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Prospects for the Development of the Northern Sea Route and Logistics through the Seaport of Arkhangelsk

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Abstract. The article outlines the relevance of the research topic related to the strategic orientation, within the framework of which the modernization of the Northern Sea Route and the implementation of major projects in the northern regions and in the Arctic zone are planned. The object of the study is the Northern Sea Route (NSR), and the subject is the analysis of its development prospects. The study is aimed at assessing the current state of the NSR and the role of the Arkhangelsk Oblast, highlighting the advantages of northern maritime logistics and the prospects for its development. This research involved an extensive review of analytical materials, reports from specialized institutions and scientific publications. A mixed methodology was implemented, integrating both qualitative and quantitative approaches. Qualitative methods included observation, interviewing, expert assessments and testing. Quantitative methods, including questionnaires and monitoring, were also used to ensure a comprehensive analysis. Processing of the obtained information was carried out using methods of analysis and synthesis, comparison, as well as an empirical approach. The paper identifies the main directions of cooperation in the Arkhangelsk Oblast related to the reorientation of cargo supplies along the NSR. In the current geopolitical conditions, the use of the NSR capabilities is one of the key priorities in cooperation with the People's Republic of China. Another promising area of cooperation with the Arkhangelsk Oblast is the development of logistics along the NSR through the seaport of Arkhangelsk with the Republic of Belarus. The importance of the NSR is associated with the establishment of an orderly supply scheme for remote territories of Russia, which will allow forming an integrated approach to the organization of northern delivery. Such promising areas of development of the northern trajectory require modern maritime and land infrastructure. In this regard, the Comprehensive plan for the development of the Arkhangelsk transport hub for the period until 2035 has been adopted. An analysis of the accumulated experience of the NSR operation shows that this route has become an important element in global supply chains in recent years. The potential of the NSR as an alternative route can become a significant factor in the formation of new economic ties and strengthening Russia's position in the Arctic.

Keywords: Northern Sea Route, marine infrastructure, Arkhangelsk transport hub, investment projects

Introduction

Russia is entering a new phase of economic development, characterized by intensive development of the Arctic territories. The level of development of Arctic natural resources is approaching an unprecedented level, surpassing even the Soviet period. In 2022–2024, the Arctic

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region of the Russian Federation has become the center of attention for the entire transport sector¹. Against the backdrop of growing geopolitical tensions and increasing risks in traditional maritime trajectories, the NSR is becoming increasingly important not only for Russian, but also for foreign shipping companies. This trend leads to a noticeable increase in the intensity of shipping along this route. According to the results of 2023, the volume of cargo traffic along the NSR reached an absolute record and amounted to 36 million tons (Fig. 1). Plans for 2024 are even more optimistic².

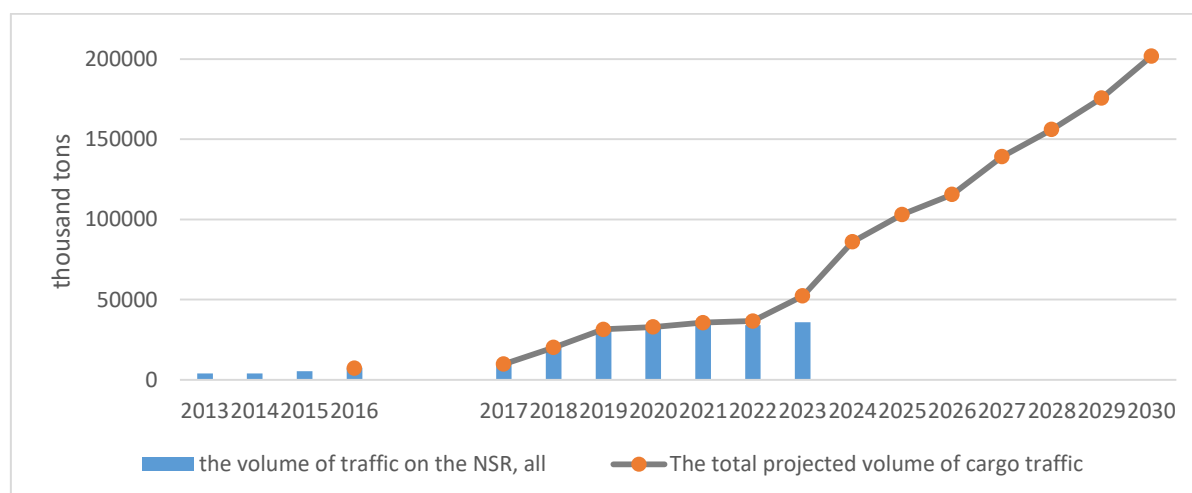


Fig. 1. Cargo traffic volumes along the NSR. Source: compiled by the authors based on analytical data and data from^{3,4}.

This positive trend of increasing cargo turnover is emphasized by the Minister of the Russian Federation for the Development of the Far East and the Arctic A.O. Chekunkov: "Suffice it to say that over the past seven years, cargo turnover along the NSR has increased eightfold and is expected to reach 200 million tons in the next seven years"⁵.

The NSR is the main factor providing transport links to hard-to-reach areas of the Arctic Zone of the Russian Federation, and in some situations, this mode of transportation is the only possible option for delivering cargo. The Minister of the Russian Federation for the Development of the Far East and the Arctic A.O. Chekunkov underlines that the active development of this route can significantly change the economic map of the country. With the help of the NSR, it is possible to reduce the time of cargo delivery between Europe and Asia, which will attract investors and allow the development of the richest resources of the Arctic⁶. The main focus is on the infrastruc-

¹ Trends in maritime freight transport in 2023. URL: <https://index1520.com/analytics/tendentsii-morskikh-gruzoperevozok-v-2023-godu/> (accessed 01 August 2024).

² Analytical study of Marinet market status and trends in 2023. URL: [MARINET-H2-2023-Digital.pdf](https://marinet-h2-2023-digital.pdf) (accessed 01 August 2024).

³ Order of the Government of the Russian Federation No. 3120-r of 21.12.2019. URL: <http://government.ru/docs/38714/> (accessed 05 August 2024).

⁴ UISIS (fedstat.ru). URL: <https://www.fedstat.ru/indicator/51479> (accessed 01 August 2024).

⁵ The Northern Sea Route: development. URL: <https://iz.ru/1528371/2023-06-14/chekunkov-rasskazal-o-zainteresovannosti-stran-v-razvitii-severnogo-morskogo-puti?ysclid=m0e8cgy7ws53712929> (accessed 27 August 2024).

⁶ Minister for the Development of the Russian Far East Alexey Chekunkov: Development of the Northern Sea Route is a ticket to the prosperity of the future Russia. URL: <https://www.kp.ru/daily/27517.5/4779609/?ysclid=m0e8lma4fk289396378> (accessed 01 August 2024).

tural development of the region: the construction of ports, the modernization of navigation systems and the improvement of communications. A.O. Chekunkov emphasizes the need to create an accurate map of Arctic shipping routes for safe and efficient navigation. This is especially important in the context of climate change, when ice conditions are becoming more predictable. In addition, the Minister notes the importance of international cooperation for the successful operation of the NSR. Opening up new prospects requires interaction with neighboring states, scientific communities and businesses. Joint initiatives can contribute to the creation of a stable and safe transport network in the Arctic.

The President of the Russian Federation V.V. Putin has set the task of increasing cargo turnover along the NSR to 80 million tons per year by 2024, and to 150 million tons by 2030 ⁷. In order to implement the instructions of the President of the Russian Federation following the results of the meeting on the development of the Arctic zone of the Russian Federation (No. Pr-868 dated May 22, 2022), the Northern Sea Route Development Plan for the period up to 2035 was approved by the Order of the Government of the Russian Federation of August 1, 2022 No. 2115-r ⁸.

Therefore, the formation of a modern and highly productive logistics infrastructure is a key factor in the successful implementation of large-scale projects to use the natural resources of the Arctic and promote the socio-economic progress of the region ⁹. The Arctic transport system is a project to create an integrated multimodal transport network. It will include sea and river transport, aviation, pipelines, rail and road communications. The NSR will be modernized by updating and integrating navigation, hydrographic and hydrometeorological support. These measures are being implemented in order to ensure safety and improve the efficiency of the entire transport infrastructure of the region. Arkhangelsk, as one of the main ports of the NSR, has the potential for significant participation in the organization of cargo transportation between the northern territories of the Russian Federation and foreign countries. Large-scale renewal of the Arkhangelsk port infrastructure, including modernization of terminals and increasing throughput capacity, will be a key factor in attracting international freight carriers. Investments in new technologies and logistics will help to improve the quality of service and reduce delivery time. In addition, Arkhangelsk has a favorable geographical position, which allows it to be an effective cargo transshipment point. Given the growing demand for environmentally friendly routes, the NSR and the port of Arkhangelsk can take a leading position in the transportation of goods. Taking into account the importance of the Arkhangelsk seaport in the NSR, the Governor of the Arkhangelsk Oblast A.V. Tsybulskiy focuses on the need to modernize the infrastructure and improve the logistics

⁷ Information and analytical collection of materials. URL: https://parlib.duma.gov.ru/common/upload/document_pravchas/I__ghsf200324.pdf?ysclid=m0fia5sir8868281817 (accessed 21 August 2024).

⁸ Ibid, p. 21.

⁹ Decree of the President of the Russian Federation of October 26, 2020 No. 645 "On the Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035". URL: <http://www.kremlin.ru/acts/bank/45972/> (accessed 01 August 2024).

system. Arkhangelsk, as a key transit hub, plays a significant role in trade not only for Russia, but also for the countries of Northern Europe, ensuring the competitiveness of cargo transportation in the global economy. The Governor emphasizes that in order to achieve the set goals, it is necessary to implement investment projects and attract private investors. A.V. Tsybul'skiy notes that the region has already started to create a new transport hub. The trial sea freight traffic to China, which started last year, will become the basis for launching new transport lines this year¹⁰.

Thus, the Arkhangelsk seaport, possessing rich potential, should become the center of economic development, and its further development depends on the joint efforts of all interested parties.

Object and methods of research

The object of the study is the current state and modernization of the NSR. The aim of the study is to analyze the current state of the Northern Sea Route, its importance for the transport system of Russia and for the Arkhangelsk Oblast, highlight the advantages of northern maritime logistics and the prospects for its development.

In the course of this study, an analysis of analytical materials, reports of specialized organizations and scientific literature on the NSR was conducted. Comparison of the obtained data with the results of previous studies and existing theoretical concepts made it possible to interpret the results more accurately and identify the main factors. Qualitative and quantitative methods were used for the study. Among the qualitative methods, observation, interviewing, expert assessments and testing were applied. The study used the methods of expert survey and brainstorming with specialists and experts in the transport industry and government officials to identify trends and problems in the development of the NSR. This enabled us to gain an in-depth understanding of the changes that have taken place and to identify the most important factors affecting the development of the NSR. These were complemented by quantitative methods, namely questionnaires and monitoring. The methods of analysis and synthesis, comparative analysis, and empirical research were used to process heterogeneous data.

Scientific research review

The Northern Sea Route (NSR) has recently attracted particular attention from researchers due to climate change, which is creating new opportunities for shipping and trade. The research area covers a wide range of issues, such as the environmental impact, geopolitical consequences, and economic efficiency of using the NSR. Scientists are focusing on the impact of climate change on ice conditions, which makes it possible to predict how the accessibility of the NSR will change in the coming decades.

¹⁰ Alexander Tsybul'skiy: "We should transport at least 600 million tons of cargo per year via the NSR". URL: <https://spb.vedomosti.ru/economics/characters/2024/06/11/1043319-aleksandr-tsibul'skii-mi-dolzhni-perevozit-po-smp-minimum-600-mln-t-gruzov-v-god?ysclid=m0e4gs9cx297567721> (accessed 27 August 2024).

Among the first economic studies comparing the Northern Sea Route (NSR) with the traditional routes through the Suez Canal, it is worth noting the work of M. Liu and J. Kronbak [1]. The researchers concluded that a 40% reduction in distance when using the shortest sea routes does not lead to a corresponding reduction in operating costs, which increase due to the use of ice-breaker support in harsh navigation conditions of shipping. According to O. Faury and P. Cariou [2], fuel costs at shorter distances of northern sea routes do not decrease, but, on the contrary, increase when operating ships in difficult navigation conditions. Other specialists and scientists also carried out calculations of transport costs along the NSR. Thus, the study by F. Lasserre [3] revealed that the competitiveness of the NSR can increase with an intensification of its use. At present, the level of NSR operational utilization in the northern latitudes remains insufficient. Researchers H. Schoyen, S. Brathen [4] concluded that the use of ships along the NSR is more profitable for the transportation of liquid and bulk cargo compared to container cargo. Another aspect of studies is the seasonality of NSR navigation despite climate change and increased ice melting. Researchers, using model calculations, argue that the NSR can effectively operate for a short period [5, Zaostrovskikh E.A.]. During the period of operation from August to November, the NSR does not provide for economically justified cargo navigation. The authors' attitude to foreign researchers who raise issues related to the NSR route is ambiguous. Many of them tend to focus on environmental threats and economic risks, not forgetting to mention the geopolitical importance of this route. Although such problems really deserve serious analysis, sometimes it seems that the authors do not delve deeply enough into the context, leaving aside the significant advantages and opportunities offered by this route. Criticism of the NSR often focuses on the negative side, ignoring the environmental and navigational safety advances that have been made in recent years. Modern technologies that allow minimizing the impact on nature do not receive due attention from foreign analysts. This creates a one-sided view of the situation, which, of course, does not contribute to an objective discussion. In addition, it is worth noting that in some cases the emphasis on problems may be caused by political motives. Therefore, it is important to bring an additional, more multilayered perspective to the topic, taking into account not only the risks, but also the potential benefits that could have a positive impact on international co-operation and the development of the Northern Sea Route.

Extensive studies of the Arctic and the North are presented in the works of the authoritative Russian scientist Yu.F. Lukin, who also pays special attention to the geopolitical aspects of NSR management [6]. The scientist emphasizes that the NSR is not only an important transport artery, but also an arena of geopolitical struggle between states seeking to assert their interests in this strategically important region. Another scientific work by Yu.F. Lukin [7] presents a comparative analysis of the Arctic strategies of the two powers (Russia and the United States), showing not only the differences in approaches to the development of this strategically important region, but also the fundamental civilizational differences between the two powers. We agree with the scholar that these differences in strategies reflect not only political and economic interests, but also the

deeper cultural and historical contexts of both countries. Russia, with its thousand-year history of developing the North, sees the Arctic not only as a resource potential but also as part of its identity. The US has limited strategic and economic interests. In addition, the US increasingly focuses on military security in the region, which creates tension and increases the risk of conflict, while more important issues of cooperation and sustainable development remain in the background. Instead of uniting to solve common problems, such as environmental protection and climate change, the Arctic powers often become rivals. Thus, the archipelago of Arctic strategies becomes a mirror reflecting the complex relationship between the two civilizations.

The same position can be traced in the works of P.A. Gudev, a scientist of the E.M. Primakov National Research Institute of World Economy and International Relations of the Russian Academy of Sciences [8], who shows the strategic importance of the NSR for the Russian Federation. Although international norms of maritime law, including the 1982 UN Convention on the Law of the Sea, apply to the Arctic, the Russian Federation emphasizes the importance of applying its national legislation to regulate shipping along this route. As arguments, the scientist cites the historical practice of using the NSR, the environmental vulnerability of the Arctic. In the works of P.A. Gudev, the issue of compliance of national legal regulatory mechanisms with the provisions of the 1982 Convention is considered. According to the author, these mechanisms comply with the Convention and are based on international law. We agree with the author that the environmental vulnerability of the Arctic is becoming increasingly evident in the context of global climate change. Rising temperatures lead to melting glaciers and a decrease in the area of sea ice, which affects the region's ecosystems. Many animal species, such as polar bears and seals, are at risk of extinction due to the loss of their usual habitat. These changes entail not only environmental, but also socio-economic consequences, which require special measures. This causes disagreement among a number of states, including the United States of America, which have traditionally opposed the introduction of a unified regime for shipping along the NSR, believing that Russia's interpretation of the provisions of the 1982 Convention is excessive.

In order to analyze the efficiency of maritime trade routes, M. Stopford [9] suggests using three groups of parameters: capital costs, operating costs, and ship transition costs. The Russian scientist V.L. Erokhin continued the analysis of the use of trade routes for China, using the approach proposed by M. Stopford, and compared the economic efficiency of the NSR and the Suez Canal [10–11]. As a result of the research, the author concluded that the periodic use of the NSR is less economically efficient for China than the constant use of traditional southern land routes for delivering goods to Europe, since the costs of using the NSR often exceed the costs of southern sea transportation.

The same conclusion was reached by A.M. Novozhilov [12], who showed that the Northern Sea Route space could become an effective international transport corridor. A group of scientists (V.Yu. Kaminskiy, D.A. Skorokhodov and V.T. Vaskov) [13] studied the parameters of the operation of infrastructure facilities in the Arctic region and the Northern Sea Route.

Significant research on the NSR is conducted by Professor M.N. Grigoryev of the E.M. Primakov National Research Institute of World Economy and International Relations of the Russian Academy of Sciences [14]. One of the works analyzes the importance of forecasting the volume of transportation of mineral raw materials along the NSR. A method for forecasting the cargo flow of mineral raw materials is presented. The necessity of regular updating of the forecast to ensure its relevance is noted. Another study by M.N. Grigoryev [15] assesses the current state and prospects of development of the fleet of Arctic rescue vessels from the perspective of their readiness for operation in the conditions of year-round navigation. The study, conducted as part of the analysis of the state of the NSR infrastructure, revealed a serious fleet deficit for the implementation of effective search and rescue operations in conditions of medium and severe ice conditions. We support the scientist's conclusions: this region is indeed characterized by difficult climatic conditions, which significantly complicate navigation and increase the risks for ships. It is important to note that this region hosts a strategically important part of the fleet involved in international freight transport. The lack of specialized icebreakers and rescue vessels contributes to delays and potential threats to the safety of navigation. Analysis shows that in case of emergencies, the possibilities for prompt assistance remain limited, which can lead to disastrous consequences for both crews and the environmental situation in the region. Experts call for more active modernization of the existing fleet and the development of new technologies to cope with difficult ice conditions. Overcoming this deficit requires extensive investment and coordination on the part of government agencies and the private sector. Comprehensive measures are needed to create a unified system of maneuvering and interaction of rescue forces, which will increase readiness for emergency situations on the NSR. Such steps will help to ensure the safety of navigation and the preservation of the ecosystem of the Arctic region. The work of scientist G.V. Aleksushin [16] also presents a comprehensive analysis of the development of the Russian nuclear icebreaker fleet, covering its origin, operation and future prospects. A comparative study of the Soviet and modern stages of creation and use of nuclear icebreakers with emphasis on the evolution of their technical characteristics was carried out. The analysis of key tactical and technical parameters confirmed the similarity and proportionality of the designs of different generations of nuclear icebreakers. The dynamics of cargo turnover along the NSR for the period from 1933 to 2022 was studied, a close relationship between the growth of cargo flows and the development of the nuclear icebreaker fleet was revealed. These interdependencies were illustrated in the diagrams. The influence of both economic and political factors on the composition of the nuclear icebreaker fleet was analyzed. The reasons for the reduction in the number of nuclear icebreakers at the beginning of the 21st century, caused by a temporary decrease in cargo flows along the NSR, were studied. The optimal parameters of nuclear icebreaker grouping to ensure efficient operation of the NSR were determined.

The joint research paper by Yu.P. Ampilov and M.N. Grigoryev [17] presents a comprehensive analysis of a set of problems related to the large-scale development of natural resources in the Arctic region. The authors emphasize that the current strategy, mainly focused on the hydro-

carbon potential of the Arctic as the main factor in the growth of cargo turnover along the NSR, is incomplete, since such an approach does not take into account other resource and logistics capabilities of the Arctic, and does not include the risks in the global hydrocarbon market. In the current conditions of civilization development, which requires significant volumes of non-ferrous and rare-earth metals, many of which are present in the depths of the Russian Arctic, but for many years remained “in the shadow” of the oil and gas vector of development, such a situation leads to import dependence and vulnerability of the country. In this regard, the authors strongly recommend adjusting plans for the development of the Arctic, taking into account new challenges and realities, and provide convincing statistical data and factual materials to support their position.

Extensive research of the NSR is being conducted by scientists of the Northern (Arctic) Federal University named after M.V. Lomonosov (NArFU) in order to deeply understand the opportunities and challenges associated with the development of this strategic route. The scientists analyze various aspects, including environmental, economic and geopolitical, which affect the development of the NSR. Particular attention is paid to the study of climate change and its impact on ice conditions. Research shows that as ice cover decreases, new horizons for shipping are opening up, but warming may bring new challenges related to safety and environmental protection. In addition, the university's specialists are actively working on modeling transport flows and optimizing routes, which can significantly reduce the time of cargo delivery. Interaction with international partners is also an important aspect of the work, allowing for the exchange of experience and the introduction of innovative technologies. The important scientific research by the authoritative NArFU scientist Yu.F. Lukin has been noted above. However, it is important to note other studies of issues and problems related to the functioning and competition of sea freight transportation in the Arctic region. In one of his works, Yu.F. Lukin [18] analyzes the activities of the NSR in the period from 2012 to 2020, basing on legislative acts adopted in 1998, 1999 and 2012. Yu.F. Lukin studied an extensive list of domestic and foreign publications on the topic of the Arctic and the NSR. The analysis conducted by Yu.F. Lukin shows the importance of an integrated approach to the study of key aspects of the modern development of the NSR and its role in international trade. Based on the Novgorod chronicles, he traces the historical roots of the Arctic routes, which allows for a deeper understanding of the context of current geopolitical realities. The cartographic materials used in this study help to visualize changes in the navigation and logistics structure, emphasizing the strategic importance of the Northern Sea Route for Russia. In addition, the analysis of legislative initiatives and presidential decrees shows how modern policy has influenced the creation of a legal framework for the development of the Arctic. Government decrees and ministry documents complement this picture, illustrating the integration of various levels of governance within a single strategy. The study of the International Monetary Fund and the White Paper of China highlights the global economic trends that determine the interest of different countries in the Arctic. As part of the Polar Silk Road project, Yu. F. Lukin raises issues of sustainable development of the region, focusing on the need for social and environmental responsibility. This creates a basis

for further research aimed at harmoniously combining the interests of both states and local communities.

Another paper by scientists D.V. Bhagwat and V.A. Khalturinskaya from the Northern (Arctic) Federal University named after M.V. Lomonosov [19] also shows the importance of the NSR not only for Russia, but also on a global scale, since the modernization of the NSR will make it possible to transform it into a competitive world-class transport corridor.

Thus, the topic of research on the NSR in different contexts is relevant and significant. Recently, studies have been conducted on various aspects related to the use of the NSR, including political, social, economic, and environmental issues. An equally important aspect is the geopolitical dynamics arising around this route. Competition between states interested in access to the natural resources of the Arctic and in using the NSR for international trade requires careful analysis. Thus, the study of the NSR becomes an interdisciplinary task combining environmental, economic, and political research.

Results and interpretation of the study ***Comparative analysis of the Northern and Southern Sea Routes***

A comparative analysis of the Northern and Southern Sea Routes reveals their characteristics: both positive and negative (Table 1). The NSR, which runs along the Russian coast, significantly reduces travel time between Europe and Asia, which is especially important for trade. This route is becoming more accessible due to climate change, which reduces ice coverage during the summer months. However, it requires careful planning due to difficult weather conditions and infrastructure limitations. In contrast, the Southern Sea Route, which connects the Atlantic and Pacific Oceans via the Panama Canal, has a more developed port system and transport services. Although the Panama Canal route takes longer, it guarantees reliability and safety of transportation, which makes it attractive to many shippers. However, high tariffs for passage through the canal may negatively affect its competitiveness. At the moment, economic factors, seasonal fluctuations and environmental risks remain key factors in choosing between these routes. In the future, technological developments and changes in international politics may affect the attractiveness of both routes.

Table 1

Comparison of the NSR with the Southern Sea Route

<i>Element of comparison</i>	<i>Northern Sea Route</i>	<i>Southern Sea Route</i>
Length: St. Petersburg — Shanghai (China)	8 000 miles	12 500 miles
Length: Murmansk — Yokohama (Japan)	5 770 miles	12 840 miles
Ice cover / Requirement for icebreaker escort	9–10 months / yes	no / no
Need to use vessels with a high Arctic class	during the winter-spring navigation period	no
Possibility of year-round navigation	using icebreakers and high-class Arctic vessels	yes
Possibility of using ordinary vessels	limited	yes
Passage fee	no	yes
Increase in insurance premium	yes	no

<i>Element of comparison</i>	<i>Northern Sea Route</i>	<i>Southern Sea Route</i>
Developed infrastructure	no	yes
Queues for passage	no	yes
Passage through unfriendly countries	no	yes
Passage through pirate attack areas	no	yes

The strategic interests of the NSR development are also related to the implementation of large-scale projects in the North and the Arctic¹¹. The focus is on the extraction of mineral resources, which can be classified into two categories: hydrocarbons and minerals. Energy supply plays a decisive role in the development of solid minerals, since it directly affects the profitability of projects and their economic feasibility. In this regard, the key factor in the development of Arctic resources is the efficiency of energy supply. Investors need innovative technologies that provide autonomous energy supply in the difficult conditions of the Arctic. In 2023, a number of significant projects were implemented in the field of energy and shipbuilding. The key event was the successful transportation and placement of the gravity platform for gas liquefaction (GLP) at the Utrenny terminal of the Arctic LNG 2 project (NOVATEK)¹². Another achievement was the towing of the Severnoe Siyanie floating drilling rig along the NSR without icebreaker escort. Currently, more than 20 large investment projects of various natures are being implemented and planned in the Russian Arctic, the total volume of which exceeds 13 trillion rubles¹³. These projects form the basis for the development of more than 10 potential production clusters. The implementation of large-scale energy projects in this region has created the need to develop the transport infrastructure of the NSR.

Thus, the NSR cannot be called a key transport route in modern realities, but its role in the Russian transport system and on an international scale is increasing. This is facilitated by a number of factors (Fig. 2).

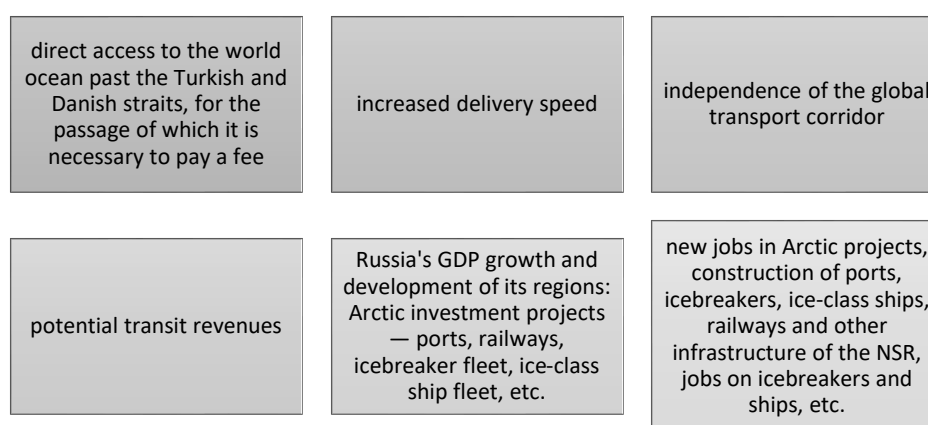


Fig. 2. Advantages of the NSR for the economy and business of Russia¹⁴.

¹¹ Analytical study of Marinet market status and trends in 2023. URL: MARINET-H2-2023-Digital.pdf (accessed 01 August 2024).

¹² Installation of the CDP of the first line of Arctic LNG-2 completed at the Utrenny terminal on the Gydan Peninsula. URL: <https://neftegaz.ru/news/spg-szhizhennyy-prirodnyy-gaz/790528-zavershena-ustanovka-ogt-pervoy-linii-arktisk-spg-2-na-terminale-utrenniy-na-p-ve-gydan/?ysclid=Iz878wedfi165301671/> (accessed 01 August 2024).

¹³ Arctic Russia — The First Hundred. URL: <https://arctic-russia.ru/project/pervaya-sotnya/?ysclid=Iz87cfmjvk47454287> (accessed 01 August 2024).

¹⁴ Compiled by the authors on the basis of analytical data.

The NSR is the shortest sea route connecting the regions of the Far East with the European territory of the Russian Federation. Its proximity to virtually untouched mineral resource deposits makes it a strategically important transport corridor. The most significant obstacle to using this route is the difficult ice conditions, which make it challenging for ships to pass without icebreaker support. During winter and spring navigation, ship traffic becomes completely impossible in some sections of the Northern Sea Route. At the same time, there is a significant change in climate in the Arctic region, characterized by rates exceeding the global average by 2–2.5 times¹⁵. Therefore, the prospects for the northern sea ports of the Arctic coast are large-scale. The Arkhangelsk Oblast, due to its geographical location and historical orientation to the Arctic, occupies a key place in the development of the NSR and the Arctic zone of the Russian Federation. The Arkhangelsk Oblast has serious competencies in shipbuilding and ship repair, port facilities are being developed, and the infrastructure of the Arkhangelsk Transport Hub (ATH) is being completely rebooted. The center of the ATH is the Arkhangelsk seaport — a multi-profile seaport for year-round navigation with a berthing front of over 8 km. The depth of the Arkhangelsk port fairway ensures the passage of ships with a draft of no more than 9.2 m and a displacement of up to 35 thousand tons. In addition to the transportation of goods related to Arctic projects through the port of Arkhangelsk, the region has a steady flow of its own products from forestry enterprises. These products can be delivered to the countries of the Asia-Pacific region via the NSR. In order to expand the production capacity of the ATH and increase its cargo transportation, the Pavlovskoe silver-bearing lead-zinc deposit located on Yuzhny Island within the Novaya Zemlya archipelago is an important resource. In the context of increasing the cargo flow of the port, its potential to increase transportation volumes should be noted. Attracting products from enterprises from the Republics of Karelia and Komi, as well as the Vologda Oblast, will make it possible to achieve a figure of at least 2 million tons per year.

Consequently, the NSR has a high potential and development prospects, which are ensured by natural competitive advantages, as well as large-scale technical re-equipment of the ATH, the seaport of Arkhangelsk, the analysis of which is presented in the section “Results and interpretation of the study”.

Current state of the Arkhangelsk seaport

In the current geopolitical climate, optimization of the NSR capabilities is of paramount importance for the formation of a global logistics infrastructure. “The Arkhangelsk seaport, being multifunctional and providing uninterrupted navigation throughout the year, has direct access to the World Ocean without the need to pass through the territorial waters of other states. This makes it a strategically important asset for international trade” [20, Rogachev I.V., Kovaleva E.N.]. It has an advantageous geographical location, and its remoteness from the western borders with

¹⁵ Warming in the Arctic is happening 2.5–3 times faster than on the planet as a whole — AARI. URL: <https://portnews.ru/news/331560/?ysclid=Iz8bhqp8I3716363960> (accessed 07 August 2024).

European countries makes it an attractive alternative for cargo transportation. Direct access to the World Ocean through the White Sea provides the opportunity to carry out sea voyages both along the NSR and through the Suez Canal without any restrictions. The delivery time for cargo from Arkhangelsk to Shanghai is 53–58 days using the Suez Canal and 20–22 days via the NSR.

Despite the fact that the port is prone to freezing, icebreaker assistance within the port ensures year-round navigation. The Arkhangelsk seaport is largely, namely two-thirds, focused on servicing northern shipments and cargo transportation, specializing primarily in handling of general and oil cargo. At the same time, the Arkhangelsk seaport has a number of competitive advantages (Fig. 3).

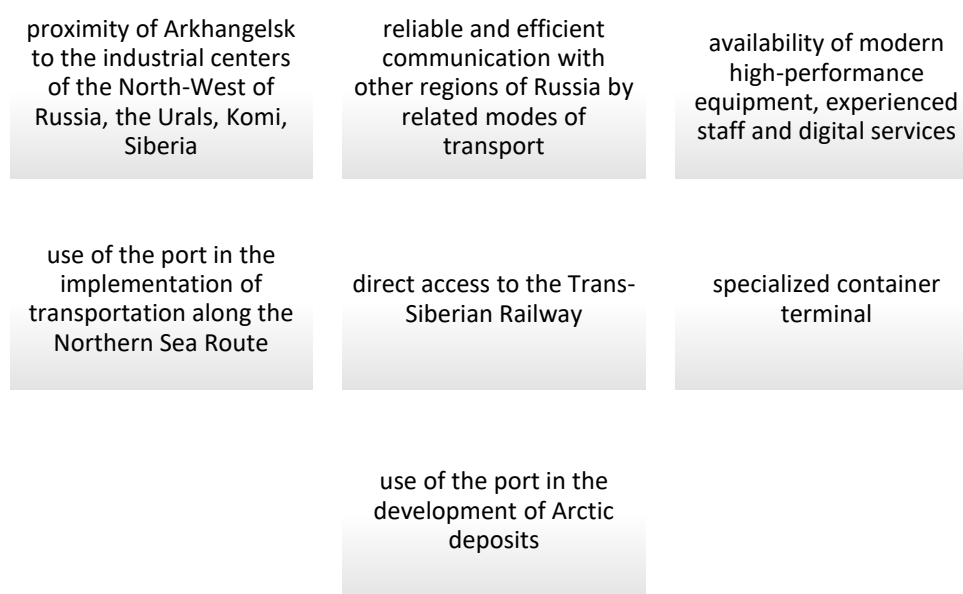


Fig. 3. Advantages of using the Arkhangelsk seaport ¹⁶.

The capacity of the Arkhangelsk seaport in terms of cargo turnover is approximately 11 million tons per year. However, the actual volume of cargo handling ranges from 4 to 6.5 million tons annually (Fig. 4). Consequently, there is potential for growth and capacity to increase the current cargo turnover.

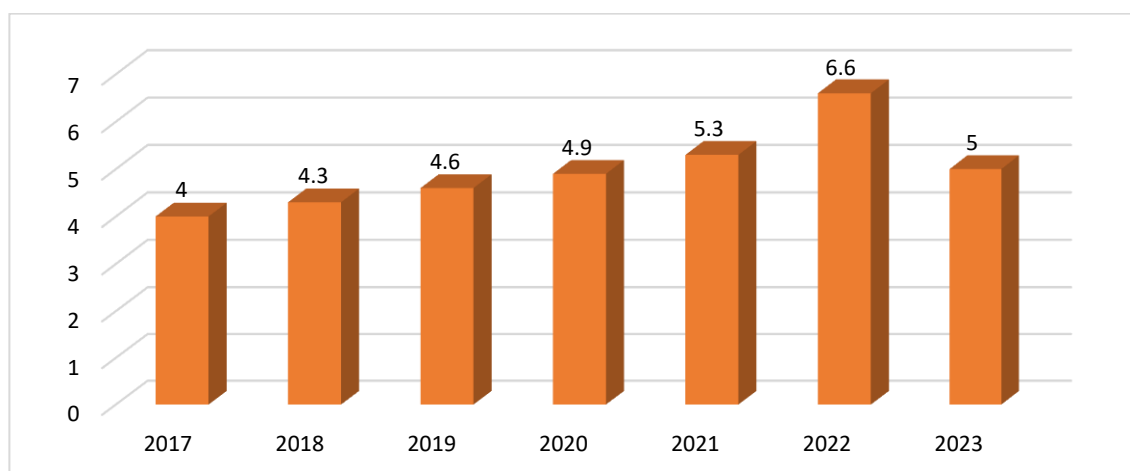


Fig. 4. Dynamics of cargo turnover of the Arkhangelsk port, million tons ¹⁷.

¹⁶ Compiled by the authors on the basis of analytical data.

The predominant share of cargo turnover in the Arkhangelsk port is sea transportation via the NSR (Fig. 5). The largest shippers of cargo are Norilsk Nickel, Severnaya Zvezda, Baimskaya Mining Company, Novatek, Gazpromneft and Rosneft.

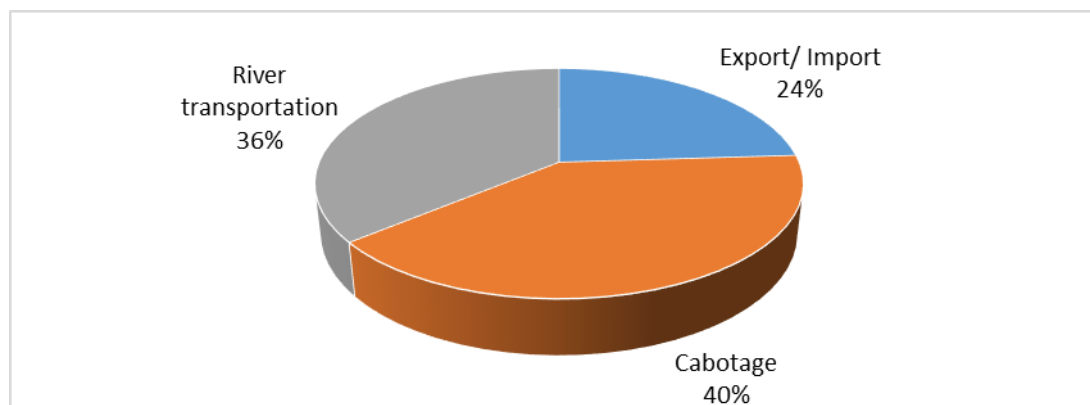


Fig. 5. Structure of cargo turnover of the Arkhangelsk seaport ¹⁸.

The Arkhangelsk port is a specialized terminal for transshipment of various cargoes that play a key role in supplying the Arctic region. A significant share of the port's cargo turnover is represented by cargoes for investment projects implemented in the Arctic. Its structure provides for the transshipment of complex and oversized cargo. The main cargo turnover of the northern port includes oil cargo, equipment, machinery, construction materials, timber and fish products. Forecasts for the volume of cargo handling in the Arkhangelsk seaport are positive: "Vostok-Oil for the period 2023–2024 — 500 thousand tons per year, Novatek — 1 million tons per year up to 2030, Norilsk Nickel — 220 thousand tons per year up to 2035" ¹⁹.

The Ekonomia terminal of the Arkhangelsk sea trade port has significant throughput capacities, providing for the simultaneous handling of five vessels with a cargo capacity of 25–30 thousand tons each. The annual volume of cargo handled at the terminal is 1.6 million tons. In terms of railway infrastructure, Ekonomia can handle 183 railcars simultaneously. The container terminal at Ekonomia covers an area of 89.9 thousand m² and has a simultaneous capacity of up to 7 thousand units in twenty-foot equivalent. The main type of cargo handled at the terminals of the Arkhangelsk seaport is general cargo, including non-standard and oversized cargo, which requires the port to have significantly greater competencies than, for example, working with bulk cargo.

Thus, the port of Arkhangelsk has terminal, shipping and ship repair capacities (Fig. 6).

¹⁷ Compiled by the authors on the basis of analytical data.

¹⁸ Compiled by the authors on the basis of analytical data.

¹⁹ On the development prospects of the Arkhangelsk seaport. Portal on the development of the Arctic. URL: <https://goarctic.ru/work/viktoriya-pestova-o-perspektivakh-razvitiya-morskogo-porta-arkhangelsk/?ysclid=m0fj4tiaxe308886548> (accessed 01 August 2024).



Fig. 6. Terminal, shipping and ship repair capacities of the Arkhangelsk port ²⁰.

Reorientation of cargo deliveries and cooperation on the NSR

The sanctions pressure that Russia faced in 2022 led to significant changes in the established logistics chains of shippers. Thus, the timber and wood-processing enterprises of the Arkhangelsk Oblast, which previously shipped almost 100% of finished products to European countries, have been forced to reorient their shipments towards Asia since 2022 and to switch from sea to rail transport. In this regard, the Eastern Railway is currently heavily loaded. The projected volume of freight traffic by enterprises of the Arkhangelsk Oblast is about 2 million tons per year. In the future, it is planned to completely reorient these cargoes to sea transportation along the NSR, which will reduce the load on the lines of the Eastern Railway.

There are also changes in the market situation in the field of cargo transshipment, including the Baltic Sea ports, with which the port of Arkhangelsk competes. As a result of sanctions imposed by Western countries, Russian enterprises have lost the ability to supply mineral fertilizers through the ports of the Baltic countries, resulting in a port capacity deficit of approximately 6 million tons per year. An alternative transshipment point for mineral fertilizers is the seaport of Arkhangelsk, which can handle over 1 million tons of mineral fertilizers per year.

Today, large international logistics companies are reporting an aggravation of the situation in the Red Sea and an increase in cargo transportation costs. Due to the current circumstances, they are forced to use an alternative sea route that goes around the Cape of Good Hope, which excludes the use of the Suez Canal. This route carries 1.3 billion tons of cargo annually, which corresponds to 12–15% of the total global maritime cargo turnover. However, the journey from St. Petersburg to China currently takes 90 days. In this regard, there is growing interest in using the NSR and, in particular, the Arkhangelsk seaport, as it is located closer than all other Arctic ports to the center of Russia, to the industrial centers of North-West Russia, the Urals, Komi, Siberia, and the route to China via the NSR takes only 23 days.

²⁰ Compiled by the authors on the basis of analytical data.

In order to develop the NSR, the International Container Logistics (ICL) project was created, which will carry out maritime container transportation between the eastern and western parts of Eurasia. Transportation will be carried out using own ice-class container ships. Fesco and ICL supported the proposal of the Arkhangelsk Oblast Government to include the Arkhangelsk port in the ICL project logistics chains for cargo transit along the Arctic route as a feeder port. Proximity to the center of Russia, a fairly short railway and road distances make Arkhangelsk the most convenient site for import and export cargo. The first stage involves the delivery of cargo by sea from Murmansk to Arkhangelsk (and/or in the opposite direction) on medium-tonnage vessels and further transportation by rail and road to central Russia, with the prospect of direct transportation of cargo via deep-water routes. The capacity of the feeder line is estimated at approximately 4 million tons of container cargo. The organization of such transportation can contribute to the inclusion of the Arkhangelsk seaport in the international transport corridor “North–South”. There is potential to increase cargo traffic in this direction to 75 million tons by 2040 ²¹.

In the current international relations, the development of cooperation with the PRC is considered one of the most important areas. China is beginning to actively use the NSR for cargo transportation to and from the Russian Federation, as it has a number of advantages over the traditional southern route. China is interested in the energy resources, solid mineral deposits, and biological resources of the Arctic region. In 2023, the Chinese shipping company Newnew Shipping Line “opened a regular container line between China and the ports of Arkhangelsk, St. Petersburg (Big Port), and Kaliningrad via the NSR. In 2024, an agreement was signed on cooperation in organizing 10–12 China—Arkhangelsk—China voyages” ²² along the NSR. The shipments are planned to be export-import, with a load of 500 to 700 containers per voyage. The planned import from China includes consolidated cargo and spare parts for cars, which, after unloading from the ship, will undergo customs clearance and will be transferred to rail transport for delivery to sales markets in Moscow.

One of the promising areas of cooperation with the Arkhangelsk Oblast is the development of logistics along the NSR through the seaport of Arkhangelsk with the Republic of Belarus. Before the introduction of sanctions against the Republic of Belarus (until 2022), the Republic’s exporters shipped their products through the seaports of Latvia and Lithuania. The total export cargo turnover of the Republic of Belarus until 2022 was about 30 million tons. The export specialization of the Republic of Belarus covers a wide range of goods, including potash fertilizers, oil products, sawn timber in standard containers, cars and equipment, as well as rolled metal products. Currently, the volume of Belarusian export cargo transiting through the territory of the Russian Federation is almost 20 million tons. Sea operators of the Arkhangelsk port offer Belarusian enterprises a range of services for

²¹ International transport corridor “North–South”: investment decisions and soft infrastructure. URL: https://eabr.org/upload/iblock/a2b/EDB_2022_Report-2_INSTC_rus.pdf?ysclid=m0gco9v38w348931036 (accessed 20 August 2024).

²² Lukin Yu.F. Arctic strategies of Russia and the USA. URL: http://imc-i.ru/userfiles/ufiles/Arctic_V_2024-04-02.pdf. (accessed 20 August 2024).

export with an acceptable competitive rate for cargo transportation to the ports of the People's Republic of China. Negotiations are currently underway with timber industry enterprises and logistics companies in Belarus.

Northern delivery

In 2024, the federal law "On Northern Delivery"²³ came into force. The adoption of this law is an important step in establishing an orderly scheme for supplying remote territories, which made it possible to form a single comprehensive national approach to organizing northern delivery. Experts believe that the introduction of a system of ranking and prioritizing cargo in combination with digital tracking of their movement when using the services of a single sea carrier will help to improve the efficiency and transparency of the northern delivery system²⁴.

In the Arkhangelsk Oblast, a significant part of the territories is remote from the regional center and has difficult transport accessibility. There are settlements that can only be reached in summer by water, while during the off-season (before the creation of winter roads) or in spring they are practically cut off from the mainland. They are located in seven districts of the Arkhangelsk Oblast. The mechanism of northern delivery is an important component of life support and development of the northern territories. The main nomenclature of northern delivery cargo is fuel, oil and lubricants, coal, construction materials, food, and other industrial goods for the population, most of them are included in the list of "first category northern delivery cargo"²⁵.

The law establishes a list of transport and logistics infrastructure facilities, the so-called backbone network, which is critical for building optimal logistics routes and ensuring uninterrupted supplies to the northern delivery territories. The development of these facilities will be carried out, among other things, within the framework of federal funding.

As part of the implementation of the federal law, the Government of the Russian Federation appointed a single marine operator for northern delivery for a period of fifteen years²⁶. Rosatom State Corporation became this operator²⁷; it will perform the functions of ensuring uninterrupted delivery of goods. The main tasks of the operator will be to ensure the safety of maritime transportation and to minimize the impact on the environment. In addition, the creation of a single maritime operator opens up new horizons for cooperation with private companies, which

²³ Federal Law "On Northern Delivery" dated 04.08.2023 No. 411-FZ (latest revision). URL: https://www.consultant.ru/document/cons_doc_LAW_453883/?ysclid=lz7bczoq5b77020909 (accessed 01 August 2024).

²⁴ Experts believe that the introduction of a cargo ranking and prioritization system, combined with digital tracking of their movement when using the services of a single sea carrier, will help increase the efficiency and transparency of the northern delivery system.

²⁵ Order of the Government of the Russian Federation dated 02.12.2023 No. 3462-R. URL: <https://normativ.kontur.ru/document?moduleId=1&documentId=461107&ysclid=m0gjujj12g367742962> (accessed 25 August 2024).

²⁶ Federal Law "On Northern Delivery" dated 04.08.2023 No. 411-FZ (latest revision). URL: https://www.consultant.ru/document/cons_doc_LAW_453883/?ysclid=lz7bczoq5b77020909 (accessed 01 August 2024).

²⁷ Rosatom State Corporation will carry out centralized management of the Northern Sea Route. URL: <https://www.consultant.ru/law/hotdocs/75922.html?ysclid=m0gfw7tul126505112> (accessed 21 August 2024).

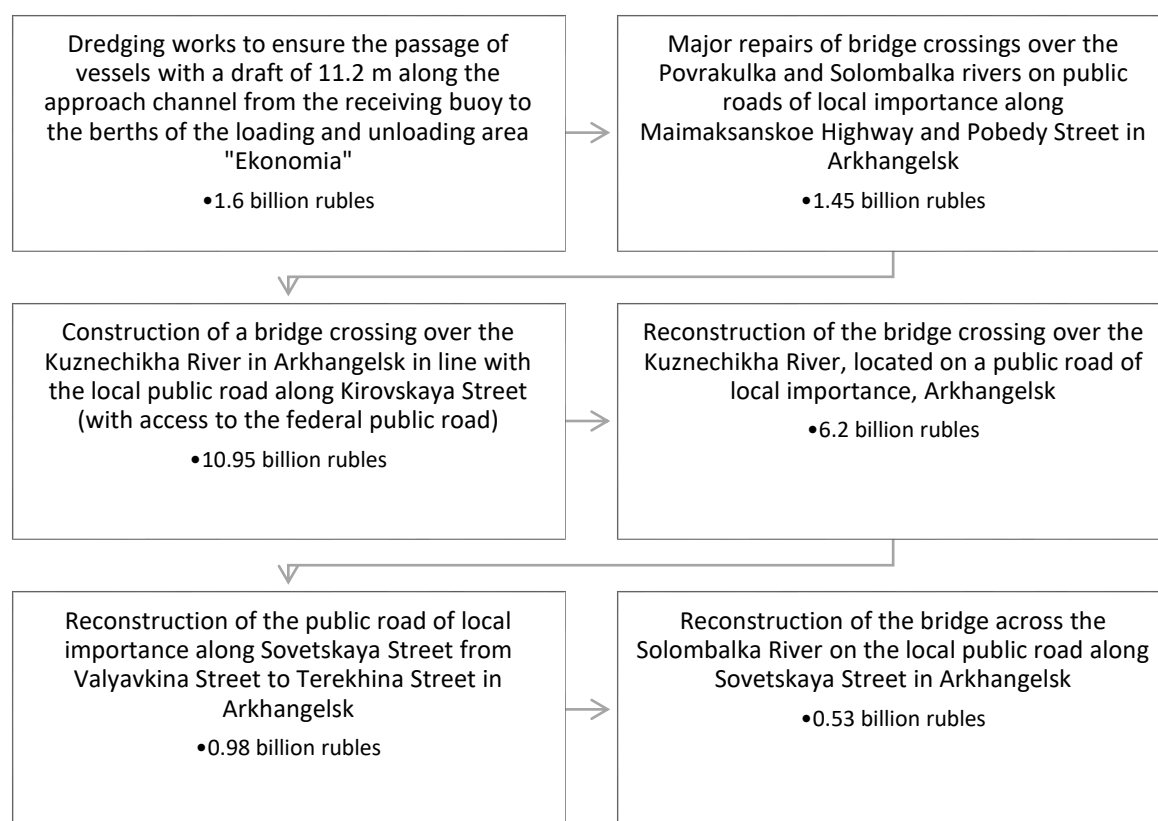
promotes investment attraction and infrastructure development. This, in turn, will have a positive impact on the regional economy, contributing to the creation of new jobs and the development of social programs. The Arkhangelsk Oblast is actively involved in the functioning of a single maritime operator, since delivery to the northern supply areas of the region by sea and river transport accounts for about 40% of the total volume of cargo delivered. At the same time, the potential of the main terminals of the Arkhangelsk transport hub is promising and includes 7 companies and a fleet of regional shipping enterprises. Their capacities can play a decisive role in organizing the transportation of northern supply cargo, meeting the needs of other subjects of the Russian Federation participating in this system. This will allow the Arkhangelsk seaport to become a key support point for ensuring northern delivery.

Comprehensive plan for the ATH development

The Arkhangelsk Transport Hub (ATH) plays an important role in the functioning of the Russian Arctic transport system. Currently, it is one of the main hubs for the transshipment of goods necessary for the implementation of existing and prospective projects in the Arctic.

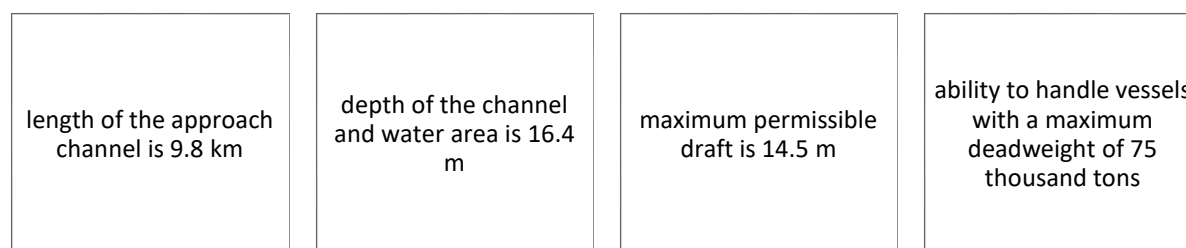
In September 2023, the Government of the Russian Federation approved the Comprehensive Plan for the Development of the Arkhangelsk Transport Hub until 2035. This decision clearly demonstrates the recognition of the key role of Arkhangelsk in the implementation of the country's socio-economic development strategy²⁸. The comprehensive plan for the development of the ATH provides for both the renewal of the existing transport and engineering infrastructure and the construction of new facilities. The implementation of this plan will be carried out in several stages. Currently, the priority is the development of port infrastructure, which will increase its throughput capacity. The comprehensive plan includes priority activities (Fig. 7). The total cost of implementing the plan will be 21.710 billion rubles.

²⁸ Order of the Government of the Russian Federation of September 22, 2023 No. 2555-r "On approval of a comprehensive plan for the development of the Arkhangelsk transport hub for the period until 2035". URL: <https://www.garant.ru/products/ipo/prime/doc/407659510/?ysclid=iz7b1slcoh870912324> (accessed 01 August 2024).

Fig. 7. Comprehensive plan for the ATH development ²⁹.

Deep-water area project of the Arkhangelsk seaport

The central element of the comprehensive program is a promising infrastructure project of federal significance — the creation of a modern seaport in Arkhangelsk (Fig. 8). The depth of the Arkhangelsk port water area will allow it to receive Panamax-type vessels ³⁰ with a displacement of up to 75 thousand tons. This will make the area a strategically important hub for ensuring northern deliveries and foreign trade operations in the central region of the Russian Federation and the countries of the Asia-Pacific region, in particular, for timber export.

Fig. 8. Key competitive advantages of the project ³¹.

Taking into account the wide range of cargoes to be transshipped, the volume of which is preliminarily estimated at 19.3 million tons, a multi-terminal model of the project is presented, which offers potential shippers any suitable terminal configuration. The project involves not only

²⁹ Compiled by the authors on the basis of analytical data.

³⁰ Classification of transport ships by size — Shipshub. URL: <https://shipshub.com/ru/article/1823-1.html> (accessed 01 August 2024).

³¹ Compiled by the authors on the basis of analytical data.

the construction of intra-port infrastructure, but also the modernization of the transport network, providing access to the new area. The project includes the construction of a 70 km long railway line and a 50 km long road.

In terms of reorientation of timber industry exports to eastern markets, cargo shipments via the deep-water area of the Arkhangelsk seaport will become the most cost-effective and efficient delivery option for enterprises of the Northwestern Federal District. The projected volume of container import-export shipments may reach 300 thousand containers (4.45 million tons) by 2032 and 600 thousand containers (8.9 million tons) by 2046, and half of this volume will be export of sawn timber.

In view of the restrictions imposed on the export of Russian metal products to European countries, the Northwestern Federal District and the Urals region are expected to expand their export destinations. Expansion and reorientation of metal products supplies to India and Southeast Asia is projected. Logistics via the NSR to the countries of the Asia-Pacific region will provide competitive conditions for shippers, which will strengthen Russia's position in friendly markets.

Taking into account infrastructure development, ferrous metals cargo turnover may reach about 4 million tons in 2050. The technological scheme of deep-water terminals allows for the combination of container and general cargo transshipment.

Growing demand for fertilizers in the Asia-Pacific region markets will stimulate additional demand for shipments in the eastern direction. The cargo turnover of the region will be provided by fertilizers sent to the countries of the Asia-Pacific region via the Northern Sea Route — up to 5 million tons by 2050.

The embargo on Russian oil products determines the relevance of using the deep-water area and the NSR for shipments to the markets of the Asia-Pacific region. The strategic partner in the implementation of the project for the construction of a new deep-water area of the Arkhangelsk port is the state corporation Rosatom, which is currently the single infrastructure operator and the largest port operator on the NSR. The deep-water area project is proposed to be divided into several stages of implementation to reduce the investment burden. The first stage of the container terminal construction³² includes the construction of two berths capable of receiving Panamax-type vessels. The design capacity of the terminal is 0.3 million containers or 4.45 million tons of container cargo per year. The cargo flows of timber industry enterprises in Arkhangelsk Oblast and neighboring regions have sufficient potential to ensure maximum loading of the terminal (4.5 million tons of export). The implementation of the project to construct a deep-water area at the Arkhangelsk seaport has a significant effect (Fig. 9).

³² On the development prospects of the Arkhangelsk seaport. Portal on the development of the Arctic. URL: <https://goarctic.ru/work/viktoriya-pestova-o-perspektivakh-razvitiya-morskogo-porta-arkhangelsk/?ysclid=m0fj4tiaxe308886548> (accessed 01 August 2024).

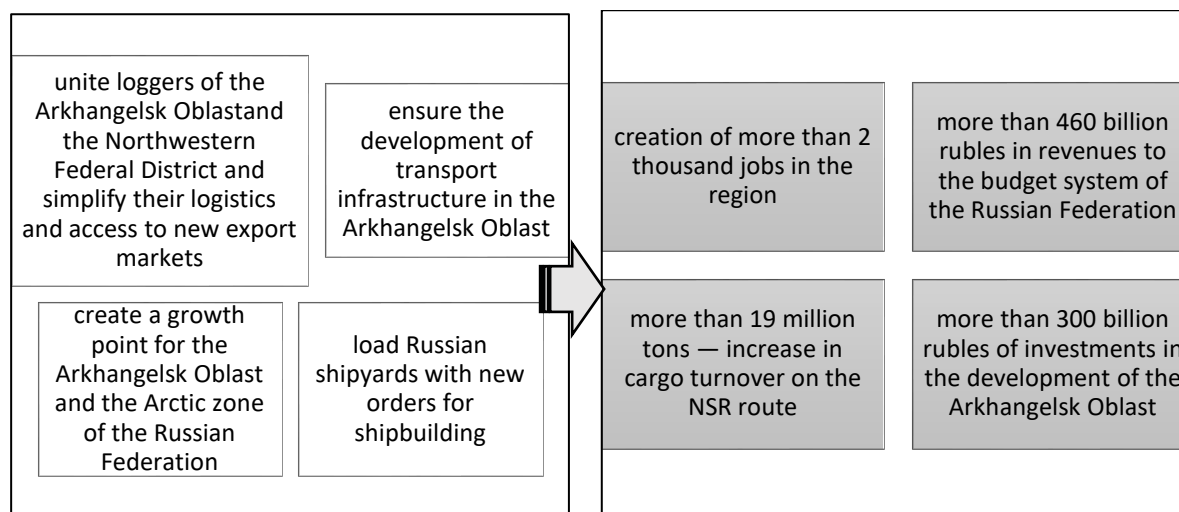


Fig. 9. Effect of the implementation of the project to construct a deep-water area at the Arkhangelsk seaport ³³.

Since construction and operation of the project infrastructure require highly qualified workers and technical specialists, part of the demand for labor is expected to be fulfilled by attracting workers from various regions of the Russian Federation, which could create additional potential for increasing the number of employed people in the Arkhangelsk Oblast.

The development of the deep-water area of the NSR will expand the capabilities of the existing transport infrastructure, which, in turn, will reduce the shortage of ports with sufficient depth to receive large vessels in the western Arctic region of Russia.

Conclusion

Thus, the NSR is becoming an important transport route for Russia. Climate change and melting ice are opening up new horizons for shipping, making the NSR more accessible and attractive for commercial transport, which creates the conditions for active use of the route as an alternative to traditional sea routes. For the Arkhangelsk Oblast, the NSR offers new economic prospects, contributing to the development of port infrastructure, logistics and related sectors. Increased cargo traffic in the northern direction can create new jobs and improve the standard of living of the local population. In addition, the development of the Northern Sea Route can increase the investment attractiveness of the region and enhance its importance as a transit route.

Reduced delivery time compared to southern routes and significant fuel savings are among the key advantages of northern maritime logistics. It is also important to note that the polar seas are rich in natural resources, and the development of the NSR may intensify their extraction. Despite the positive trends identified, the study also recorded a number of serious problems, such as lack of sufficient funding and bureaucratic barriers. It is also necessary to pay attention to environmental aspects and navigation safety in order to ensure sustainable development of the Northern Transport Corridor. These challenges require a comprehensive approach and joint action by all market participants.

³³ Compiled by the authors on the basis of analytical data.

These conclusions enable the development of recommendations for various stakeholders, including government agencies, business associations, and entrepreneurs.

An important part of the NSR development is the creation of a modern deep-water seaport area in Arkhangelsk, which will significantly improve the region's logistics capabilities. The new port will become an important hub for cargo transit, attracting foreign and Russian investors. It will also create new jobs, contributing to the economic development of the city and the entire Arkhangelsk Oblast. The deep-water port of Arkhangelsk will open new routes for shipping, providing year-round access to international markets. The increase in cargo traffic will contribute to the development of related industries, from transport logistics to goods processing. Arkhangelsk will become a prominent player in the maritime trade arena, competing with other northern ports. An equally important aspect is the possibility of introducing modern technologies into the port infrastructure. This will improve the efficiency of cargo handling and reduce the downtime of ships, which, in turn, will reduce costs for business partners. Thus, the deep-water port of Arkhangelsk will become not only an economic, but also a multimodal hub that meets the modern requirements of international trade.

The application of a comprehensive approach to the study of the Northern Sea Route and the role of the Arkhangelsk seaport has not only provided a more complete understanding of current processes, but also contributed to the development of practical recommendations for improving business conditions in this area.

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