related services, etc..

Due to the identified significant interregional differences between the subjects of the European borderland of Russia in the level of innovative development, the implementation of state policy to ensure the economic security of the Russian regions in terms of promoting innovation has to be spatially adaptive and take into account the existing heterogeneity of the Russian border area. For the regions – generators of innovation and active exporters of innovative products (St. Petersburg, Rostov region), the important innovative aspects of economic security are to level out the negative impact of foreign economic and political factors on their innovative systems (primarily to protect strategic export-oriented innovative sectors economy from external influence), expand the use of its comparative advantage to strengthen the international competitiveness based on innovation, differentiation of innovation ties in order to avoid the problem of geographical manoeuvres. For regions – consumers of innovation, important aspects of economic security are to become involved in international, and even, first of all, inter-regional channels of new knowledge flows, development of absorptive capacity, technologisation and modernisation of the economy, improving the efficiency of using domestic resources to enhance local innovation processes.

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