

Spatial Management of the Shipping Routes in the Russian Arctic*



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Abstract. The new plans for Russian Arctic development are predetermined by changes in the external economic environment and the state's internal policy. In May 2018, Russian President Vladimir Putin announced new development guidelines for the Northern Sea Route. Later on, the documents related to the strategic development of the Russian Arctic zone were approved. In these documents, the Northern Sea Route development is highlighted as one of the main directions of competitive national transport communication of the Russian Federation on the global market. The purpose of the research is to determine the role of the Northern Sea Route in the country's spatial and socio-economic development in the context of the Spatial Development Strategy of the Russian Federation until 2025. The long-term plans launched various economic, political, and other socially significant processes in the Russian Arctic, which led to the formulation of two research tasks. The first one is to consider the main approaches to the

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spatial management of the regional economy and to present the implementation of the spatial economy provisions in case of the Northern Sea Route that is the center of the Arctic space “assembly”. The second one is to reveal the Northern Sea Route potential as a transport and logistics highway in the transit traffic area, transportation of raw materials, and ensuring vital activity of the population of the Northern regions in deliveries of goods to the Northern territories. As a result of the research, the authors have identified the main trends in the NSR development: strengthening of Russia’s domestic economic policy, aimed at activating business processes in the Arctic zone of the Russian Federation, and the usage of the NSR as an international transit highway. Data analysis on transportation of raw materials and goods deliveries to the Northern territories indicates that inland navigation will soon be a dominant type of navigation on the Northern Sea Route.

Key words: Arctic, spatial economy, Spatial Development Strategy of the Russian Federation, Northern Sea Route, cargo turnover.

Introduction

Currently, Russia is the largest Arctic state for which multidimensional development of the Arctic zone is a matter of world leadership in the Arctic economy. This target raises the question of the need to apply expanded scientific understanding of the Arctic to ensure regional sustainability. The growing interest of the state in the “new” Arctic development is confirmed by intensification of legislative activities, development of various strategic programs, emergence of permanent discussion platforms, and other Arctic events.

Changes in the spatial organization of the Russian economy over the previous two decades can be represented as two multidirectional vectors. The first one has been an active integration into the world economy since the 1990s. It was accompanied by adoption of new rules of world trade, a significant change in the distribution of production factors, increased concentration of capital, scientific, technical, and innovative potential in large urban agglomerations. The second one was to strengthen the system of state strategic planning and management aimed at addressing issues of spatial and economic development of the country including regions and individual industries. This trend has intensified since 2014 on the background of changes in international policy and introduction of a number of political, economic and other restrictions.

One of the general directions, laid down in the Russian strategic development documents adopted in 2014–2020, is the development of the Arctic Zone of the Russian Federation, in particular the Northern Sea Route (NSR) as a historically established national transport communication of the Russian Arctic and transit corridor of global importance. It is necessary to emphasize the importance of the Northern Sea Route for regions with access to the Arctic seas and long coastline, with insufficient development of the system of land communications of year-round operation, as well as the role of sea routes in close connection with inland waterways and meridional railways of the European and Asian North. The geopolitical and transnational importance of maritime navigation in the Arctic zone is determined by the need to control rich natural resources and marine areas, as well as the transit value of the Northern Sea Route as an internal route between the northwestern and Far Eastern regions of Russia. This route development opens up opportunities for the growth of transnational transit traffic between European ports and ports in the Pacific region.

Thus, the current trends actualize scientific research of the modern experience of economy management in the Arctic territory of the Russian Federation through the prism of the Arctic

communications' development in the NSR waters in the context of a new wave of the region's industrial development.

The research methodology is based on a general scientific approach. Theoretical constructions are based on the results of expert evaluation of domestic and foreign scientists and specialists in the field of spatial economics. The information base includes collected and systematized research on development of the Arctic and the Northern Sea Route, legislative and regulatory acts of the Russian Federation regulating the issues of state management of the economy and the formation of strategic planning system; information and analytical materials of foreign analytical centers (the Centre for High North Logistics (CHNL)) and the state authorities of the Russian Federation.

Theoretical basis of the research is the works of domestic and foreign scientists in the field of spatial organization of the economy, economic history of the northern territories' development, as well as works on the role of the communication system in the process of organizing regional markets in the regional space development as a systemic whole (A.G. Granberg, P.A. Minakir, A.I. Tatarkin and their followers) [1; 2; 3]. For example, the works of S.V. Kuznetsov, V.S. Selin, and T.V. Uskova present the basics of the spatial organization of the regional economy of the Arctic and northern territories, issues of management and justification of the rational organization of the Arctic communication system and the Northern Sea Route [4; 5].

Modern "process of assembling" the Russian Arctic space around the regional communication system is based on strengthening the geographical (traditional), historical, and economic connection of the Arctic space and the Northern Sea Route. For instance, the theory of new economic geography justifies the leading role of communications in the process of organizing regional markets, as well as in the regional space development as a systemic whole (P. Krugman,

J. Harris, A. Pred) [6; 7; 8; 9]. P. Krugman and his followers argue that as the regional communication system is diversified, agglomeration is formed which is the structure of providing access to the market. As a result, this allowed identifying a certain pattern: in the agglomeration formation, guaranteed access to the market (through a diversified communication system) is more important than other communication properties (the effect of scale and/or diversity, mobility of production factors or availability of communication routes). In the Arctic, the diversification effect of the regional communication system is particularly noticeable in the transportation and redistribution of energy resources (oil) in the western and eastern directions when there is a shortage of these resources.

The economic history of agriculture development of Russian northern (Arctic) territories shows that industrial North development would be impossible without development of Arctic navigation and management of reliable transport links. Geological discoveries in the 30s and the beginning of development of industrial deposits of non-ferrous and precious metals, coal and oil, mineral fertilizers (Monchegorsk, Kirovsk, Vorkuta, Ukhta, Amderma, Igarka, Norilsk, Magadan, Pevek) required the organization of transport links. Two options were considered: the first one is the construction of a latitudinal railway from Murmansk and Arkhangelsk to Lena and the Pacific Ocean, the so-called highway of the three oceans – the "Great Northern Route"; the second one is the Northern Sea Route. In fact, it was about two concepts of the North development: latitudinal (the idea of concessionary development) and meridional (construction of railway and river highways leading to domestic markets) [10].

As a result, on December 17, 1932, the Council of People's Commissars of the USSR decided to organize the Main Directorate of the Northern Sea Route and set the task: "To finally lay the Northern Sea route from the White Sea to the Berengov

Strait, equip this route, keep it in good condition and ensure the safety of navigation along this route" ("Izvestia", December 21, 1932) [11, p. 3]. In this way, the Northern Sea Route was involved in the sphere of national economic and social development.

In fact, the entire pre-war period of the Northern Sea Route development was associated with major Arctic expeditions. This is the voyage of the icebreaker steamer "Litke" (1934), high-latitude expeditions on the icebreaker steamer "Sadko" (1935 and 1936) [11, p. 12]. Economic and scientific-applied issues, related to the study and development of natural resources, were brought to the fore. The experience of the first navigations was in demand during the Great Patriotic War when military vessels were driven from east to west [10].

The post-war period is characterized by revolution in the equipment of the Arctic fleet. The powerful diesel-electric icebreakers "Moscow", "Leningrad", as well as the icebreaker "Lenin" with a nuclear power plant, six icebreaker-transport vessels of the Lena type were put into operation. The construction of such icebreakers made it possible to expand the period of Arctic navigation and, accordingly, the Northern Sea Route capacity [11, pp. 30–31]. Throughout the entire period of the Northern Sea Route development, expeditionary scientific research and economic development of hard-to-reach territories continued.

In 1970–1980, researchers identify a new stage in the NSR development [11] when the main country's oil production base was created in the Western Siberia North. By 1980, oil production was more than one second, and gas production was one third of the all-Union production. Transportation along the western part of the Northern Sea Route contributed to the search for gas on the Yamal Peninsula and in the northern part of the Yamal-Nenets Okrug. Also, development of a large non-ferrous metallurgy center in Norilsk

and its connections with other regions of the country mainly by water transport have led to the need for further navigation development in the Northern seas. During the economic expedition of the Siberian Branch of the USSR Academy of Sciences, headed by Academician A.G. Aganbegyan and conducted in 1980 along the coast of the Siberia along the Northern Sea Route, the issues of creating territorial production complexes (TPC) in high latitudes were investigated, and it was confirmed that the prospects of the TPC depend on their transport support.

Each stage of economic development of the hard-to-reach Northern territories set new tasks for the NSR development for science and industry: extending the navigation terms on the Arctic seas, changing the tactics of ice navigation increasing the icebreaker and transport fleet; improving the coastal infrastructure, improving the management system.

Modern scientific research is devoted to the challenges and realities of the Northern Sea Route development in the 21st century. For instance, V.S. Selin analyzes the cargo flows of the Northern Sea Route primarily from the standpoint of export supplies to the main world markets [4]. According to the research, the NSR operation on the principles of economic efficiency, taking into account the ice situation (the need for icebreaking support), is possible with the volume of cargo transportation of at least 20 million tons per year [12]. At the same time, the volume of cargo transportation on the NSR in 1990–2000 decreased by more than four times, and in the Eastern sector of the NSR – by 30 times (in Soviet times, it did not exceed 7 million tons). At the same time, most researchers associate the strategic prospects for the Northern Sea Route development with the development of new hydrocarbon deposits in the Arctic region.

The experts' discourse has recently focused on the possibility of using the NSR as an alternative to the southern route, and the prospects for

implementing the sub-global strategy “One Belt – One Road”. According to Chinese scientists, in comparison with traditional sea routes, the NSR provides lower costs and can serve as an energy corridor. It also highlights its strategic value as a catalyst for economic activity and cooperation in the Northern Hemisphere [13]. The possibilities of combining the “One Belt – One Road” strategy and the Russian integration project of the Eurasian Economic Cooperation, as well as the impact of this potentially synchronized project on the Far Eastern segment of the Russian spatial development strategy, are evaluated in [2].

NSR in the context of the Spatial Development Strategy

The Northern Sea Route is officially a shipping route connecting Northern Europe with Asia. The current NSR boundaries are defined in the Commercial Maritime Code of the Russian Federation¹: from the Kara Strait in the west to the Cape Dezhnev in the east, and are associated with the ice situation in these areas. The NSR is a unique transport highway in terms of its geopolitical and geo-economic position, its role in ensuring the country’s defense capability, and its reserves of natural resources. Its water area development has had a significant impact on the economy, culture and life of the peoples of the Far North, in particular the small ones (Nenets, Evenks, Chukchi, Koryaks, Itelmen, and others). The Northern Sea Route and the North-Eastern Passage are considered synonymous in various sources. But we should note that the North-Eastern Passage includes the Barents Sea and access to the Murmansk Seaport, in such a way forming a common route in the Russian sector of the Arctic between the Cape Nordkap and the Bering Strait.

In the context of the Spatial Development Strategy of the Russian Federation for the period

¹ Code of Merchant Shipping of the Russian Federation no. 81-FZ, dated April 30, 1999. *Official Internet website*. Available at: <http://www.pravo.gov.ru> (accessed: October 5, 2020).

until 2025² (hereinafter – the Strategy), the Northern Sea Route unites Russian Arctic economic space. Spatial organization is a naturally formed order of spatial development of the regional economy which is determined by localization of productive forces (labor and capital) and economic relations. According to the Strategy, the combination of homogeneous localities is embodied in the form of centers that represent the territory (and adjacent subsurface) of one or more municipalities taking into account the adjacent water area (mineral resource center). They respectively specialize in high-efficiency production, within which there is a set of developed and planned for development deposits and promising areas, connected by a common existing and planned infrastructure and having a single point of shipment of extracted raw materials or enrichment products to the federal or regional transport system [14].

Within the framework of the space, the Strategy defines the geostrategic territory: the Russian Arctic and priority mineral resource centers. The territories’ grouping, presented in the Strategy, is associated with changes in the spatial organization of the country’s economy as a whole, in particular, with the shift of production of hydrocarbon raw materials to the poorly developed territories of Eastern Siberia and the Far East, the waters of the shelves of the Far Eastern and Arctic basins. The goals, main directions and tasks, as well as the mechanisms for implementing the state policy of the Russian Federation in the Arctic are defined by the Presidential Decree no. 164³, dated March 5, 2020. Infrastructure support for developing

² On approval of the spatial development strategy of the Russian Federation until 2025: Government Decree of the Russian Federation no. 207-r (as amended on August 31, 2019), dated February 13, 2019.

³ On the Fundamentals of the State Policy of the Russian Federation in the Arctic for the Period through to 2035: Presidential Decree of the Russian Federation no. 164, dated March 5, 2020. Available at: <http://publication.pravo.gov.ru/Document/View/0001202003050019> (accessed: October 30, 2020).

mineral resource centers is the main priority. The establishment of successful entrepreneurship in the geostrategic territories of the Russian Federation, located within the Russian Arctic zone, requires further Northern Sea Route development as a transit corridor of global importance⁴.

Discussion on the NSR potential

Let us consider the main directions of revealing the Northern Sea Route potential as a transport and logistics highway in the field of transit traffic area, transportation of raw materials, and ensuring vital activity of population from northern regions in the form of deliveries of the Northern territories.

Transit traffic area reveals the opportunities for participation in international transport links and development of transport services in international business.

Efficiency estimates of the Arctic traffic area are quite contradictory [15; 16]. Experts identify various factors that hinder development of commercial "passage", such as *low throughput* (in 2013, 71 ships passed through the NSR, about the same number of ships pass through the Suez Canal in two days) [17, p. 260]; special *natural and climatic conditions* (shallow waters of the northern seas, low temperature conditions, as a result, short navigation times and the need for icebreaking wiring) [18, p. 18]; *financial factors* (pilotage fee for passage through the NSR, payment of icebreaking wiring, total insurance risks) that objectively cause a high level of operating costs and affect profitability of cargo delivery through the NSR [19].

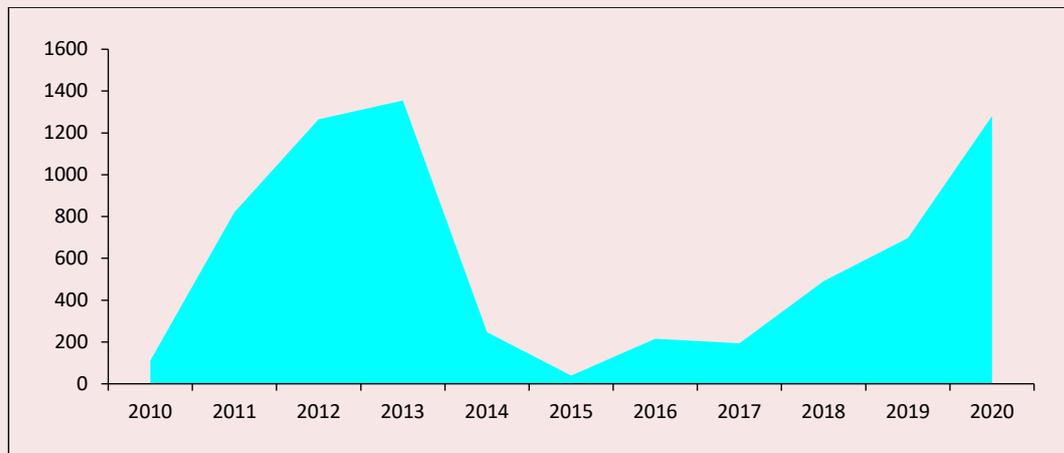
Transit traffic area volume between Europe and Asia on the NSR is characterized by high volatility over the previous decade. From 2010 to 2013, there was an increase in cargo traffic, and, since 2014, a sharp decline has begun in the volume of transit

traffic area. According to statistics, the number of transit flights and their cargo turnover has been growing since 2018. In 2020, compared to 2019, cargo turnover actually doubled from 697.3 to 1281.01 thou. tons (*Fig. A*).

With the volume growth of international transit traffic of goods, the number of flights (ships) increased disproportionately to the volume of cargo turnover in some periods (*Fig. B*). For example, in 2011–2012, the volume of goods, transported in transit, increased by 34%, and the number of ships – by 2.7%. A similar situation was in 2017–2018 when, with an increase in the volume of transported cargo, the number of ships remained unchanged. This is due to the more efficient use of ships (less ballast crossings – more "double" voyages). In 2020, the main share of transported cargo was iron ore concentrate (1,004,134 tons, in 2019 – 697,277 tons). In 2019, there were 13 flights with iron ore. Among them, six vessels were from Murmansk and seven from Nunavut (Canada). Three of them also went in the opposite direction from east to west (return flights). The ice class of most of these vessels is generally low. Six vessels have the Ice 2 class, three vessels – Arc 4 and two – Arc 5. Only two of the total displacement exceeded 65 thousand registered tons, the rest – from 41 to 44 thousand tons. Other transit cargo was transported by ships owned by COSCO. Eight vessels with a capacity of 22–26 thousand tons made eleven voyages from east to west and in the opposite direction. It is worth noting that the return flights were also loaded. In total, COSCO transported 198,451 tons. These are wind equipment, wood pulp, fertilizers and other general and bulk cargo. Ports of departure and destination in Europe were located in Denmark, Finland, Lithuania, Germany, and Sweden. Most of the vessels passed the NSR water area without difficulty. The nuclear container ship "Sevmorput" crossed the NSR the fastest (5.9 days), the ship "Callisto" was the slowest (13.8 days). If we exclude these maximum and minimum values, we find that

⁴ Draft unified plan for achieving the national development goals of the Russian Federation for the period through to 2024 and for the planning period through to 2030. Available at: <http://government.ru/news/36606/> (accessed: October 30, 2020).

Figure 1. Dynamics of transit cargo traffic 2010–2020



A) Volume of international transit cargo traffic area, thou. tons



B) Number of transit flights, items

Source: The Centre for High North Logistics (CHNL) Available at: <https://chnl.galschjodtdesign.no/?p=2225> (accessed: February 12, 2021).

in 2020, transit ships crossed the NSR in an average of 8 days. At the same time, only one vessel used icebreaking support. It was “North Spitzbergen” which ran in late July – early August. Despite the positive dynamics, the volume of transit cargo in the total volume of traffic remains insignificant – about 4%⁵.

⁵ According to data of the Northern Sea Route Administration (December 10, 2020), the total traffic volume in the NSR waters amounted to 30,858,7 thou. tons including transit traffic area of 1281 thou. tons. *Information and Analytical Agency “PortNews”*. Available at: <https://portnews.ru/news/306100/> (accessed: February 12, .2021).

Nowadays, it is impossible to give an unambiguous assessment of the prospects for developing international transit transport. From the analyzed array of foreign scientists’ (26) works on this issue [15] for the period from 1991 to 2013, half of the studies has drawn conclusions on the profitability of Arctic transportation. The other half is divided into two parts: in seven works, the authors came to the opposite conclusions, in six – contradictory. A similar situation is in the domestic research field. Economic laws imply the choice of a cheaper option for the route of cargo/goods transportation,

all other things being equal, so to the above factors that hinder the development of this direction, it is necessary to add the features of the functioning of the container transport market. According to experts, in the container transportation market, up to 70% of pricing occurs in the spot market where price fluctuations reach up to 25%. According to the PWC⁶, in 2018, cargo traffic between Asia and Northern Europe amounted to 15 million TEU (conditional 20-foot containers), and the total volume of international maritime trade – 23.1 million TEU. Accordingly, in order for the “new” Arctic sea transport system to occupy its niche in the world market, its turnover must be at least 2.5 million TEU. In order for the logistics market participants to perceive the new offer as competitive, it must be 10% cheaper and 20% faster. In the short term, most international economic agents do not consider the Arctic routes as economically profitable.

In the field of transportation of raw materials.

Economic development of the Russian Arctic zone is based on the extraction of hydrocarbon raw materials and implementation of geological exploration aimed at identifying new production areas. The unique potential of hydrocarbon raw materials is represented by natural gas, oil, and natural bitumen. The recoverable reserves of hydrocarbons amount to about 245 billion tons of conventional fuel in the fields located in the Arctic zone. About 85% of these reserves are concentrated in the West Siberian, Timan-Pechora and Barents-Kara oil-and-gas provinces (OGP), while the main share of reserves (161.7 billion tons of conventional fuel) falls on the West Siberian OGP⁷.

⁶ At the Arctic forum, there were weighted the prospects for transit along the Northern Sea Route. Available at: <https://sudostroenie.info/novosti/28839.html> (accessed: March 31, 2021).

⁷ Katysheva E.G. Gas industry of the Russian Arctic. *Neftegaz.RU*. 2020, no. 10, October. Available at: <https://magazine.neftgaz.ru/articles/arktika/633267-gazovaya-promyshlennost-rossiyskoy-arktiki/> (accessed: February 15, 2021).

The development of fuel and energy resources in the Russian part of the Arctic determines the dominance of Russian inland navigation in the NSR in terms of the number of shipping companies, ships and flights. In 2016–2019, Russian shipping companies accounted for 62–73% of all shipping companies operating on the NSR, and made 75–87% of all flights. The main volume of cargo is accounted for by energy resources (LNG, oil, coal) and metals [20, pp. 7, 15].

European companies also participated in domestic shipping on the NSR. In total, up to 23 companies operated each year which made 269 flights in four years. They provided general cargo vessels, bulk carriers, heavy carriers, and auxiliary vessels for maritime operations. Most of the flights took place between Murmansk and Sabetta, as well as between the areas of the Kara Sea and the Gulf of Ob. Norwegian shipping companies serviced drilling operations in the Kara Sea, and companies from Luxembourg, the Netherlands and Belgium provided dredging services in the Gulf of Ob in 2016–2017 [21].

The volume of extraction and export of natural resources has an impact on the development of Arctic ports. The cargo turnover of the seaports of the Arctic basin in 2020 decreased and amounted to 96.0 million tons (-8.4%), of which the volume of transshipment of dry cargo – 30.1 million tons (-4.9%), liquid cargo – 65.9 million tons (-9.9%). The leading position is occupied by the ports of the Western Arctic⁸ which mainly provide year-round logistics support for navigation on the Murmansk – Dudinka route to support the activities of the MMC Norilsk Nickel group of companies, as well as carry out oil turnover from the Ob Bay and Varandei regions. These trends encourage the largest resource developers to invest in the construction of a specialized transport fleet (class no lower than

⁸ Federal Agency for Sea and River Transport. Available at: http://www.morflot.ru/deyatelnost/napravleniya_deyatelnosti/portyi_rf.html

Arc7), in icebreaking supply and support vessels [22]. We will highlight the four leading ports in terms of cargo turnover from 2018 to 2020:

- Murmansk and Arkhangelsk providing diver-sified services;
- Sabbeta and Varandei providing multi-disciplinary services.

Port of Murmansk handled 56.1 million tons of cargo in 2020 (in 2019 it was 61.9 million tons, in 2018–60.7 million tons). The port of Arkhangelsk, despite its more favorable position, free year-round access to the World Ocean handled cargo by an order of magnitude less – 3.3 million tons (in 2019 – 2.7 million tons, in 2018 – 2.8 million tons). This is due to limited capabilities in terms of receiving ships entering the port, as well as the time of passage to the seaport⁹ [23].

The port of Sabetta showed record growth rates in the volume of processed cargo – 27.8 million tons (in 2019 – 27.7 million tons, in 2018 – 17.4 million tons). This growth is due to the proximity to oil and gas deposits, as well as the growing volume of export supplies of liquefied natural gas from the Yamal LNG plant.

The port of Varandey (4.9 million tons) significantly reduced the volume of cargo turnover (by 31.8% compared to 2019), due to its mono-profile (the port is intended for the oil export produced in the north of the Nenets Autonomous Okrug by sea), and oil transshipment indicators decreased in 2020.

The forecast estimates of the growth of the NSR cargo turnover are related to the further development of Russian Arctic hydrocarbon projects. According to the May Presidential Decree, the NSR cargo turnover should increase to 80 million tons per year by 2024. According to the

⁹ For instance, to pass to the seaport of Arkhangelsk, it is necessary to spend a day on the passage of the White Sea, provided that there is no need for icebreaking wiring, for the passage to the port of Murmansk: about four hours. In this case, the conditions from the port of Murmansk are more attractive, as temporary losses can lead to an increase in the freight rate.

Federal Agency for Sea and River Transport in 2017, cargo traffic on this route increased by 42.6% and amounted to 10.7 million tons, by 2020, according to the agency, the volume of cargo transportation on the NSR should be 44 million tons (as of December 10, 2020, the total volume of traffic in the waters of the Northern Sea Route was 30 million 858.7 thousand tons), and it will have increased to 70 million tons by 2030. According to the estimates of the Ministry of Natural Resources, by 2024 the volume of cargo transportation via the NSR will have reached 52 million tons per year¹⁰.

In March 2019, the Ministry of Natural Resources updated the forecast of the NSR cargo turnover, adding to it the volumes necessary for the implementation of the May presidential decree (82 million tons by 2024¹¹). The main volume of cargo will be associated with the transportation of energy resources and other raw materials – liquefied natural gas, oil, coal, metals.

As a result, we can conclude that the current economic development of the regional space of the Russian Arctic is based on promising resource projects that form a cargo base and unite the territories of the Arctic regions around the Northern Sea Route (*Tab.*).

Russia's Arctic space has huge reserves of energy and mineral resources in the same geographical locations (“where gas meets ore”) which open up opportunities for additional on-site industrial processing in the future before shipping via the NSR.

In the field of ensuring vital activity of population from northern regions in the form of deliveries of the Northern territories (according to the letter of the law “early delivery of products to the regions of the Far North and equivalent areas”). In the framework of this work, we will not consider the specifics of the implementation of the northern delivery. However,

¹⁰ Source: RBC Group. Available at: <https://www.rbc.ru/business/16/01/2019/5c3dde2f9a79471715920f53>

¹¹ *Ibidem.*

NSR resource projects

Business territory	Company	Type of activity (field)
Murmansk Oblast	PAO NOVATEK	GMP production, assembly and installation of modules of upper constructions
Nenets AO	Gazprom Neft PJSC	Oil output (Prirazlomnoye)
	LUKOIL	Stationary sea ice-resistant shipping berth (Terminal "Varandey")
New land	State Atomic Energy Corporation Rosatom	<i>It is planned to be developed.</i> Reserves of silver-containing lead-zinc ores of industrial categories for the conditions of their open-pit mining (Pavlovskoye field)
Yamala-Nenets Autonomous Okrug, Yamal Peninsula	PAO NOVATEK	Natural gas production and liquefaction (Arctic-LNG, Yamal-LNG)
	Gazprom Neft PJSC	Oil production (Novy Port field)
	LUKOIL	Oil production (Sandibinskoye field)
Krasnodar Krai	Rosneft Oil Company	Oil production (Vankor field)
	LLC "NNK-Taimyrneftegazdobycha"	Search, exploration and development of oil and gas fields, oil refining, and production and marketing of petroleum products (Payakh project)
	VostokCoal/ Arctic Mining Company (AMC)	Development of high-quality anthracite area (Lemberovskaya group)
	Nornickel	Production, complex gas preparation for transmission to the NPR gas transmission system (Pelyatinskoye field)
	NAO "Severnaya Zvezda"	Production of coal concentrates from coking coals (Project for coal complex creation)
Republic of Sakha (Yakutia)	JSC "Zyryansky coal mine"	Open-pit anthracite mining (Zyryan opencast coal mine)
	Vostok Engineering	<i>It is planned to be developed.</i> Reserves of rare earth metals. (Tomtorskoye field)
Chukotka AO	"Mayskoe Gold Mining Company"	Gold mining (Mayskoye fold field)
	KazMinerals	It is planned to be implemented. Processing of copper and gold fields, copper concentrate production (Baim copper and gold project)
Source: own calculations based on information from the RBC news site and the official websites of the companies.		

the authors should emphasize that the Northern Sea Route is historically one of the most important components of the life support systems of the Russian Arctic regions. Free movement of goods throughout the country within the framework of the single economic space is one of the most difficult state tasks in Russia due to the size of the territories and geographical features. As some Russian regions do not have a year-round connection with the main centers of production of goods, primarily fuel and food, the state support system for early delivery of goods applies to these territories.

Delivery of the Northern territories is actually carried out entirely by water transport. For instance, about 15% of cargo volume related to the northern importation is delivered by sea, more than 85% – by river [4].

Conclusion

In conclusion, we should note that, in fact, in all strategic documents of Russia's development, the Northern Sea Route development is defined as the main direction of socio-economic development of the priority geostrategic territories of the Russian Federation located within the Russian Arctic zone. Moreover, it is considered in the concept of creating an international transport and logistics highway. The NSR development includes infrastructure provision of mineral resource centers, modernization and development of seaports that ensure its operation, and promotion of socio-economic development of strategically important settlements.

Inland navigation on the NSR will play a significant role in the future socio-economic development of remote Russian Arctic territories.

The Russian government has established eight Arctic development zones along the country's northern borders and has proposed several priority infrastructure projects (such as ports, terminals, railways, airports, and electricity transmission facilities) to support increased exploitation of natural resources and require year-round marine transport of energy and minerals.

The Spatial Development Strategy of the Russian Federation assumes the multidimensional development of the Arctic Zone within the established planning horizon (through to 2035) and highlights the features that determine special approaches to the socio-economic spatial development of this region and ensuring national security in the Arctic. The time interval of the Strategy falls on the era of global warming. This climate factor contributes both to development of new economic opportunities and to creation of additional risks for economic activity and the environment in the permafrost melting zones, and increases the ice-free space of the Arctic Ocean seas which contributes to the strengthening of the Arctic geopolitical potential.

So, in terms of transit cargo, first of all, it is necessary to highlight the problem of year-round navigation impossibility. Nowadays the NSR closes for year-round navigation, except the Ob Bay and the Yenisei River to the west through the Kara Sea. The lack of year-round navigation throughout the NSR is a problem for international shipping companies interested in regularly using the route as the shortest route for cargo transportation between Northeast Asia and northwest Europe and not considering changing their transport and logistics system for a route that is open only part of the year. The question of commercial use of the NSR remains open. An assessment of the flight costs, the passage time and the risks does not allow drawing a clear conclusion in favor of the NSR. However,

implementation of the strategic development goals of the NSR transport and logistics system in the future will change the development vector of international transit transport.

As a result of studying transportation of raw materials, we can conclude that inland navigation is the dominant type of navigation on the NSR including about 76-92% of all voyages during the period. Most of the cargo transported on the NSR is domestic cargo, mainly export and coastal cargo. In the next few years, large volumes of Russian Arctic oil, LNG, coal, metals, ore, grain, and other natural resources will be transported by high-ice-class cargo ships from remote locations along the NSR to large Russian hubs or specialized transshipment terminals for temporary storage and transshipment. Achieving competitiveness in international transit transport will be possible on the basis of intensive development of domestic transport, as well as upon completion of the main projects for the Northern Sea Route development through to 2035 including realization of the federal project "Northern Sea Route" (2018–2024), the launch of year-round navigation throughout the NSR (through to 2030) and formation of a new international transport corridor by 2035.

Sea transport (together with limited air transport) plays a significant role in ensuring population's life, as it is the only route for delivery of goods, materials and fuel to almost 100 remote settlements on the Russian mainland Arctic coast, archipelagos and islands. The same applies to Arctic settlements along Russia's inland waterways that depend on river transport.

In general, shipping on the NSR is of great strategic and economic importance for Russia. The NSR acts as a transport corridor along its entire Arctic coast and as a gateway to the North Atlantic Ocean in the west and the North Pacific Ocean in the east.

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