

INNOVATION SPACES OF THE EUROPEAN PART OF RUSSIA

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Abstract

The rapid integration of the post-Soviet Russia into the system of market relations predetermined, on the one hand, a tangible “shift to the sea” of industrial activity, infrastructure, and population, on the other, initiated further “stratification” of coastal zones on the level and pace of socio-economic dynamics. Important actors in transformation of the Russian interregional innovation space are the coastal zones being country’s priority geo-economic corridors, and the clusters of residential and economic activity. The study deals with the external and internal determinants of economic growth of the leading maritime agglomerations of the European part of Russia with an emphasis on the role of the innovation factor. The elements of the third industrial revolution in the spatial structure of the leading maritime agglomerations and the resulting territorial, economic, technological, social and environmental effects are identified. The impact of innovations on the transformation of agglomeration spaces of coastal regions of the European part of Russia is assessed.

Keywords: coastal innovation space, coastal agglomeration, innovation geography

JEL Code: F63, R11, R12

Introduction

The distance of the coastal border areas of Russia from the main domestic centers contributes to the fact that the innovation processes taking place are more likely to be of cross-border nature, and increased contact with foreign partners contributes to a more active mutual dissemination of technologies. The dynamics of world development, which sets the rhythm of technological updates, requires appropriate synchronization from all participants in the innovation process (Druzhinin et al., 2017). At the same time, the exclave characteristic of such territories of European Russia as the Kaliningrad region and the Republic of Crimea causes additional costs and risks, affecting both the specifics of its socio-economic development and national security in general. In particular, while having significant potential for the development of innovative activities the Republic of Crimea and the city of Sevastopol have the problem of non-recognition of its presence in the Russian Federation. As for the Kaliningrad region, its exclave problems are due to differences in economic and political orientation of the adjacent territories. Despite the enhanced development of infrastructure in the Kaliningrad region, its standards are lagging behind the standards of the adjacent European Union member countries,

and thus a kind of “infrastructure barrier” is created at the border (Mikhailov, 2013). In this context, the promotion of innovative development of these coastal border regions from the position of the Russian Federation and the subjects themselves is very relevant.

1. Innovations and economic growth

There is a significant relationship between technological development and long-term economic growth. Most modern technological innovations are among the achievements of the third industrial revolution. Rifkin (2011) one of the ideologists of the third industrial revolution, argues that its main elements are the transition to ICT in production, focus on renewable energy, green economy and a post-industrial society. The two past revolutions consisted the interaction of new communication technologies with new energy sources. The first industrial revolution of the 19th century was based on the mass press technique and on the economy based on the energy of coal and steam. The second, which occurred in the 20th century, was based on the spread of electrical communications, from telephone to radio and television, and on an internal combustion engine. The third industrial revolution began with a digital communications.

Alvin Toffler views the history of the development of civilization as a continuous wave motion (Toffler, 1990). He describes that the development of S&T occurs in waves: as the first wave (an agrarian civilization) used to be replaced by the second wave (industrial civilization), a new wave is coming, which leads to the creation of a super-industrial civilization in the world. Toffler pointed out the industries that will make up the backbone of the Third Wave industry are: electronics, space industry, industry based on ocean resources and genetic engineering industry.

The third industrial revolution, like the two previous ones, inevitably affects changes in the territorial structure of the economy. This process started in the early twentieth century. Already at the end of the twentieth century, profit centers in many industries began to shift from the production departments of leading companies to their R&D centers. These changes are accompanied by the creation of a number of innovative facilities that can be divided into two groups: innovation infrastructure and supporting infrastructure for business. Due to lack of innovation infrastructure facilities, the Kaliningrad region, the Republic of Crimea and the city of Sevastopol are moderate innovation centers, but they are good cases of strategically significant coastal regions, the development of which determines national security.

2. Research Methodology

The study focuses on the transformation of innovation infrastructure of coastal regions of the European part of Russian that is taken in strive for creating competitive and sustainable

territorial innovation systems. The research scope are two similar coastal regions: the Kaliningrad region – an exclave in the Baltic Sea, and the Republic of Crimea and Sevastopol – a quasi-exclave on the Black and Azov seas. There a number of reasons behind this choice: Firstly, the geo-spatial location of these regions. Both are coastal with the maritime economy specifics formed Soviet period. In the Kaliningrad region, to a greater extent, – fishing and port, in the Crimea and Sevastopol – tourist and naval. Secondly, both regions are exclaves, making the efficiency of resource use and benefits associated with the sea to be vital for the sustainable economic development, especially in the context of an uncertain geopolitical situation (Druzhinin, 2016). Thirdly, both regions are strategically significant for the national security. Their long-term development vector is set at the national level. Fourthly, the similar economic development models using special institutional regimes: special economic zone in the Kaliningrad region and free economic zone in the Crimea and Sevastopol. Fifthly, the experience of cooperation with each other in the marine sector, both in the Soviet period of history and in the new time.

The objectives are to identify patterns in the innovation processes within the selected regions and to allocate the demand for a corresponding innovation infrastructure. An individual attention is given to the assessment of the particularities that occur due to coastal location in the light of the innovative development of exclaves associated with the whole complex of effects. These effects are classified in the following groups: Territorial – affecting spatial organization of the regional economy with respect to the sea and its connectivity with other regions. Economic – affecting the specialization and economic strategy of the region. Technological – affecting a set of technologies created and implemented. Social – affecting the quality and standard of living in the coastal zone. Military-political – affecting the openness and contacts of the region. Ecological – affecting the state of the environment and the coastal ecosystem of the region.

We hypothesize that the innovation development trajectory of a coastal region is highly dependent on its strategic positioning in the national space. The maritime specialization can obtain the following focus: tourist; fishing industry; shipbuilding; naval; transport and logistics; high-technology; mixed. Demand for particular innovation infrastructure relates to innovation specialization, involving the use of resources and the advantages of a seaside position. Further analyzes cover both quantitative statistics and qualitative information that characterized the development of the innovation infrastructure of the selected regions as of 2019 (Table 1).

Table 1. Methodical features of the assessment of innovation infrastructure development

Data category	Indicators
Innovation infrastructure	<ul style="list-style-type: none"> - number (legal name, address, and valid phone number, a website is preferable); - type (innovation – directly aimed at supporting innovation; supporting – aimed at creating a favorable business climate, which is the basis of innovation); - localization (at the level of the oblast, republic; city: Sevastopol, Kaliningrad); - specialization (marine, other). An in-depth consideration is done with regard to the maritime

	economy. The following focus areas are distinguished: tourism, fishing, shipbuilding, naval, transport and logistics, high technology, mixed.
Innovation trajectory	- innovative interests of the region determined on the basis of laws and regulatory acts governing innovative activities in the regions (The Decree...№ 790, 2014; Order... № 17, 2018; Spatial development strategy... № 207-p, 2019).
Economy structure	- the development level of the innovation economy and the innovation environment (estimated on the basis of specialized regional rankings); - promising industry specialization determined in the Spatial Development Strategy of the Russian Federation for the period up to 2025, focusing on marine economic specialization types (tourism, fishing, shipbuilding, naval, transport and logistics, high technology, mixed).

Formation of a complete register of innovative and supporting infrastructure, including for the purpose of cartographic material, is complicated by the lack of a centralized portal for the regions with complete actual information. Great attention is paid to provide reliability of the data. It is ensured by a critical analysis of a large amount of qualitative information (Development Corporation of the Kaliningrad region, 2019, www.kgd-rdc.ru/investor; Innovative infrastructure in Russia, 2019, www.innovation.gov.ru/page/383; Investment portal of the Republic of Crimea, 2019, www.invest-in-crimea.ru; Monitoring of small innovative enterprises of the scientific and educational sphere, 2019, www.mip.extech.ru/reestr/reestr.php; National Center for Monitoring Innovative Infrastructure of Scientific and Technical Activities and Regional Innovation Systems, 2019, www.miiris.ru/regions). Eligibility criteria are: legal status, exact address, working phone, and a website (additional). Marine specialization is determined by analyzing their mission, services, projects implemented and other qualitative information. Cartographic representation of data is used to reflect the localization and degree of coastalization of the innovation and supporting infrastructure, scientific organizations, small innovative enterprises at the level of Kaliningrad and Sevastopol. Maps are created using the Google Maps Engine tool. First, experts determined a totality of innovation facilities to be mapped and grouped by address. Their concentration is reflected in the size of the dots.

3. Results of the study

According to various innovation development rankings compiled annually for the regions of Russia, the Kaliningrad region, the Crimea and Sevastopol demonstrate an average and below average score with a tendency to increase. For these regions being the national geostrategic territories their innovative development is an important state priority with a focus on ensuring economic growth rates and living standards comparable (or higher) for the Republic of Crimea and Sevastopol with other constituent entities of the Russian Federation, and for the Kaliningrad region – with bordering EU countries (Spatial development strategy... № 207-p, 2019).

Table 2 presents the specializations areas of the economies of the three regions studied perceived as promising at the federal level. These areas are expected to act as drivers of regional development and form the demand for new knowledge, technology, innovation and specialized

infrastructure. For the Kaliningrad region, these are 20 industries, the Republic of Crimea – 21, and Sevastopol – 16. According to our estimates, a maritime focus of economic activity can unite more than a third of all priority activities presented, which makes purposeful innovation of maritime economic activity a significant object of state innovation policy.

Table 2. The specialization of the economies of the Kaliningrad region, the Republic of Crimea and Sevastopol

Economic activity type	Type of maritime specialization	A	B	C
manufacture of finished metal products, except machinery and equipment		+	+	+
manufacture of leather and leather products			+	
manufacture of computers, electronic and optical products		+	+	+
production of medicines and materials used for medical purposes	mixed	+	+	
manufacture of machinery and equipment		+	+	+
beverage industry			+	+
manufacture of apparel			+	
food production	fishing industry	+	+	+
manufacture of other finished products		+	+	+
manufacture of other non-metallic mineral products		+	+	+
manufacture of other vehicles and equipment	shipbuilding	+	+	+
manufacture of rubber and plastic products		+	+	
production of chemicals and chemical products		+	+	
manufacture of electrical equipment		+	+	+
crop and livestock production, incl. services		+	+	+
fishing and fish farming	fishing industry	+	+	+
information and communication activities		+	+	+
professional, scientific and technical activities	mixed	+	+	+
activities in the field of health and social services (wellness)	tourism	+	+	
transportation and storage	transport / logistics	+	+	+
tourism	tourism	+	+	+
motor vehicles, trailers and semi-trailers (except automotive production)		+		+
furniture manufacture		+		

*A – Kaliningrad region, B – Republic of Crimea, C – Sevastopol

Source: compiled from (Spatial development strategy... № 207-p, 2019)

Analysis of the innovation and supporting infrastructure in the regions demonstrate their initial stage of formation – establishment of the supporting elements of the innovation system. Table 3 presents a summary of the distribution of infrastructure objects by type.

Table 3. Development of innovative and supporting infrastructure by regions, 2019

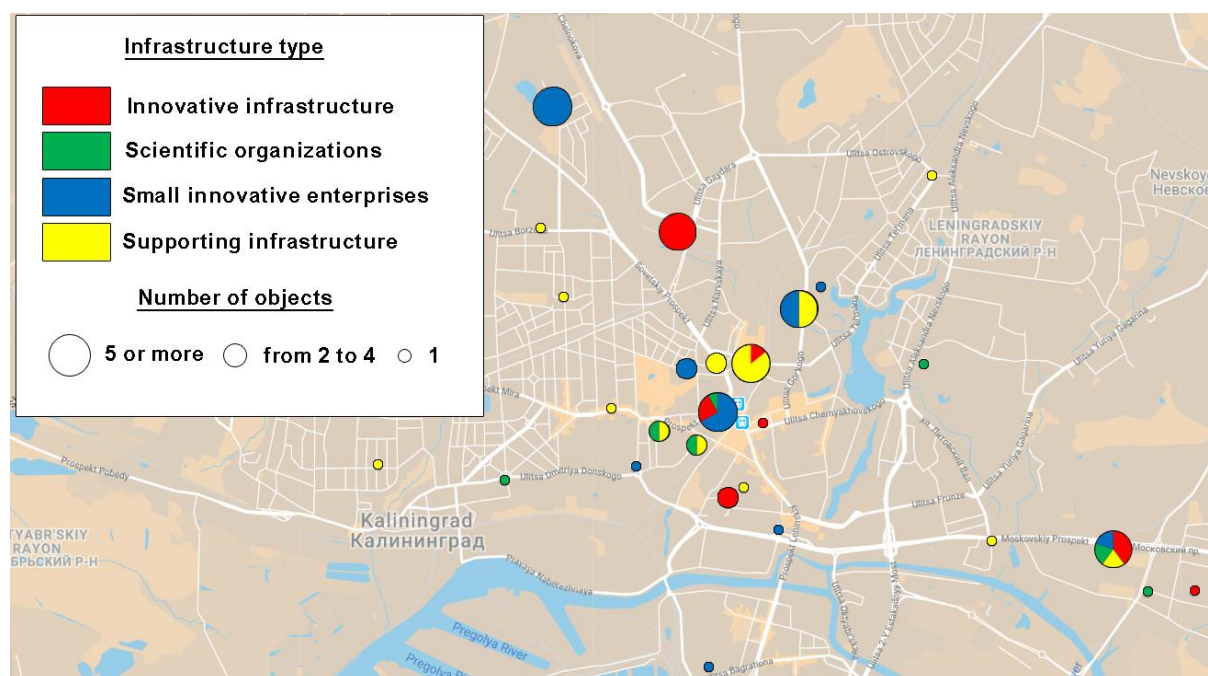
Infrastructure type	Kaliningrad region		Republic of Crimea	Sevastopol
	total	Kaliningrad		
<i>innovation infrastructure</i>				
cluster	4	2	1	
innovation accelerator	1	1		2
innovation and technology center	5	4		
technology transfer office / center	2	2		
prototyping center			1	
scientific and technical info center	2	2		
engineering center	2	2		1
technopark / S&T park	2	2		
center for collective usage	3	3	5	3
fablab (fabrication laboratory)	1	1	1	
business incubator	2	2	1	

other	3	3	1	3
<i>supporting infrastructure for business</i>				
Co-working	4	4	4	3
chamber of commerce and industry	3	1	1	1
development agency	1	1	1	
business association / union / club	5	5	6	6
regional development corporation	1	1	1	1
civic chamber	1	1	1	1
information and settlement center	1	1	1	1
multifunctional center services	21	1	1	1
SME support center	4	4	2	2
cluster development center	1	1	1	
financing fund	3	3	4	3
other	5	4	9	3

Source: developed by the authors

In the Kaliningrad region, the infrastructure to support innovation and entrepreneurship is localized in the regional center – the city of Kaliningrad. The secondary attraction poles for the development of innovative, industrial and social infrastructure are the city of Gusev, where the Technopolis GS Innovation Cluster is located, and the settlement of Yantarny, where a number of elements of the Kaliningrad amber cluster are located. The undoubted advantage of the Kaliningrad region as compared to Crimea is a coverage of municipalities with centers for public services for business. However, the low density of other types of infrastructure does not contribute to innovative development further inland (Fig. 1).

Fig. 1: Map of innovative and supporting infrastructure in Kaliningrad, 2019



Source: developed by the authors

In Kaliningrad, several foci of innovation can be identified. The first is based on the S&T Park “Fabrika” of the Immanuel Kant Baltic Federal University (IKBFU). It focuses on high-tech areas: materials science, photonics, X-ray optics, medical and cellular biotechnologies, etc.

For Kaliningrad and the region, the creation of the S&T park had multiple effects. Firstly, the technological effect. After the collapse of the USSR, the region largely lost its maritime specialization. The formation of the infrastructural basis for the new technologies was a significant step towards finding a new innovative trajectory (Fedorov et al., 2017). The innovation infrastructure at the Fabrika contributes to the creation of a positive image of the region as a developed investment-attractive and creative region that attracts advanced businesses and investments, providing an environment for the exchange of knowledge and experience in high-tech. The territorial effect for the city was an additional impetus to the development of the area where the S&T park is located, since it occupied the unused building of the former shoe factory, which has undergone significant modernization.

The second center is formed on the basis of Kaliningrad State Technical University (KSTU) and has a clear marine economy specialization. There is a great potential for inter-organizational and inter-sectoral interactions of companies in the region (fishing, shipbuilding and ship repair, tourism, maritime transport, and amber industry). Thus, the request for an innovation infrastructure being formed in accordance with the traceable innovation specialization of the regional economy finds its confirmation. The maritime innovation system unites the industrial scientific and educational institutions with their material and technical base (incl. KSTU, Baltic State Fishing Fleet Academy, AtlantNIRO, Atlantic Branch of the Institute of Oceanology RAS, Museum of the World Ocean, etc.), the Small Innovative Enterprises of the marine complex (Mechatronica, Automation of oil terminals, National Engineering Center for Civil Shipbuilding, Teplonasos etc.), and the specialized facilities of KSTU (e.g. technopark, engineering center, shipbuilding cluster, amber cluster, association of innovative enterprises).

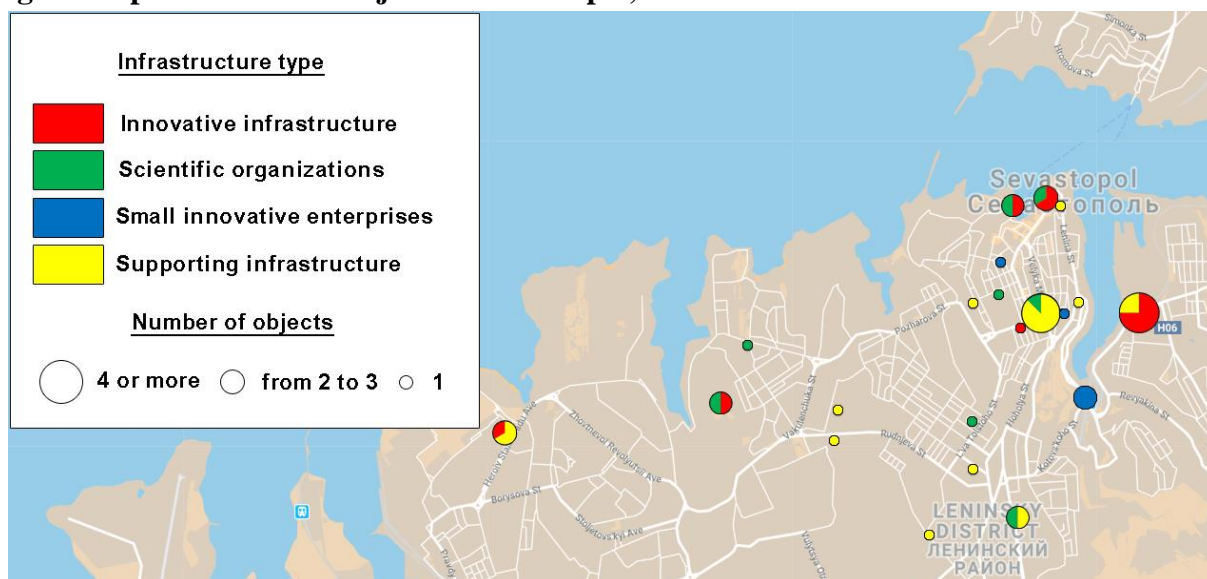
Considering the spillover effects, the creation of an innovative and supporting infrastructure of maritime specialization is of great importance. *Firstly*, for the spatial economic development regarding the two priority marine specializations in regional innovation strategy (Order... № 17, 2018): mining and processing of amber; construction of ships and vessels, production of components. *Secondly*, for economic development, since it involves the accumulation and use of specific resources, the market value of which has a clear territorial link and forms the strategic potential of the region, which qualitatively distinguishes it from others. In the case of the Kaliningrad region, specific resources are closely related to the sea and have not only material nature, but also intangible associated with accumulated industry-specific relational capital, rooted regional networks research and industrial cooperation, development of collective learning processes formed by regional identity as a fishing region. Improving the efficiency of the use of specific resources is associated with strengthening their relationship with market

factors in the placement of economic activity, which will strengthen the localization of economic activity in priority areas and prevent its rapid contraction in the event of an increase in the adverse effects of external and / or internal factors (Mikhaylov, Mikhaylova, 2017). *Thirdly*, for the diffusion of new technologies in the regional marine sector, as well as maintaining its specialization at the national level (mainly in the field of fishing and processing, shipbuilding). Despite the fact that these are complementary processes with the potential to create synergistic effects, they require independent management and do not necessarily interrelate with each other.

The third focus of innovation activity and infrastructure is formed on the basis of a business incubator for 70 jobs, created in early 2019 with state participation. Its advantages are that there is a significant number of supporting infrastructure organizations that promote business development. In contrast to the first two poles of the regional innovation space, where universities are the core organizations, this one is the result of the interaction of business and regional authorities regarding the development of the IT sector.

The representation of the innovation infrastructure on the territory of the Crimea and Sevastopol is lower compared to the Kaliningrad region, despite the fact that 2.4 times more population lives on the Crimean peninsula – tab. 4. This is largely due to the recent incorporation of Crimea into the Russian Federation associated with serious transformations: institutional, economic, social, etc. The innovation system of Crimea has not yet had time to fully emerge. Its spatial concentration is observed around the two main centers of the peninsula – the cities of Sevastopol and Simferopol. In Sevastopol, 9 objects of innovation and 20 supporting infrastructure are localized, and in Simferopol – 7 innovative and 23 supporting. The infrastructure location shows the effect of coastalization, especially in Sevastopol (fig. 2).

Fig. 2: Map of Innovative objects of Sevastopol, 2019



Source: developed by the authors

In terms of specializations, the distribution of infrastructure of the Crimea corresponds to its innovative and economic development priorities (The Decree...№ 790, 2014): tourism and recreation; agro-industrial complex with the production of environmentally friendly products of horticulture and viticulture; high-tech industries; IT-sphere. As part of the classification adopted in the study of maritime specialization of innovation, we have identified three significant areas: tourism, high technology, the naval (fleet), which should account for the growing need for innovation and the generative capacity of the regional innovation system of Crimea.

4. Conclusion

The study on the innovation infrastructure of the two coastal exclaves of Russia have confirmed the hypothesis – the demand for innovative and supporting infrastructure in coastal regions is formed in accordance with the marine specialization. It is revealed that the innovative economy sector of the Kaliningrad region, the Republic of Crimea and Sevastopol has a marine economy orientation as one of the main and most important for the regions. The purpose of specialized innovation infrastructure creation is to support local innovative enterprises and help commercialize the results of intellectual activity of scientific organizations engaged in research in the field of fisheries, fishing, shipbuilding and other activities related to the sea.

The differences between the studied regions are in approaches to the innovation infrastructure development. The spatial and sectoral distribution of infrastructure in the Kaliningrad region is characterized by a high degree of its concentration in Kaliningrad – the administrative center. The alignment of the modern innovation system of the region takes into account the marine economic competencies accumulated in the region. An important role is assigned to the two largest regional universities (IKBFU, KSTU). They are the main cores of the innovation system of the region. Each of the universities has developed its own innovative specialization, consistent with their research program and with federal and regional development priorities. Their combination sets the innovation trajectory of the region, combining, above all, the fishing, shipbuilding and specialization of high technologies.

The formation of innovative and supporting infrastructure in the Crimea peninsula has a bipolar structure. The main cores that attract and concentrate the main infrastructure, scientific organizations and innovative enterprises are the cities of Simferopol and Sevastopol. Marine economy specialization is also being formed here, however, with somewhat different specifics, primarily tourism, green technologies, and naval. The spatial assessment of infrastructure localization in Crimea revealed a manifestation of coastalization effect. Currently the formation

of the innovation infrastructure is initiated in equal both by universities with state support and by business, limited by foreign sanctions policy.

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