

# Development of the Russian Arctic Zone: The Role of Innovation Infrastructure and Legal Regulation

**Diana M. Dmitrieva**

*Assistant Professor (PhD in Economics), Organization and Management Department,  
Saint-Petersburg Mining University, Vasil'evsky Ostrov, 21 liniya 2, Saint-Petersburg-199106, Russia.*

*Orcid ID: 0000-0002-4208-4842*

**Alina A. Ilinova**

*Assistant Professor (PhD in Economics), Organization and Management Department,  
Saint-Petersburg Mining University, Vasil'evsky Ostrov, 21 liniya 2, Saint-Petersburg-199106, Russia.*

*Orcid ID: 0000-0001-5168-0518*

## Abstract

Russia is one of the most important players in the Arctic zone with significant economic, security, and political interests in the region. This is primarily because of significant natural resources, in particular oil and gas, on the Russian Arctic territories. Paper is devoted to the research of development of the Arctic zone of the Russian Federation, particularly to the investigation of legal regulation of the region development and innovation infrastructure of the Arctic zone. The objective of this paper is to develop main principles of innovative development of the Russian Arctic from a perspective of legal regulation and innovation infrastructure development, taking into account crucial role of mineral resource complex for the Russian Arctic. Necessity of innovative development of the Arctic region is defined. The analysis of legal and regulatory framework of the Arctic development as the basis of innovative activity in the region is carried out. The main approaches to development of innovative infrastructure of the Arctic region are represented. As a result, we offer the approach to creation of innovation infrastructure in the Arctic and main principles of development of mineral resources complex of Russian Arctic, based on effective legal regulation and innovative development of the region. The main problems of innovative development of the Arctic region are revealed and the directions of further scientific research are defined.

**Keywords:** Arctic, innovations, Arctic region, innovative development, legal regulation, innovation infrastructure, mineral resources, Russia

## INTRODUCTION

The Arctic zone of Russia is the part of the Arctic under the jurisdiction of the Russian Federation.

According to "The Strategy of the Arctic zone of the Russian

Federation development and national security system for the period till 2020", complex socio-economic development of the Russian Arctic zone, realized through the effective progress of science and technology, i.e. innovative development, is one of the key directions in development of the Russian Arctic zone [1,2].

The majority of the proven reserves and forecast resources of Russia is located on the Arctic territory that defines its strategic importance. It produces more than 96% of the platinum metals and more than 90% of nickel and cobalt; it is extracted about 80% of Russian gas and 60% of oil, about 60% of copper. In different raw material production (nickel, cobalt, diamonds, platinum metals, oil and gas, rare earth metals, etc.), the Russian Arctic plays a significant role in the world [3]. And the more complex are the conditions for the extraction of resources - technological, climatic, mining and geological, geographical, etc., the more implementation of scientific research and innovations is required [4].

Development of the Russian Arctic Shelf, characterized by really high capital intensity (for example, drilling offshore in 3–5 times more expensive than on land) [5], requires new scientific based approaches to sustainable long-term development of the Arctic territories in the light of technological, economic, legal, and social issues.

The special role in this issue is assigned to up-to-date extraction technologies and oil and gas recovery technologies, providing energy effectiveness and ecology safety [6,7,8], and also to the innovative development of the Russian Arctic zone, based on effective legal regulation and development of innovation infrastructure on this territories. Due to the fact that Russia's mature hydrocarbon sources in Western Siberia are slowly drying up, extensive strategic importance of the Arctic hydrocarbons considerably increases [5].

In this paper we investigate modern development of the

Russian Arctic zone by analyzing the existing legal regulation in Russia related to Arctic development, as well as the level of development of innovation infrastructure in the region. As a result, we offer the approach to creation of innovation infrastructure in the Arctic and main principles of development of mineral resources complex of Russian Arctic, based on effective legal regulation and innovative development of the region.

**LITERATURE REVIEW**

Despite the wide range of existing papers devoted to different aspects of Arctic zone development [9-13 among many others], no optimal strategic approach that takes into account peculiarities of the Arctic territories and necessity of their innovative development focused on innovation infrastructure and legal regulation has been found. Previous studies have addressed geopolitics issues on Arctic territories [14,15], policy interests of different countries in the Arctic [16,17], oil and gas perspectives in the Arctic [10,18], Russian thinking, policies, and challenges in the Arctic [19], and others.

Many papers present case descriptions related to the Arctic and discuss such issues as geopolitics, politics interests, energy security, strategic importance of the Arctic, and others. A lot of papers devoted to oil and gas projects also are narrative and many papers are op-ed articles.

However, there are no research papers focusing specifically on development of innovation infrastructure in the Arctic region and legal regulation of its innovative development.

This paper sets out to analyze legal regulation and innovative infrastructure in the Russian Arctic and offer the approach to its creation and innovative development of the mineral resources complex in the region.

**METHODOLOGY AND METHODS**

**Analysis of the legal regulation of the Russian Arctic’s development**

The development of the Arctic region at the State level is regulated by different legal documents. The main document is “The Strategy of developing the Arctic zone of the Russian Federation and national security system for the period till 2020” [2] and a number of others.

Table 1 shows main documents and the basic provisions related to the regulation of the Russian Arctic development, including its innovative development.

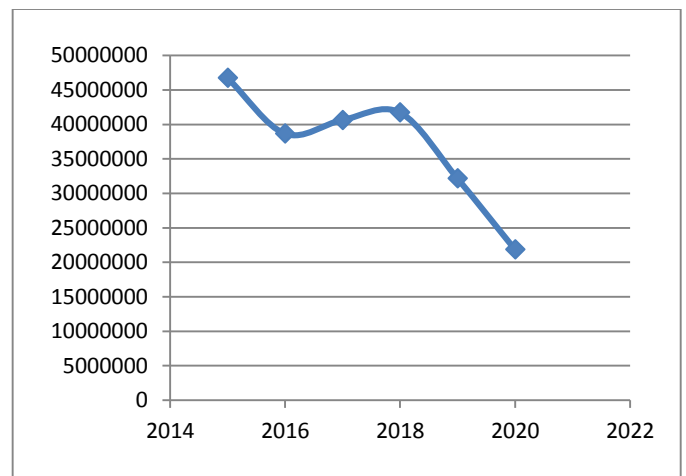
**Table 1:** Legal and regulatory framework of development of the Russian Arctic [1,2,20-24]

№	Title of the document	Basic provisions
1	Federal law “On development of the Arctic zone of the Russian Federation” (bill)	Includes General provisions for the development of the Arctic zone of the Russian Federation (geographical location, areas of implementation of public policies, the regulation of the legal aspect of the region at various levels); regulations on the rational use of natural resources and environmental protection; provisions on the implementation of the State policy within the development of the region (development of transport networks, industries, energy infrastructure, support for activities in the field of innovation support, entrepreneurial development); foundations of investment and social policy and other issues
2	“Strategy for the development of the Arctic zone of the Russian Federation and provision of national security for the period up to 2020” (approved by the President of the Russian Federation)	Main risks and threats related with the exploration and development of the Arctic zone of the Russian Federation are defined; priorities of the development and main mechanisms and steps of the strategy realization are identified; both directions of social and economic development of the region and providing of nation security are discovered; mechanism of control over realization of the strategy is established
3	“Principles of the State policy of the Russian Federation in the Arctic for the period up to 2020 and further” (approved by the President of the Russian Federation 18.09.2008)	National interests of Russia in the framework of the development strategy of the Arctic region are distinguished; goals and priorities for State policy in the Arctic including targets, measures and policy implementation mechanisms (stages of implementation of the State policy including particular events are listed) are defined

4	“The strategy of exploration and development of oil and gas potential of the continental shelf of the Russian Federation for the period up to 2020” (2006)	Oil and gas potential of the region is evaluated; main problems hindering the development of the oil and gas industry in the Arctic zone are analyzed; priorities of development of the Arctic zone oil and gas potential are defined; ecological issue is covered; expected results including particular financial metrics and production volumes are highlighted
5	Federal law № 58 “On the procedure for foreign investments to business entities” (29.04.2008)	The participation of foreign investors in the process of development of mineral resources, including the Arctic North, which exclude independent participation of foreign companies is defined allowing only their joint activities with the State companies “Gazprom” and “Rosneft”
6	Government directive №987-P “On the plan of comprehensive stimulation of development of hydrocarbon deposits on the continental shelf of the Russian Federation...” (07.06.2014)	Status of objects of offshore deposits exploration in the Arctic zone of the Russian Federation is clarified including vessels and sea stationary platforms; measures on creation of infrastructure, human resources and environmental safety of the surrounding areas are defined
7	State program of the Russian Federation “Socio-economic development of the Arctic zone of the Russian Federation for the period up to 2020” (approved Government directive, 21.04.2014 No. 366)	The directions of socio-economic activities in each region including the Arctic zone of the Russian Federation are identified; descriptions of the planned actions in the socio-economic field of the region with the amount of the financing, terms of implementation and expected results are covered

Analyzing the legal and regulatory basis of the Arctic regions’ development, one can mention that it has more theoretical character than practical. For instance in “The Strategy of region’s development till 2020” like in many other documents main aims, tasks, methods and directions of the strategy realization are described in a form of thesis, however no particular activities and measures which could lead to the development of the Arctic zone are presented. Moreover, there is no system aimed at both providing of monitoring and control over the Strategy realization and appointing people who will be responsible for the achievement of the results.

Herewith quite significant funding supports these legal acts. For example, according to the State program of the Russian Federation “Socio-economic development of the Arctic zone of the Russian Federation for the period up to 2020” total amount of funding in 2015-2020 will be 221 822 million rubles. Figure 1 shows the dynamic of the planned financing in the structure of socio-economic development of the Arctic zone. The biggest amount was contributed in 2015 (about 50 billion rubles); the dynamic of investments from 2018 to 2020 is decreasing. The expected total income of the Russian Federation’s budget due to the realization of the Strategy will be about 3,2-4,0 trillion rubles [23].



**Figure 1:** The dynamic of the planned investments to the development of the Russian Arctic, thousands rubles [23]

Such significant funding for the Arctic region’s development leads to the need of a thorough analysis and developing of specific and more effective activities in modern conditions, creation of the relevant legal basis and creation of the effective system of monitoring and control over the achievement of the goals, objectives and indicators. This is the only way to achieve the effect of the financial investment to the region’s development.

### **Analysis of innovative infrastructure of the Russian Arctic**

Development of innovation infrastructure is a fundamental part of the innovation process. According to “The concept of the Russian Federation long-term socio-economic development for the period until 2020” and “The strategy of Russia innovative development until 2020”, the construction of the innovation infrastructure is one of the main tasks for the innovative activities development in Russia, including the Arctic.

Nowadays, there is no unified term for innovation infrastructure in the world and no unanimity between scientists.

Some of authors call infrastructure for innovations development and implementation “infrastructure to support open innovation” [25,26] or “innovation support infrastructure” [27,28], and also “system of innovation supporting innovation” [29].

However, the meaning is the same – it is some type of support which is necessary in all phases of innovation activity (from research results, produced in laboratories to industrial exploitation) (professional skills and services, different institutions and organizations).

Russian scientists also pay attention to effective development of innovation infrastructure [30,31]. Some of them suppose that it means the system of the subjects of innovative activity, resources and facilities, serving innovative activity in terms of logistics, organizational, methodical, financial, information, consulting and other support [31].

In this paper, we use the term “innovation infrastructure”, which means a complex of organizational and economic institutions that provide conditions for the implementation of innovative processes of economic entities based on the principles of economic efficiency.

Innovation infrastructure can be divided into the following functional areas: transport and communications; information and telecommunications; loans and finance; stock market; institute of intermediaries; companies and firms that provide special and consulting services, etc. [32].

Within one of the major theoretical approaches the following basic blocks of innovation infrastructure can be distinguished [33]: research, production and technology, expert and consulting, finance, personnel, informational, distribution.

Research block consists of State research centers (SRC), and other various research centers and specialized institutes, universities, scientific and industrial complexes.

Production and technology block is represented by such organizations as the Association of techno parks in the sphere of high technologies (established in 2011), National Association of Business Incubators (established in 1997), the Union of innovation and technology centers in Russia

(established in 2000) and several other.

Expert and consulting block is represented by organizations that provide a variety of services on intellectual property and its legal protection, standardization and certification of products and services. Furthermore, there are consulting centers specializing in marketing, finance, investment, project management, investment management, etc. This is the National Association of innovations and innovative technologies development (NAITD, established in 2006), Russian Technology Transfer Network (RTTN, established in 2002) and some others.

The financial block is represented by different types of funds involved in supporting and financing of innovative projects in various stages of their development. It can be budget funds, non-budget funds, venture capital funds, insurance funds, investment funds and other kinds of funds and financial institutions. For example, the Foundation for Assistance to Small Innovative Enterprises in the scientific and technical sphere (Bortnik Fund, established in 1994), the Russian Association of Direct and Venture Investment (RAVI, established in 1996), the Commonwealth of Russian Business Angels (CRBA, established in 2006 ) and some others.

Personnel block is a variety of educational institutions that specialize in personnel training and retraining in innovation management, scientific and technological entrepreneurship, project management, marketing, finance, etc.

Informational block is represented by a regional system of State scientific and technical information centers, as well as regional information networks. Most of the information on the development of innovations in Russia is presented on the Internet.

Distribution block is represented by a variety of exhibitions, fairs and salons of new technologies, innovations and investments. It also comprises different professional associations and intermediaries.

Regarding the innovation infrastructure condition of the Arctic zone of Russia at the moment we can name following innovative platforms:

- Arctic Innovation Center of North-Eastern Federal University in Yakutsk;
- Arctic Research Center of the Yamal-Nenets autonomous district (Salekhard);
- Technopark of Tyumen State University;
- Autonomous institution of Khanty-Mansiysk Autonomous Okrug - Yugra “High Technology Park” (Khanty-Mansiysk);
- Technopark “Yakutia”, a venture company, agency of innovative business coordination and innovation and technology centers (Yakutsk, Mirny and Neryungri);

- Innovation cluster of Northern (Arctic) Federal University (Arkhangelsk);
- “Technopark of Yamal District” (Salekhard);
- Murmansk Technopark.
- The following platforms are projected [34]:
- The Global Arctic research and innovation complex: Research Centre for the Arctic study, the Centre of the inter-regional expeditions “Arktika”, the Arctic high-latitude research scientific laboratory, the Arctic scientific and educational center, National Research of the Yamal-Nenets Autonomous District Development Fund (Salekhard);
- International multifunctional complex “Energy of the Arctic” (Salekhard);
- Network of the Northern and Circumpolar Chambers of Commerce and Industry and Business Associations “CCI KhMADYugra” (Khanty-Mansiysk);
- The Arctic Industrial Park (Norilsk).

Thus, despite the fact that some innovative platforms in the Arctic region are operating, there is no comprehensive and systematic approach to the issue of innovative infrastructure development. There is no clear understanding of the role of these platforms in the innovative development of the region; it is not clear what are the integration link between them and how the efficiency and effectiveness of their work can be

estimated, etc.

Besides, it is unclear what approach is used when creating innovative infrastructure of the Arctic region. We will try to note the main theoretical approaches and to prove the best possible approach.

## MAIN RESULTS

### The main approaches to the development of innovation infrastructure in the Russian Arctic

Every innovation activities can come from two different ways - “technology- push” and “market-pull” [35,36]. So, these approaches can be applied for harmonious and well-functioning innovation infrastructure development.

The approach “technology- push” means that the direction of innovation is determined by the strategy, which is determined by the State. In that case regional innovation are determined not in accordance with the regions’ needs, but in accordance with the strategy as a whole.

The other approach – “market-pull” - implies that the region uses research and development (R&D) and scientific resources according to its needs that allows achieving results in the short term.

In addition, it is possible to use the “Combined” approach, which is a combination of the two above mentioned approaches. In table 2 the main advantages and disadvantages of these approaches for Arctic zone of Russia are presented.

**Table 2:** The main approaches to the development of innovation infrastructure in the Russian Arctic

Approach	Advantages	Disadvantages
“Technology-push”	<ul style="list-style-type: none"> <li>– Efficient use of R&amp;D and scientific resources</li> <li>– Stimulation of innovation infrastructure facilities to speed up R&amp;D</li> <li>– A unified development strategy, which corresponds to the projects of regional innovation and research centers</li> </ul>	<ul style="list-style-type: none"> <li>– Possible obstacles to the implementation created by the objects of regional infrastructure</li> <li>– - Possible loss of developments of regional research and innovation infrastructure objects</li> </ul>
“Market-pull”	<ul style="list-style-type: none"> <li>– -Research and innovation centers in the regions focus on projects relevant to their region, that leads to improving of innovation activities efficiency</li> <li>– High flexibility of the innovation infrastructure objects</li> </ul>	<ul style="list-style-type: none"> <li>– Possible inconsistency of the regional research projects with a common strategy</li> <li>– The need for effective coordination of objects at all levels</li> <li>– The possibility of innovative activity development in the too specialized field</li> </ul>
“Combined”	Has the advantages of each approach and the possibility of flexible management depending on the goals	<ul style="list-style-type: none"> <li>– The complexity of building the balanced infrastructure of innovations development</li> <li>– Significant capital intensity of the coordination and management of innovation infrastructure objects</li> </ul>

As already noted, the developed innovation infrastructure is a key factor of effective innovation activity in the country and the region.

Prospects of the Arctic development are directly connected with the strategy of innovative development realization. It should be noted that for the already balanced innovation infrastructure “Combined” approach would be most beneficial for its further development. However, the implementation of this approach requires substantial investment and established harmonious infrastructure with appropriate legal regulation. As described earlier, the innovation infrastructure of the Arctic is still not perfect, and for its development model “market-pull” should be used instead of “technology- push” model, which means that the end consumer does not defines the purpose of the study or creation of technology but a researcher. This situation leads to the development of areas that have no economic demand. Initially it is necessary to identify a priority of technology development and only then proceed to the innovation cycle (applied research – R&D and technological solutions – production and output to market). Use of this model allows strengthen the competitiveness of Russian technologies and products on the market.

#### **Main principles of development of mineral recourses complex of Russian Arctic**

Thus, an innovative approach today is the basis for the further effective development of the Russian Arctic.

Based on the conducted research it can be concluded that there are a number of significant problems impeding the effective development of the Arctic region, such us:

- relatively low level of interaction efficiency and coordination of the innovation infrastructure system elements;
- declarative nature of legal and regulatory framework;
- low level of innovations implementation;

- lack of legal regulation of innovation activity;
- low level and non-systematic approach to the creation of innovation infrastructure and others.

One of the factors is the lack of effective governance and the weak control over the implementation of the State strategies and programs.

A critical issue is also the creation and operating of a powerful innovation-oriented infrastructure complex in the region, based on the principles of transparency and systematic functioning.

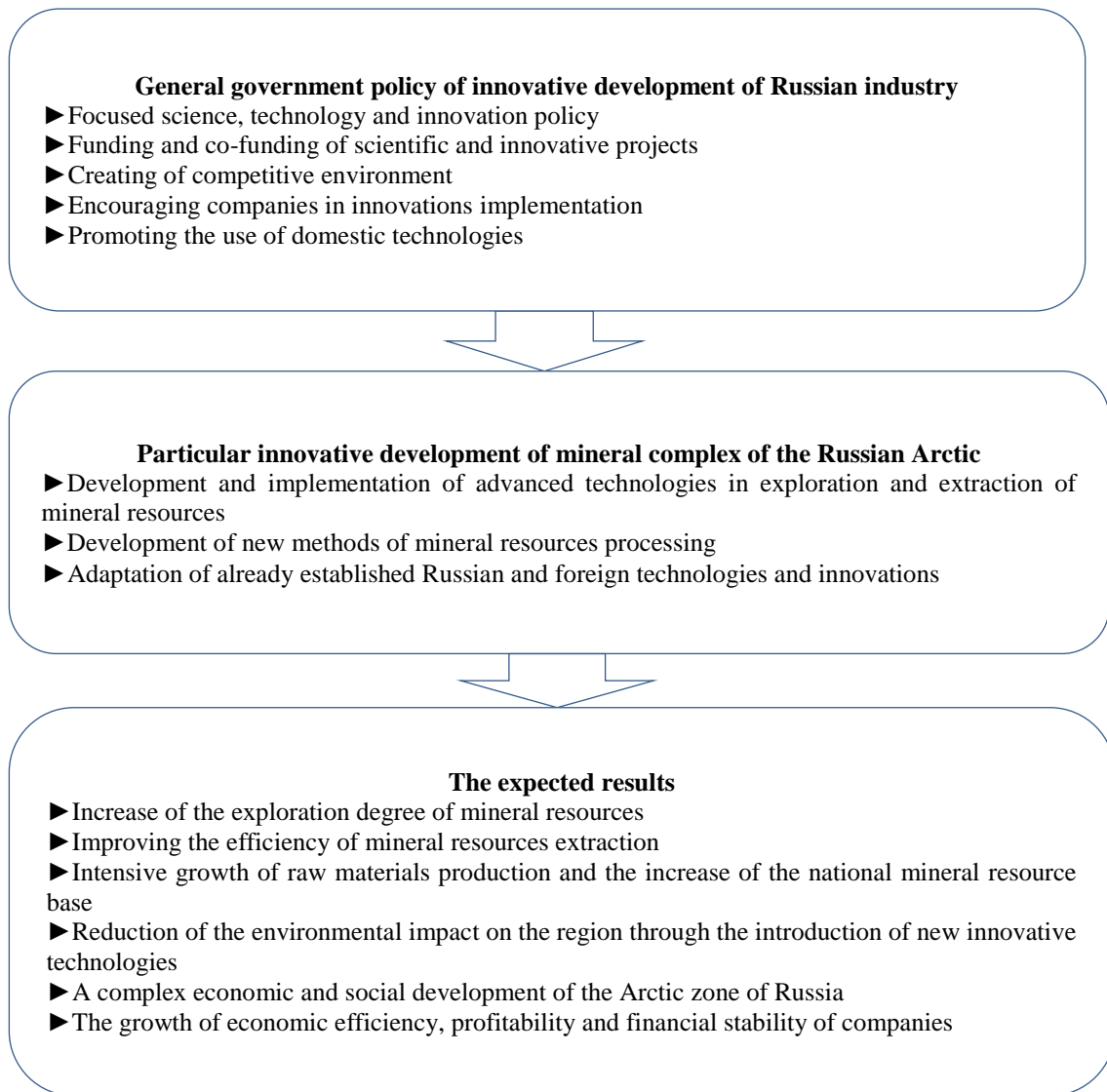
In the industrial sphere, it is necessary to focus on the introduction of new knowledge and innovation in oil and gas industry because of the growing interest from the international side to this issue.

As it was noted above, the significant mineral resources in the region determine the strategic importance of the Russian Arctic. As one of the results of our research, we suggest the following scheme of development of the mineral resources complex of the Russian Arctic, which is the primary complex of the region (Figure 2).

In the context of innovative development of the Arctic mineral complex, it is necessary to pay attention to the existing mining, oil and gas companies and to intensify attracting investments, equipment upgrading, attracting of highly qualified personnel, etc.

In the current market conditions of the various sanctions use, it is important to support companies through a policy of import substitution.

A good example in this direction is the creation and support of the so-called “Aluminum valley” by the Russian government in the Arctic region, which involved a considerable margin of “RUSAL” company and other producers of aluminum industry in the country.



**Figure 2:** The general scheme of development of the Arctic mineral resources complex

## CONCLUSIONS

Therefore, the Arctic region of the Russian Federation is strategically important for the State development due to its unique mineral raw material base, prospects of the logistics and infrastructure development and other factors. The development of the Arctic zone requires innovative approach to all spheres. Only development and implementation of effective legal basis supported by particular plans, system of monitoring and control, as well as effective use of significant investments, aimed at the comprehensive development of the region, can make achievement of the assigned tasks possible.

Moreover, now legal documents on regulation of the development of the region and innovation activities have rather declarative nature. The effective development of the region requires the adoption and justification of specific activities and measures, taking into account all the geographical, climatic, demographic, economic and social

conditions of the separate entities of the Russian Federation Arctic region. Tightening of the State control over the innovative policies in the territorial entities, especially in cases of financial resources distribution is a prerequisite.

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