

IN PURSUIT OF AN INNOVATION DEVELOPMENT TRAJECTORY OF THE KALININGRAD REGION

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Amid growing inter-state competition, national innovation policies are increasingly seeking to promote the development of regional innovation systems to intensify innovative processes and to enhance the economic competitiveness of territories. An efficient regional innovation policy requires a territorial adaptive approach to the development of mechanisms for innovating socio-spatial systems. These mechanisms should take into account the specific features and inalienable resources of territories. Whereas regional innovation systems are becoming increasingly acknowledged in public administration as versatile, the stage of a system life cycle, which is an equally important factor, often escapes managerial attention. In this article, I analyse the innovation system of the Kaliningrad region at its inception. The Kaliningrad case is of considerable interest for a study into the patterns and characteristics of the governance of innovation systems — a management paradigm aimed to promote regional development during a change in their functioning mode. In this work, I analyse the current structure of the Kaliningrad regional innovation system, of which some elements date back to the Soviet period, paying particular attention to the subsequent change in the framework conditions. I show that a new innovation trajectory requires taking into account the economic and geographical position of the region, its level of socio-economic development and economic specialization. My findings could contribute to both improving the national policy on managing innovation processes in Russian regions and developing the concept of regional innovation systems as regards research into their life cycle stages.

Keywords:

territorial innovation system, economic development, industrial cluster, innovation process, innovation economy, scientific and technological potential, system life cycle, innovation policy

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Introduction

Innovative development systems seeking to ensure the socio-economic competitiveness of concrete socio-spatial systems contribute to the inhomogeneity of the world economic space increasingly frequently. The literature has demonstrated [1; 2] that innovations have prime significance to sustainable economic growth and long-term socio-economic development. Recent studies have focused on constructing regional advantage and search for new strategic trajectories [3–6], including negative scenarios [7; 8]. The universal adaptive mechanism for regional development is a regional system of innovation [9]. The complexity of localising innovation processes precludes the establishment of a single pattern for the formation of networks and their key elements. Numerous studies analyse individual factors and conditions that together determine the emergence and functioning of innovation systems. For example, Michael Fritsch and Holger Graf [10] have investigated the effect of macroeconomic and geopolitical factors; Dimitra Komninaki has addressed peripheral regions; Chun Yang has explored the influence of foreign capital; Christian Wichmann Matthiessen [13] and Jos van den Broe and Huub Smulders [14] have studied the effects of transboundary cooperation and integration. The diversity of territorial innovation systems is affected by not only the economic and geographical position, the strength of the accumulated human capital, and technological capacities but also the temporal stage of development. Unfortunately, the life cycles of innovation systems remain poorly studied. There are, however, several case studies [15; 16], some of them focusing on the transformation of the cluster core [17–22] without conceptualising the results obtained.

Although the Kaliningrad region is not an international innovation hub, the transformation of its innovation system is worth exploring. The region is Russia's Baltic exclave bordering on Poland and Lithuania. Part of Germany until 1945, it became a Soviet territory at the end of the World War II. In 1945–1991, it was a border region of the RSFSR, separated from the mother republic by the Lithuanian and Belarusian SSRs. Within a common institutional space, the young Kaliningrad region started to forge close industrial and research partnerships with other regions of the vast country. The territory took advantage of all available road, sea, and air infrastructure as well as cooperation mechanisms offered by a centrally planned economy. After 1991, the transition to a market economy was aggravated by the impossibility to reach mainland Russia without crossing foreign states; this could not but affect the region's innovation system. In this study, I aim to explore how a new innovation trajectory developed in the Kaliningrad region amid the transformation of the economic environment. This study is of practical significance for the purpose of increasing the efficiency

of the innovation policy: this holds especially true of innovation process management in Russian regions. The theoretical significance of my research lies in improving the concept of the territorial innovation system.

The theoretical and methodological framework

There are two major research approaches in the geography of innovation [23]. The first one seeks to study innovation systems in the global innovation space and to identify the patterns of localisation and functioning of individual participants in the innovation process. The second approach explores local features and regional diversity to find connections between innovations, regional development, and competitiveness. My study focuses on innovations as a key factor of long-term development of the Kaliningrad region. The spatial dimension of innovation processes is the regional system of innovation (RSI). The RSI concept serves as the theoretical framework of this study. The idea of the RSI emerged in the 1990s in the wake of innovation system studies and territorial innovation model construction.

In the traditional interpretation, the RSI is a system connecting various firms and organisations that are involved in the processes of interactive learning and generation of new knowledge, which are part of the regional institutional environment [24]. Structurally, the RSI includes two important subsystems: technology and the economy (regional clusters of economic entities) and institutions (innovative and purpose-specific infrastructure) [25; 26]. A regional cluster, which is the core of the RSI, is a prerequisite for the formation of the system since it facilitates the emergence of an innovation environment by means of innovation policies, stronger intra-organisation innovation partnerships, supporting infrastructure, greater institutional density, and an increase in the number of knowledge generators. Therefore, my investigation of the RSI formation in the Kaliningrad region will include the analysis of clusters that can become the foundation of the system.

The RSI configuration depends on the type of the region (metropolis, agglomeration, old industrial region, periphery, etc.) and its economic specialisation, which determines the characteristics of the accumulated knowledge base [27]. Although innovation systems can emerge in any region, their subsystems may function very differently. Agglomerations, as a rule, are home to numerous organisations of the supporting infrastructure. Peripheries have a low institutional density (few actors pursue innovations), which often translates into dependence on external networks. This factor was taken into account in my analysis of the structural and functional properties of the Kaliningrad RSI. During the Soviet period, the economy of today's exclave had a strong maritime focus.

My analysis of the development trajectory of the Kaliningrad RSI pays special attention to the exploration of economic conditions. This focus does not mean that the economic system replaces that of innovation: it is accounted for by the significance of economic factors for the deployment of knowledge-intensive production facilities. These factors include the availability and cost of workforce, tax treatment, the level of research and education development, the cost of living, transport conditions, access to markets, and regulation by local authorities (including the innovation policy). The experience of selected countries shows that the above conclusions are correct [28]. For an exclave, the factors of transport, economic, and institutional accessibility play a key role.

Destructuring of the territorial innovation system

The demise of the USSR in 1991 had a devastating effect on the innovation system of the Kaliningrad region. The geopolitical factor was the most significant at the time. Having become an exclave, the Kaliningrad region found itself separated from mainland Russia. This circumstance shaped the political agenda relating to the dilemma of the region's strategic identification as a double periphery or a development corridor. The destruction of territorial and spatial cohesion between the Kaliningrad and other Russian regions severed established research and economic ties. The disintegration of entrenched innovation processes and the loss of traditional information channels followed. Moreover, the independence of the Baltics cut the production and infrastructural ties within the Baltic economic region, which included the Kaliningrad region and the Latvian, Lithuanian, and Estonian SSRs. For the Kaliningrad region, the Soviet system of centralised distribution of productive forces meant close integration with the Lithuanian economic system. In the post-Soviet period, this integration was replaced by resource,¹ transport, and energy dependence of the Russian exclave. The priority given by the Soviet authorities to support for the Baltic republics was often at odds with the interests of the Kaliningrad region. Many pieces of infrastructure, which were crucial for the region's development, were built in Lithuania: a nuclear power plant, a train ferry terminal for maritime freight transport, and other. In the new geopolitical situation, this configuration of industrial infrastructure became a serious barrier to the economic development of the region.²

¹ The Lithuanian SSR supplied the Kaliningrad region with construction materials.

² Rozhkov-Yuryevky, Yu. D. [*Politiko-geograficheskie osobennosti razvitiya Kaliningradskoi oblasti kak eksklavnogo regiona Rossii: avtoref. dis. Kand, geogr. Nauk*]. *The political and geographical features of the development of the Kaliningrad region as Russian exclave: the abstract of a doctoral thesis*. Kaliningrad. 2013.

Another important negative factor in the decomposing of the established regional system of innovations was the overall deterioration of economic conditions across the country after 1990.

The abrupt transition from a planned to a market economy caused innovations, production, and research to shrink dramatically and destroyed the supporting infrastructure in the region. The employment rate fell, unemployment increased, the index of industrial production plummeted, electricity generation reduced, and the weight of freight handled decreased (table 1). The priorities of local companies shifted from long-term development to survival, resource saving, and continuous adaptation to the rapidly changing situation.

Table 1

The socio-economic situation of the Kaliningrad region, 1980–2017

Measure	1980	1990	2000	2010	2015	2017
Employed people, thousand population	425	435	410	471	478	477
Unemployed people per 10,000 able-bodied population, people	n/d	109	112	180	116	78
Industrial production index, % of the previous year	102.7	98.5	132.4	116.0	92.2	100.5
Agricultural output index, % of the previous year	n/d	99.3	102.5	100.1	110.7	100.9
Electricity generation, million kW · h	n/d	709	212	3145	6220	7100
Arable lands, thousand ha	413.2	416.3	257.9	148.1	244.9	249.5
Mineral fertilisation, kg per 1 ha of land under crops cultivated by agricultural organisations	207	186	42	133	102	118
Cattle, thousand animals	449.5	467.5	150.9	61.6	109.4	123.6
Freight carried by public transport, million t · km	5105	5312	3411	1491	2288	1760*
Passengers carried by public transport, million people	202.0	284.0	223.3	123.5	89.2	69.4
Crime rate (per 100,000 population)	657	1243	2304	1792	1697	1740

* Road transport only

Source: prepared based on *Kaliningradstat. Istoriya regiona v tsifrakh. K 70-letiyu statistiki Kaliningradskoy oblasti: yubileynyi stat. sb.* [History in figures. For the seventieth anniversary of statistics in Kaliningrad region: an anniversary statistics digest]. Kaliningrad, 2016; *Kaliningradstat. Trud i zanyatost v Kaliningradskoy oblasti. 2017* [Labour and employment in the Kaliningrad region, 2017]. Kaliningrad, 2018; *Kaliningradstat. Selskoe khozyaistvo, okhota i lesnoe khozyaistvo* [Agriculture, hunting, and forestry]. URL: http://kaliningrad.gks.ru/wps/wcm/connect/rosstat_ts/kaliningrad/ru/statistics/enterpRSies/agriculture/; *Rosstat. Region Rossii. Sotsialno-ekonomicheskie pokazateli* [Regions of Russia. Socio-economic indicators]. 2018. URL: http://www.gks.ru/bgd/regl/b18_14p/Main.htm.

The third negative factor was the destruction of national institutions supporting research and innovations while the new formal rules, institutions, and legal framework had not yet emerged. Amid political uncertainty at the federal level, regional authorities did not have sufficient powers, mechanisms, or strategic vision to pursue an independent innovation policy. The priority objectives of the exclave region were to ensure transport accessibility and to reduce political tension brought about by the exclave being sandwiched between EU and NATO member-states.

The fourth factor affecting the Kaliningrad regional system of innovations is the impossibility of securing a national or global niche in the maritime industry — the region's traditional specialisation. The cessation of public support for the fishing industry as regards finances and international trade management and the loss of access to remote fishing areas were accompanied by low quotas for fishing in the adjacent area of North-East Atlantic, growing prices for liquid fuel, and an increase in produce transportation costs [29]. In the deteriorating business environment, Kaliningrad fishing companies became unprofitable. The privatisation of 1992–1993 resulted in massive sales of the fishing fleet. In 1994–2000, the number of boats reduced 3.5-fold to eighty-six.³ The abrupt introduction of innovations into the system of public administration in the 1990s deprived the regional system of innovations of its advantage. Kaliningrad was searching for alternative development paths that would take into account changes in the economic and geographical position, the new economic and political regime, and increased transaction costs for business and population.

Search for new regional development trajectories

The recovery of the Kaliningrad regional system of innovations was associated with the identification of new priorities and approaches to long-term regional development and the emergence of a favourable business environment; the appearance of an institutional environment for innovations and stagnating old innovators pooling their resources; the selection of a new specialisation and the creation of the earlier lacking innovation infrastructure.

³ The Marine Board of the Government of the Russian Federation. Osobennosti vnutrennego ustroystva Kaliningradskoy oblasti, svyazannye s ego primorskim polozheniem [The coastal position-related characteristics of the internal structure of the Kaliningrad region]. *Official website of the Marine Board of the Government of the Russian Federation*. URL: http://www.morskayakollegiya.ru/primorskie_regio/atlnant/kaliningradskaja/ (accessed 15.01.2019).

The transformation of the regional system of innovations in the late 1990s spurred discussions on how the Kaliningrad region should develop in the new conditions. Details, however, were not taken into account. Four major strategies were considered at the time, with special attention paid to the special economic zone model (table 2).

Table 2

Possible strategies for the regional development of Kaliningrad

Development strategy	Characteristics
A region without a special status (development in line with overall national trends)	<ul style="list-style-type: none"> – part of the common economic space of the Russian Federation; – focus on economic security and priority of national interests over regional ones; – strong federal presence in the region; – support for the region at the national average; – special economic regime is a destabilising factor; – commitment to import substitution; – preservation of strong military presence
A region with a special economic status	<ul style="list-style-type: none"> – recognition of the special economic needs of the exclave; its interests are taken into account at the federal level; – targeted federal policy aimed at supporting the socio-economic development of the region; – creation and implementation of special mechanisms compensating for the region's exclave situation; – export-oriented economy; – international aspect is taken into account only when vital issues are at stake
A region with a special economic status	<ul style="list-style-type: none"> – recognition of both economic and political differences between the exclave and other regions of the Russian Federation; – introduction of special political and economic regimes; – involvement of the West to the formation of a condominium and granting independence to the region; – integration into the community of the Baltic region states
Russia—EU cooperation region	<ul style="list-style-type: none"> – region's development is a compromise between national, regional, and international interests; – the region should be integrated into both Russian and Baltic economic space; – local free economic zones

Prepared by the author based on [30].

In 1991, a free economic zone (Yantar) was established in the Kaliningrad region. In 1996, it was transformed into a special economic zone (SEZ). The new regime spurred significant growth in the imports of raw materials and semi-finished goods which were needed to support the region's import substitution capacities in car manufacturing, television manufacturing, meat process-

ing, and furniture production. In 2006, a heavily amended law on SEZ came into effect. It aimed to support large investment projects (worth at least 150 million roubles). However, in 1991–2008, the economy of the region did not grow sufficiently strong: it remained vulnerable to external effects (changes in prices for imported components and raw materials, in the cost and terms of freight across Lithuania, and in customs duties for imports of selected goods). All the above became more conspicuous during the economic crisis [31].

From the perspective of innovation-based competitive development, the region's economic strategy, which encourages the creation of assembly plants, is inefficient. Firstly, it does not increase either gross value added or workforce productivity. Secondly, it results in the dependence of regional manufacturing industries on imported resources (technology, raw materials, components, investment, etc.). Thirdly, the strategy does not create conditions or mechanisms for the effective involvement of specific inalienable regional resources in economic processes. Nor does it facilitate the acceleration of innovation networks. Fourthly, it does not contribute to bridging regional research and industry, which specialise in different areas. Fifthly and most importantly, the strategy lacks a detailed innovative development plan for building up the innovation capacity of the region. Successful cases of deliberate creation of territorial innovation systems [32] demonstrate that key to any innovation-oriented strategy are: a shared vision of the region's future; the consideration of the region's competitive advantages; a firm action plan based on a consensus among stakeholders and enjoying financial and institutional political support; an easily accessible mechanism/platform for involving agents into the innovation process; regular monitoring of changing interests and threats to innovative development; openness to knowledge exchange; internationalisation without critical dependence; encouragement of innovation partnerships at various levels.

Innovative development at the interface of geopolitics and economics

The dramatic transformations of the 1990s took the innovation system of the Kaliningrad region back to its initial level. At the time, the central objectives were once again the choice of a major development trajectory; the selection of an export-oriented specialisation; the formation of an institutional framework; the creation of a network of interconnected, interacting, and mutually supportive participants in the innovation process and of a fitting innovation environment; the mobilisation of additional investment, knowledge, human, and technological resources. In 2000–2018, regional authorities were approaching a solution to the above problems. The lack of a systemic innovation policy precluded the

innovation system from reaching a higher level of development. Until 2018, the Kaliningrad region did not have a strategic document outlining the trajectory of innovative development. Innovation clauses were included in a strategy for long-term socio-economic development.⁴ It set rather abstract objectives: the concentration of resources in priority yet underdeveloped areas (materials science and nanosystems; information and telecommunications systems; technologies for transport, logistics, and recreation; medical biotechnology; sustainable nature management; bioresources and biotechnology; energy saving and energy security; urban technologies; social changes and technologies of social sciences and the humanities); the creation of favourable framework conditions for interregional cooperation; the establishment of close strategic ties between business, authorities, and public institutions.

The authorities both sought the development of advanced technology and understood that 'Kaliningrad is neither a major centre for competitive R&D nor an independent national or macroregional distribution centre'.⁵ In 2018, the Ministry of Industry and Trade of the Kaliningrad region revised economic priorities and developed the first independent long-term strategy for innovative industrial development.⁶ The priority areas are engineering, information technology, amber industry, shipbuilding, car manufacturing, furniture production, radio electronics, pharmaceuticals and medical industry. Public support has to encourage the emergence of competitive industrial clusters — the future core of the regional systems of innovations.

In 2019, the structure of the Kaliningrad innovation system looked as follows (see Fig. 1). It comprised both long-standing elements (of ocean management mainly) that have already adapted to new conditions: research centres, universities and several manufacturing companies, and newly established organisations responding the demands.

⁴ Government of the Kaliningrad region. *Strategiya sotsialno-ekonomicheskogo razvitiya Kaliningradskoy oblasti na dolgosrochnuyu perspektivu: postanovlenie Pravitelstva Kaliningradskoy oblasti ot 02.08.2012 No. 583* [Strategy for the long-term socio-economic development of the Kaliningrad region: a regulation of the Government of the Kaliningrad region of 02.08.2012 No. 583]. URL: <https://gov39.ru/ekonomy/strategiya.php> (accessed 01.09.2018).

⁵ Ibid.

⁶ Ministry of Industry and Trade of the Kaliningrad region. *Strategiya innovatsionnogo razvitiya promyshlennosti Kaliningradskoy oblasti: prikaz Ministerstva po promyshlennoy politike, razvitiyu predprinimatelstva i trgovli Kaliningradskoy oblasti ot 27.02.2018 No. 17* [Strategy for the innovative industrial development of the Kaliningrad region: a regulation of the Ministry of Industry and Trade of the Kaliningrad region of 27.02.2018 No. 17]. URL: https://minprom.gov39.ru/upload/iblock/087/Prikaz_17.pdf (accessed 23.12.2018).

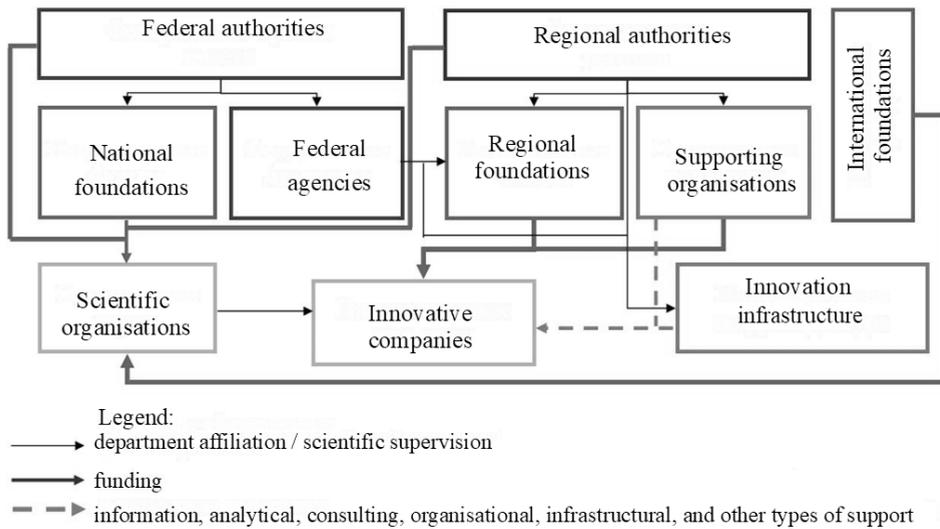


Fig. 1. The Kaliningrad regional systems of innovations

Comment:

Regional foundations: the Guarantee Fund, the Microfinance Fund, the Foundation for Business Support, the Viktoriya knowledge and technology foundation for small and medium business.

Supporting organisations: the Regional Economic Development Agency, the Foreign Investors Associations, the Associations of Small and Medium Business Support Centres, the Baltic Business Club, the Information and Accounting Centres; co-working spaces, the Development Corporation of the Kaliningrad region; the Government and Municipal Service Multifunctional Centres for Businesses, the Public Chamber, the Council of Young Researchers and Experts; the Chamber of Industry and Commerce; the Union of Industrialists and Entrepreneurs of the Kaliningrad region; the Business Rights Commissioner; the Centre for Cluster Development; centres for small and medium business supported of the Microfinance Fund; the Regional Integrated Centre of the Foundation for Business Support, etc.

Innovation infrastructure: the Shipbuilding and Ship Repair Cluster of the Kaliningrad region, the Association of Innovative Nano-Bio-Info-Cogno-Socio-technology Companies; the Business Incubator, the ABB Engineering Centre; the TechCamp Kaliningrad technological project accelerator; the Kaliningrad State Research Centre for Information and Technology Security; the Kaliningrad Centre for Innovations and Technology and its Centre for Technology Transfer; research and technology information centres; the Kaliningrad Centre for technology Transfer; the Sreda obitaniya (Environment) energy-sav-

ing and green technology cluster; university research and innovation infrastructure (engineering centre, science parks, shared facility centres, the FabLab, business incubators, the Student Engineering Unit).

Scientific organisations: universities (including the federal university), research, engineering, and other organisations.

Innovative companies: large, medium, and small innovative companies — the producers and consumers of new knowledge.

The core of the Kaliningrad RSI (a shipbuilding and ship repair cluster and an amber cluster) is being developed. Cluster initiatives are at a certain level of formalisation. The Shipbuilding and Ship Repair Cluster of the Kaliningrad region became a formally constituted body in 2018. The Kaliningrad Amber Cluster was included into the federal registry of industrial cluster, which granted its participants access to public support, in 2019. Despite positive changes in the innovative development of the Kaliningrad region, which took place in 2000–2018,⁷ a number of challenges still remain [33]: insufficient funding of research, low innovation level of business structures, the imbalance and defragmentation of innovation and supporting infrastructure, small investment and lack of funds in the economic entities, lack of a comprehensive regional innovation policy, small scale of the internal market, limited demand for innovations, and weak linkages between regional businesses, academia, and authorities.

Conclusion

The need for a new trajectory of the innovative development of the Kaliningrad region stems from the de-structuring of the Soviet RSI. The process involved the severance of established academic and industrial linkages, the shrinking of innovations, the destruction of traditional information and knowledge flows, the loss of the niche maritime specialisation within interregional division of labour, and the deterioration of the economic and social situation, including plummeting production and rapidly growing prices. A catalyst for intra-system changes was a comprehensive institutional change of the form of economic management and ‘shock’ introduction of innovations into all sectors of economy and society spheres, primarily, into public institutions. The restructuring of the Kaliningrad RSI required a number of objectives being set, including the formulation of major regional development strategy, the creation of an enabling environment for innovation, the overcoming of the RSI fragmentation and the incorporation of new elements into it, and search for alternative niches of specialization.

⁷ Abdrakhmanova, G.I., Bakhtin, P.D., Gokhberg, L.M. et al. Reyting innovatsionnogo razvitiya subyektov Rossiyskoy Federatsii [The innovative development ranking of Russian regions] Issue 5. Edited by L. M. Gokhberg. Moscow, 2017

At the early stage of post-Soviet development, regional innovative development was not the aim of public policy. Later, the focus shifted to the overcoming of exclave deficiencies and the improvement of economic situation by introducing special economic regime. The latter was meant to increase the investment attractiveness of the Kaliningrad region. The selected policy resulted in the development of assembly plants (primarily, car manufacturing facilities) and growing dependence on foreign technology. Without an innovation infrastructure and an institutional environment, innovations were sporadic. SEZ residents, however, created the core of the new economic system — the principal consumer of innovations and knowledge dating back to the Soviet period. Residents had incompatible interests, which caused a persistent rift between research and industry.

Today's search for alternatives of the Kaliningrad region innovative development is affected by the local authorities' ambition to restructure the region's economy in order to increase workforce productivity and gross value added. These efforts are formalized and have institutional support. The latter includes an innovative development strategy and an active contribution to the creation of innovation infrastructure and industrial clusters. The new innovation trajectory outlined in the strategy draws on the knowledge accumulated in the region at different times in history. The strategy suggests a combination of traditional industries (amber, shipbuilding), SEZ specialisations (car manufacturing, furniture production, radio electronics), and breakthrough areas (engineering, information technology, pharmaceuticals and the medical industry). Attaining the goals set in the document will require systemic effort from all innovation stakeholders.

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