ISSN 2221-2698

No. 49
2022

Arkhangelsk
DOI: 10.37482/issn2221-2698.2022.49

ISSN 2221-2698
Arctic and North. 2022. No. 49

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SOCIAL AND ECONOMIC DEVELOPMENT

Arctic and North. 2022. No. 49. C. 4–19.
Original article
UDC 316.334.52(98)(045)
doi: 10.37482/issn2221-2698.2022.49.5

Approaches to Assessing and Monitoring of the Budget Potential Use in the Far North

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Abstract. In the current crisis conditions, improving the financial security of the territories as a factor of development and investment attractiveness of the regions is a key task. An important role in its solution is played by assessment of the budget potential, which allows creating the information basis for the development of recommendations on the mobilization of financial resources and their effective use. It has defined the goal of this article: substantiation of the methodological approach to assessing the level of budgetary potential use. It has been determined, that an increase of budget potential can be influenced by the activity of regional authorities in the course of implementation of the budget process. Within the developed methodological approach to evaluation of the budget potential, based on application of the integral and matrix approaches, selection of indicators is substantiated with the allocation of two groups characterizing financial security of the regions and quality of the budget process governance. In the course of the methodology approbation on the basis of data from the Far North (FN) regions, the calculations of the total integral index, assessing the level of use of budgetary potential in the regions, and its components — individual integral indices — were carried out. The FN regions are leveled by the budget potential use. Matrices grouping the regions on the level of financial security and governance quality are formed. The comparison of typological groupings and analysis of coefficients included in calculation of the integral index made it possible to study the tendencies, to reveal the specificities and problems of forming and using the budget potential in region of the Far North. It is found out that the FN regions with high and moderate levels of the budget potential use are characterized mainly by governance problems. In the regions with reduced or low level of the budget potential use, the financial problems are amplified along with managerial problems. The problem areas identified in the course of the study are a guideline for development of measures aimed at effective governance of the budget potential.

Keywords: *budget potential, Far North region, financial security, quality of the budget process management, typologization, regional development*

Introduction

The tasks of restoring sustainable growth of regional economies in the context of the crisis caused by sanctions and the global pandemic determine the particular importance of strengthening the financial base by increasing the fiscal potential of the territories, which actualizes the problem of creating a reasonable system for assessing the latter. A rationally constructed system for assessing the budget potential will contribute to the implementation of an effective budget process and, in general, to the effective management of regional finances. The issue of sufficiency of author-

For citation: Barasheva T.I. Approaches to Assessing and Monitoring of the Budget Potential Use in the Far North. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 5–22. DOI: 10.37482/issn2221-2698.2022.49.5

ities' financing of their powers is the most acute in the Far North regions, which is due to the overestimated costs of life here.

In Russian and foreign practice, there are various methodological approaches to assessing the budgetary potential of territories. At the same time, the choice of a system of indicators is significant. Methods of foreign researchers, who identify the fiscal potential with the tax potential, include the following criteria for evaluation: state and local tax and non-tax revenues, tax burden, taxation load [1]. The most common methods for assessing the budget potential developed by Russian researchers [2, Golodova Zh.G., p. 3], [3, Naydenova T.A., Shvetsova I.N., p. 42–44] are based on the calculation of analytical coefficients that describe the state of regional budgets in terms of their balance, sustainability, and ability of the region to finance its own needs. The methodology of Yashin S.N. and Yashina N.I. also suggests the use of budget coefficients, for the calculation of which the grouping of "expenditures and revenues of the budget, asset and liability items of the budget balance; that is, based on the use of funds and sources of their financing" is preliminarily carried out [4, p. 37]. In later studies, Russian scientists update the issue of assessing the use of budgetary capacity, paying attention to the management side of this process. For example, Kuklina A.A. and Naslung K.S. introduced additional criteria along with generally recognized budget indicators into the methodology that evaluate the "quality of planning", "orientation of the regional budget" and "the impact of budget indicators on key economic indicators" [5, p. 397]. The methodology of E.N. Gladkovskaya proposes criteria that are included in the information base of control and accounting bodies, which makes it possible to identify the targeted and effective use of budgetary funds [6, p. 34–35]. Separate indicators for assessing the managerial impact on the level of budgetary potential are also considered in the works of Russian scientists: Igonina L.L. and others [7, p. 359–360], Suleimanova M.M. [8, p. 46–48], Tkacheva T.Yu. [9, p. 12–16], Zenchenko S.V. [10, p. 191–196], Zinchenko N.V. [11, p. 28–29].

The basis for expanding the research field in terms of assessing the budgetary potential in terms of its use is, according to the author, the following interpretation of the concept of "used" or "realized" budgetary potential. On the one hand, the realized budgetary potential can act as the amount of financial resources formed and accumulated in the regional budget at the end of the period. On the other hand, it can also be considered as used by the authorities to perform budgetary functions (regulating, stimulating, social) in order to ensure the development of the territory and improve the welfare of citizens [12, Barasheva T.I.]. Taking into account the above, as well as the fact that the managerial component of the analysis is not sufficiently informative in modern assessment methods, which is confirmed by a limited list of criteria characterizing the participation of public authorities in the management of budgetary potential, it seems appropriate to assess the budgetary potential in terms of its use not only by budget coefficients, describing the financial condition of the regional budget, but also to include a separate block of indicators that make it possible to indirectly assess the quality of regulatory influences on the part of regional governments that have a direct impact on changes in the budget potential. The two blocks of indicators proposed for

analysis indirectly reflect the result of managerial influence on this process. At the same time, if the first block of indicators characterizing the financial state of the budget evaluates the consequences of making managerial decisions by both federal (they determine the conditions for interbudgetary regulation) and regional authorities, then the second block of indicators — by regional administrations.

The purpose of the study is to clarify the indicators and develop a methodology for assessing the level of use of the budgetary potential. The objectives are the following: to explore modern methods for assessing the budget potential; to substantiate the choice of indicators for assessing the level of the budgetary potential use from the perspective of managerial impact of regional authorities on this process; to calculate integral indices, assessing financial security of the territory and quality of budgetary process management, as well as the total integral index; to form matrices allowing to carry out the typology of the Far North regions according to the level of using the budgetary potential and depending on the level of financial security and the quality of budgetary process management, and to identify the main problems hindering the effective management of budgetary potential for each group of the Far North regions.

The proposed methodological approach, which allows estimating the level of budget potential usage, is based on the application of indicative and matrix analysis, methods of generalization, analysis, synthesis and includes a system of evaluation parameters divided into two groups:

- indicators assessing the financial security of the region (Table 1);
- indicators assessing the quality of regulatory impacts in the course of implementation of budgetary functions by regional authorities (Table 2).

Table 1

Indicators assessing the financial security of the region

Indicator	Characteristic	Authors using the indicator in calculation methods
1. The financial independence ratio is defined as the ratio between own income and borrowed income	Indicates the level of financial autonomy and independence from the federal center. The higher the value of the coefficient, the greater the independence.	Golodova Zh.G., Suleymanov M.M.
2. The concentration ratio of own revenues is defined as the ratio between own revenues and total budget revenues	Indicates the level of concentration of own revenues in the regional budget. The growth of the indicator indicates an increase in fiscal capacity and the strengthening of the financial independence of the territories.	Golodova Zh.G., Suleymanov M.M.
3. The expenditure coverage ratio is defined as the ratio of income to budget expenditure	Indicates the adequacy of expenditures with revenues. The higher the ratio, the higher the fiscal capacity of the region.	Golodova Zh.G., Naydenova T.A., Shvetsova I.N., Kuklin A.A., Naslugina K.S.
4. The per capita income ratio is	Assesses the availability of reve-	Suleymanov M.M.,

defined as the ratio between the average per capita income in the region and the average per capita income in the Russian Federation	nues to meet obligations to the population compared to the national average.	Golodova Zh.G., Naydenova T.A., Shvetsova I.N.

Table 2

Indicators assessing the quality of budget management in the region [1]

Indicator	Characteristic
1. The expenditure prioritisation ratio is defined as the ratio of social expenditure to total expenditure	Assesses the priority of spending of regional budgets. The higher the value of the coefficient, the higher the level of support for the population. Its value should not be lower than the national average.
2. The investment activity ratio is defined as the ratio of investment to total expenditure	Assesses the capacity to implement investment policy in a region. The higher the value of the coefficient, the higher the level of investment activity in the region.
3. The tax collection ratio is defined as the ratio of tax revenues to possible tax receipts (sum of taxes collected and tax arrears to the budget, other budget losses)	Indicates the level of tax collection from the potential amount of tax revenues, including budget losses from tax arrears, exemptions, etc. The higher the value of this coefficient, the higher the tax collection rate.
4. The income tax effort ratio is defined as the ratio between the amount of income tax collected and the amount of income tax base	Assesses the efforts to collect income tax. The higher the value of this coefficient, the higher the tax potential of the territory due to the regional authorities' efforts to attract (retain) big businesses as taxpayers.

Based on the coefficients of the first group, an integral index assessing the level of financial security of the region (IFS) is determined. The coefficients of the second group are used to calculate the integral index assessing the quality of budgetary process management (IQM). To quantify the level of use of the budgetary potential, the aggregate integral index is calculated on the basis of all eight coefficients. To make indicators comparable, a standardization procedure was carried out (private values of the indicator for the region were correlated with the numerical value of this indicator for Russia).

Integral indices, both within the boundaries of groups and in general (cumulative integral index) were calculated using the geometric mean formula (the product of the coefficients from which the root is extracted, the degree of which is equal to the number of coefficients) in accordance with the method of Zh.G. Golodova [13, p. 37–38]. The obtained integral indicators make it possible to rank and classify regions depending on the level of use of the budgetary potential. The data of the Federal Tax Service of Russia and the Federal State Statistics Service of Russia for the five-year period (2016–2020) were the information base of the analysis.

[1] Author's research.

Assessment of the level of use of budgetary potential in the regions of the Far North

On the basis of the developed methodology, a cumulative integral index that determining the level of use of the budget potential (IUBP) in the regions of the Far North was calculated (Table 3), and the regions were ranked according to this criterion (Fig. 1).

Table 3

Distribution of the regions of the Far North according to the cumulative integral indicator (CII) [2]

	2016	2017	2018	2019	2020
Group 1 — high level of use of budget potential					
High (>1.8)	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast
Group 2 — moderate level of use of budget potential					
Above average (from 1.5 to 1.8)	Khanty-Mansi Autonomous Okrug	Republic of Komi, Murmansk Oblast, Khanty-Mansi Autonomous Okrug	Republic of Komi, Khanty-Mansi Autonomous Okrug	Republic of Komi, Murmansk Oblast, Khanty-Mansi Autonomous Okrug	Murmansk Oblast
Average (from 1.2 to 1.5)	Republic of Komi, Krasnoyarsk Krai	-	Murmansk Oblast, Republic of Sakha	-	Republic of Komi, Khanty-Mansi Autonomous Okrug
Group 3 — reduced level of use of budget potential					
Below average (from 0.9 to 1.2)	Russian Federation, Republic of Karelia, Arkhangelsk Oblast, Murmansk Oblast, Irkutsk Oblast, Sakha Republic, Khabarovsk Krai, Magadan Oblast, Chukotka Autonomous Okrug	Russian Federation, Republic of Karelia, Arkhangelsk Oblast, Krasnoyarsk Krai, Irkutsk Oblast, Sakha Republic, Khabarovsk Krai, Magadan Oblast, Chukotka Autonomous Okrug	Russian Federation, Republic of Karelia, Arkhangelsk Oblast, Krasnoyarsk Krai, Irkutsk Oblast, Khabarovsk Krai, Magadan Oblast, Chukotka Autonomous Okrug	Russian Federation, Republic of Karelia, Arkhangelsk Oblast, Krasnoyarsk Krai, Irkutsk Oblast, Sakha Republic, Khabarovsk Krai, Magadan Oblast, Chukotka Autonomous Okrug	Russian Federation, Arkhangelsk Oblast, Krasnoyarsk Krai, Irkutsk Oblast, Sakha Republic, Khabarovsk Krai, Magadan Oblast, Chukotka Autonomous Okrug
Group 4 — low level of use of budget potential					
Low (< 0.9)	Tyva Republic, Kamchatka Krai	Tyva Republic, Kamchatka Krai	Tyva Republic, Kamchatka Krai	Tyva Republic, Kamchatka Krai	Republic of Karelia, Tyva Republic, Kamchatka Krai

Table 3 shows that the regions of the Far North (FN) differ significantly in terms of the level of CII. Within the boundaries of the first and second groups with a high and moderate level of CII, there are highly developed producing FN regions. The third and fourth groups include most of the regions that differ significantly in terms of economic development, and the level of use of the budg-

[2] This and the following tables (4, 5, 7, 8) were compiled by the author on the basis of calculations.

etary potential did not exceed the average for Russia. In general, there is a relative stability of the regions in terms of the level of the budgetary potential use.

Figure 1 demonstrates the dynamics of CII and gives a ranking of the FN regions for 2019 (the year not affected by the pandemic). The Nenets Autonomous Okrug was the leader in terms of the use of budgetary potential in 2016 and 2019, the Sakhalin Region — in 2020. The region with the lowest CII throughout the analyzed period was the Republic of Tyva.

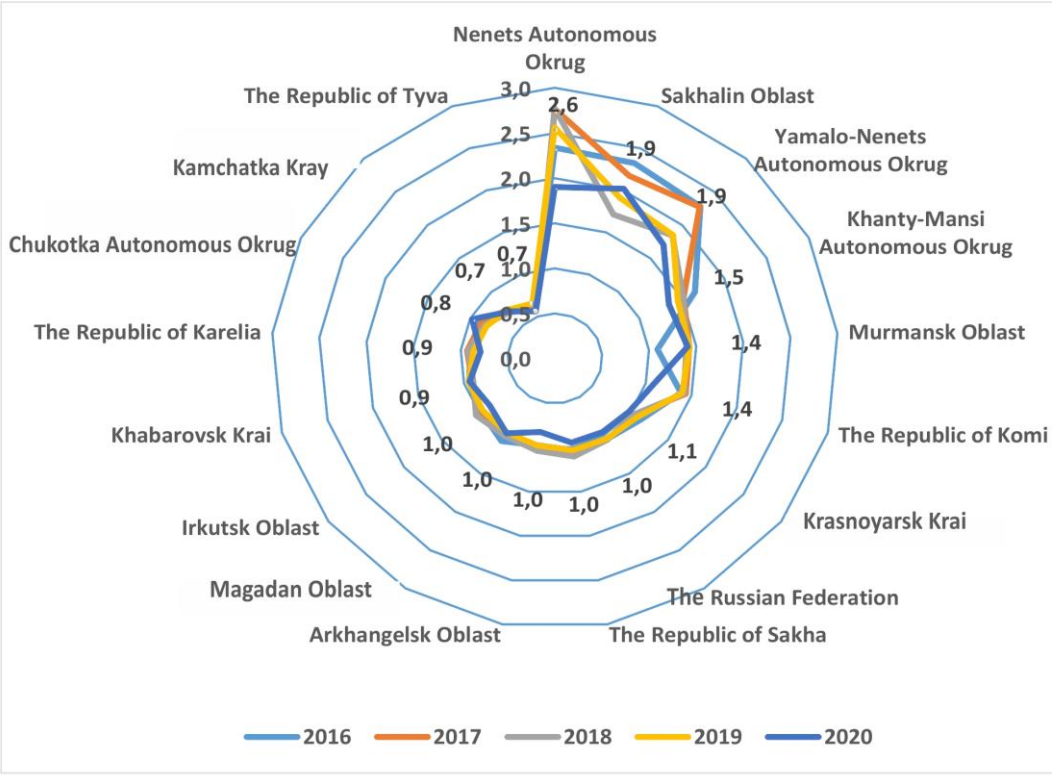

Fig. 1. Dynamics of the cumulative integral index characterizing the level of use of the budgetary potential in the regions of the Far North (CII) [3].

In order to identify the causes and problem areas in the management of budgetary potential, we detail the analysis by examining the impact of its individual components on the result (CII). For this purpose, integral indices were calculated using the geometric mean formula based on the coefficients included separately in the first (Table 1) and second (Table 2) groups.

The integral indices, assessing the financial security of the regions (IFS) and calculated on the basis of the coefficients of the first group (Fig. 1), demonstrate a generally higher level compared to the integral indicators characterizing the quality of budget process management (IQM), calculated on the basis of the coefficients of the second group (Fig. 2).

[3] This and the following figures (2, 3) were compiled by the author.

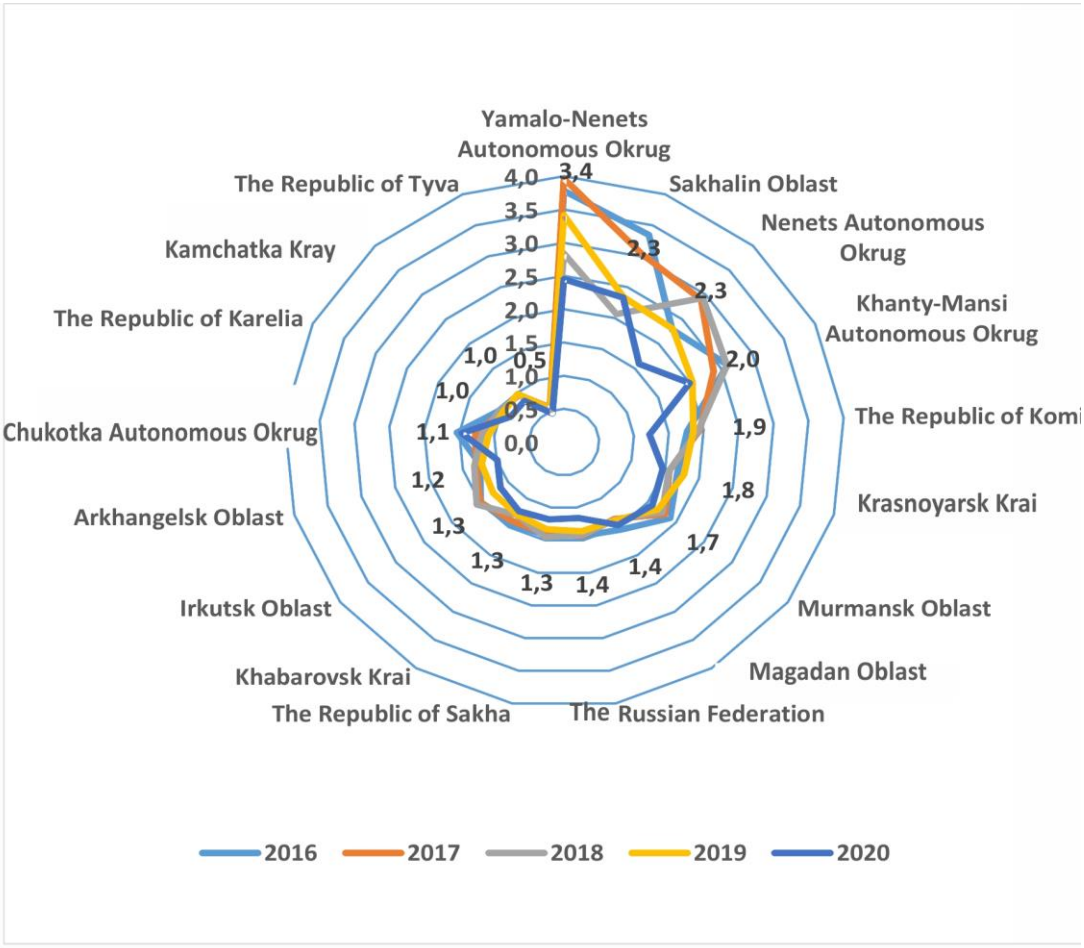

Fig. 2. Dynamics of the integral index assessing the level of financial security of the regions of the Far North (IFS).

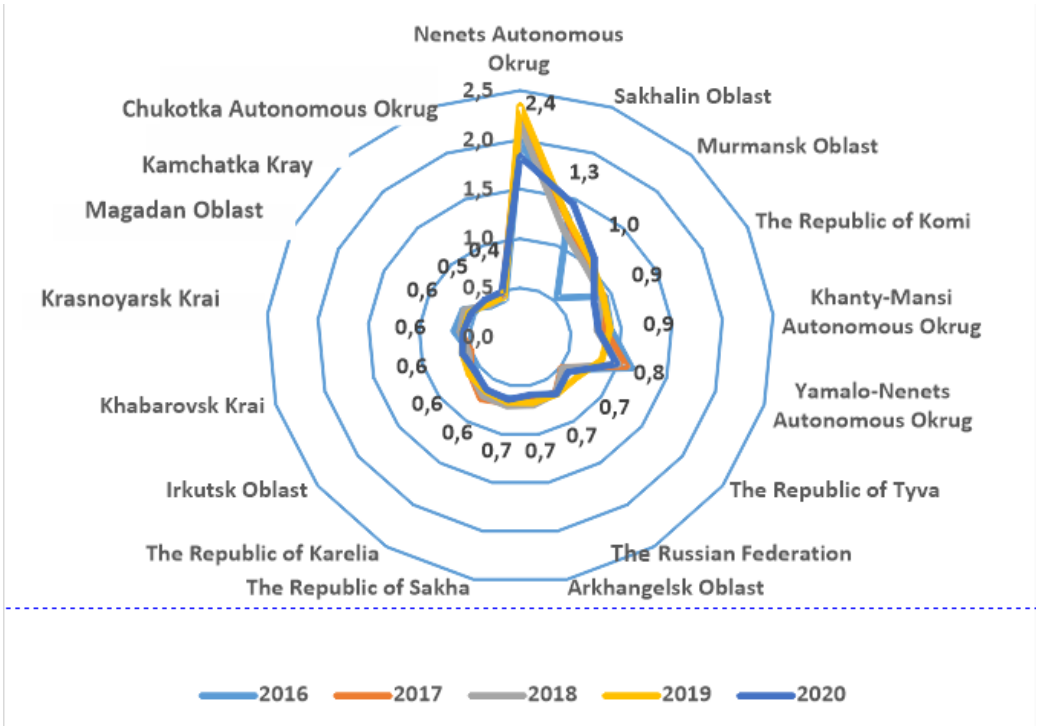

Fig. 3. Dynamics of the integral index assessing the level of management quality in the regions of the Far North (IQM).

It is noteworthy that for the period from 2016 to 2019, there is a decrease in the average values of the IFS and IQM in the studied groups, a trend that has continued in 2020.

Assessment of the impact of indicators characterizing financial security of the regions on the level of use of the budget potential

In order to assess the impact of the IFS on the CII, let us compile a matrix that compares the levels of the CII and the IFS for 2016 and 2019 (Tables 4, 5).

Table 4

Distribution of the FN regions by the level of use of the budgetary potential and the level of financial support of the territories in 2016

	Aggregate integral indicator assessing the level of use of budgetary potential (CII)					
Integral indicator assessing the level of financial support of territories (IFS)		High (>1.8)	Above average (from 1.5 to 1.8)	Average (from 1.2 to 1.5)	Below average (from 0.9 to 1.2)	Low (< 0.9)
	High (> 2.1)	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast	Khanty-Mansi Autonomous Okrug	-	-	-
	Above average (from 1.7 to 2.1)	-	-	Republic of Komi	Murmansk Oblast	-
	Average (from 1.3 to 1.7)	-	-	Krasnoyarsk Krai	Russian Federation, Sakha Republic, Magadan Oblast, Irkutsk Oblast, Khabarovsk Krai, Chukotka Autonomous Okrug	-
	Below average (from 0.9 to 1.3)	-	-	-	Republic of Karelia, Arkhangelsk Oblast	Kamchatka Krai
	Low (< 0,9)	-	-	-	-	Tyva Republic

Table 5

Distribution of the FN regions by the level of use of the budgetary potential and financial support in 2019

	Aggregate integral indicator assessing the level of use of budgetary potential (CII)					
Integral indicator assessing the level of financial support of territories (IFS)		High (>0.8)	Above average (from 1.5 to 1.8)	Average (from 1.2 to 1.5)	Below average (from 0.9 to 1.2)	Low (< 0.9)
	High (> 2.1)	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Sakhalin Oblast	-	-	-	-
	Above average (from 1.7	-	Republic of Komi, Khanty-Mansi	-	Krasnoyarsk Krai	-

	to 2.1)		Autonomous Okrug			
	Average (from 1.3 to 1.7)	-	Murmansk Oblast	-	Russian Federation, Sakha Republic, Magadan Oblast	-
	Below average (from 0.9 to 1.3)	-	-	-	Republic of Karelia, Arkhangelsk Oblast, Irkutsk Oblast, Khabarovsk Krai, Chukotka Autonomous Okrug	Kamchatka Krai
	Low (< 0,9)	-	-	-	-	Tyva Republic

It is possible to distinguish groups of regions by the level of financial security: high level — the Sakhalin Oblast, the Nenets and Yamalo-Nenets Autonomous okrugs; moderate level (includes average and above average) — Khanty-Mansi Autonomous Okrug, Murmansk and Magadan oblasts, Komi and Sakha republics, Krasnoyarsk Krai; low level (below average) — the Republic of Karelia, Arkhangelsk and Irkutsk oblasts, Khabarovsk and Kamchatka krais, Chukotka Autonomous Okrug; the lowest level is the Tyva Republic. In the last two groups of FN regions, the integral indicator (IFS) did not exceed the national average. The Sakhalin Oblast, the Nenets and Yamalo-Nenets Autonomous okrugs demonstrate complete impeccability in maintaining a high level of financial security in 2016 and 2019. The situation of the Khanty-Mansi and Chukotka Autonomous okrugs, Murmansk and Irkutsk oblasts, Khabarovsk Krai worsened. Only the Krasnoyarsk Krai moved to a higher level of financial security.

Integral indicators assessing the financial security of the territories decreased in all regions over the analyzed period, which affected the value of the total CII. Of all the four coefficients involved in the calculation of integral indicators, the financial independence coefficient had the greatest impact on their decrease, which on average in the regions decreased by almost 2 times in 2019 compared to 2016, and by 3 times in 2020 (with the exception of the Kamchatka Krai).

The reason for the decrease in the coefficient was the reduction in the growth rate of own income compared to the growth rate of non-repayable receipts (Table 6). In 2019, the growth rate of own revenues, calculated in prices of 2016, is lower than the level of the previous year in the Nenets and Khanty-Mansi Autonomous okrugs and the Republic of Sakha, and in all regions in 2020, with the exception of the Khabarovsk Krai. The decrease in the coefficient indicates an increase in the financial dependence of the majority of regional budgets on financial assistance from a higher level.

Table 6

Dynamics of growth rates of key budget indicators [4]

	2016	2017	2018	2019	2020
Own income (average for FN regions)	1.05	1.05	1.15	1.10	1.00
Non-repayable receipts (average for FN regions)	1.06	1.09	1.71	1.32	1.46

[4] Calculated and compiled by the author based on data from the Federal State Statistics Service of Russia.

There is also a downward trend in the regional average income concentration coefficient, which is associated with a reduction in the share of own income in the total budget revenues of the region and an increase in transfers. In 2019, own income increased by 1.39 times compared to 2016, and non-repayable receipts included in income increased by 2.2 times. In 2020, the growth of own income compared to the level of 2016 amounted to only 1.37 times, while the growth rate of transfers increased by 3 times. The reduction in the coefficient in 2019 is noted in all FN regions, with the exception of the Republic of Komi and the Kamchatka Krai. In 2020, negative dynamics was observed in all 16 northern regions.

The coefficient of expenditure coverage by incomes also slightly decreased in the regions of the North. Its maximum growth was noted in 2018, and it declined in 2019 and 2020 due to the excess of expenditure growth over income (Fig. 4). As a result, the balance of budgets was disturbed, which led to an increase in the budget deficit in a larger number of northern regions.

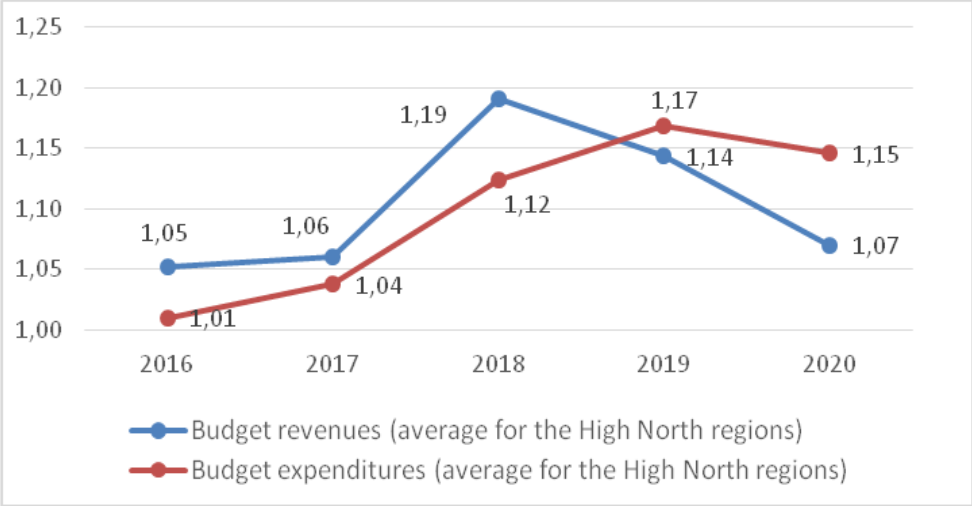

Fig. 4. Growth (decline) rates of budget revenues and expenditures [5].

In 2019, budget expenditures exceeded its revenues in the Irkutsk and Magadan oblasts, the Khabarovsk and Kamchatka krais, the Tyva and Sakha republics. In 2020, 11 northern subjects were in a similar position.

The coefficient of average per capita income, which characterizes the level of income security of the population relative to the average Russian indicator, decreased over the analyzed period in the republics of Sakha, Komi and Tyva, the Khanty-Mansi Autonomous Okrug, and the Sakhalin Oblast. The coefficients of the Republic of Tyva, Khabarovsk Krai, Khanty-Mansi Autonomous Okrug, Arkhangelsk and Irkutsk oblasts are below the national average.

Assessment of the impact of indicators of the budget process management quality on the level of use of budget potential

In order to quantitatively assess the quality of budgetary process management, integral indicators (IQM) were calculated using the coefficients of the second group for the period 2016–2020.

[5] Calculated and compiled by the author based on data from the Federal State Statistics Service of Russia.

Based on the results of the calculations, matrices were compiled to assess the change in the IQM and its impact on the total integral indicator (CII) (Tables 7, 8).

Table 7

Distribution of the FN regions by the level of use of the budgetary potential (CII) and the level of management quality (IQM) in 2016

	Aggregate integral indicator assessing the level of use of budgetary potential (CII)					
Integral indicator assessing the quality of budgetary potential management (IQM)		High (>0.8)	Above average (from 1.5 to 1.8)	Average (from 1.2 to 1.5)	Below average (from 0.9 to 1.2)	Low (< 0.9)
	High (> 1.6)	Nenets Autonomous Okrug	-	-	-	-
	Above average (from 1.3 to 1.6)	Sakhalin Oblast	-	-	-	-
	Average (from 1 to 1.3)	Yamalo-Nenets Autonomous Okrug	-	-	-	-
	Below average (from 0.7 to 1)	-	Khanty-Mansi Autonomous Okrug	Republic of Komi	Khabarovsk Krai	-
	Low (< 0,7)	-	-	Krasnoyarsk Krai	Russian Federation, Murmansk Oblast, Republic of Karelia, Arkhangelsk Oblast, Irkutsk Oblast, Sakha Republic, Magadan Oblast, Chukotka Autonomous Okrug	Tyva Republic, Kamchatka Krai

Table 8

Distribution of the FN regions by the level of use of the budgetary potential (CII) and the level of management quality (IQM) in 2019

	Aggregate integral indicator assessing the level of use of budgetary potential (CII)					
Integral indicator assessing the quality of budgetary potential management (IQM)		High (>0.8)	Above average (from 1.5 to 1.8)	Average (from 1.2 to 1.5)	Below average (from 0.9 to 1.2)	Low (< 0.9)
	High (> 1.6)	Nenets Autonomous Okrug	-	-	-	-
	Above average (from 1.3 to 1.6)	-	-	-		-
	Average (from 1 to 1.3)	Sakhalin Oblast	Murmansk Oblast	-		-
	Below average (from 0.7 to 1)	Yamalo-Nenets Autonomous Okrug	Republic of Komi, Khanty-Mansi Autonomous Okrug	-		
	Low (< 0,7)	-	-	-	Russian Federation, Republic of	Tyva Republic, Kam-

					Karelia, Arkhangelsk Oblast, Irkutsk Oblast, Sakha Republic, Magadan Oblast, Chukotka Autonomous Okrug, Krasnoyarsk Krai, Khabarovsk Krai	chatka Krai

On the basis of the existing matrix, we single out four groups of FN regions by the level of management quality: high level (Nenets Autonomous Okrug); moderate level (Sakhalin and Murmansk oblasts); lower level (Yamalo-Nenets and Khanty-Mansi Autonomous okrugs, Komi Republic); low level (below the Russian average) — this is the most numerous group of FN regions.

It should be noted that management problems in the northern regions are no less acute than financial ones. Despite the fact that the Sakhalin Oblast and the Yamalo-Nenets Autonomous Okrug show a high level of CII, which is ensured by a stable financial base throughout the analyzed period, they have problems in terms of the quality of budgetary process management. The Murmansk Oblast has improved its position in the ranking, moving from a low level of IQM to an average one by 2019. Khabarovsk Krai, on the contrary, moved down to a lower position.

Let us assess the influence of the coefficients involved in the calculation of the IQM on the integral indicator of management quality (IQM) and on the total integral indicator (CII).

The tax collection rate, estimated on the basis of potential revenues, taking into account arrears, deferred, suspended for collection and other types of debts, calculated for the FN regions, determines the effectiveness of tax administration measures and demonstrates a higher efficiency of the work of control authorities in most of the northern territories than the Russian average. It had a positive impact on the total score of the CII. In 2019, compared to 2016, there was an increase in the coefficient in 15 FN regions (with the exception of the Nenets Autonomous Okrug), which was ensured by a reduction in tax arrears in certain regions and an increase in tax revenues, in 2020 — in 11 regions. In 2019, compared to 2016, debt growth is recorded in the republics of Komi and Tyva, Khabarovsk Krai, Nenets, Khanty-Mansi and Yamalo-Nenets Autonomous okrugs, Irkutsk and Sakhalin oblasts, in 2020, it remained the same in the last five regions.

The tax effort coefficient for income tax shows the manifestation of the activity of regional authorities to attract (preserve) large economic entities as taxpayers, which are the main payers of income tax for the northern regions. There is a positive dynamics of the indicator in the northern regions for 2016–2019 (Fig. 5). At the same time, in the most productive year of 2019, individual indicators decreased in the Khanty-Mansi and Yamalo-Nenets Autonomous okrugs, the Krasnoyarsk Krai, the Magadan and Sakhalin oblasts, continuing the trend in 2020 (except for Sakhalin Oblast). At the same time, in 2020, the average value of the coefficient for the northern regions increased compared to 2016, and its value was 4.8 times higher than the average Russian indicator. The coefficient of tax effort demonstrates the highest level of fluctuation among the analyzed indicators, as evidenced by the coefficient of variation, the value of which exceeded 200%. The Nenets Autono-

mous Okrug, the Sakhalin and Murmansk oblasts, and the Komi Republic retain the leadership among the FN regions in this indicator.

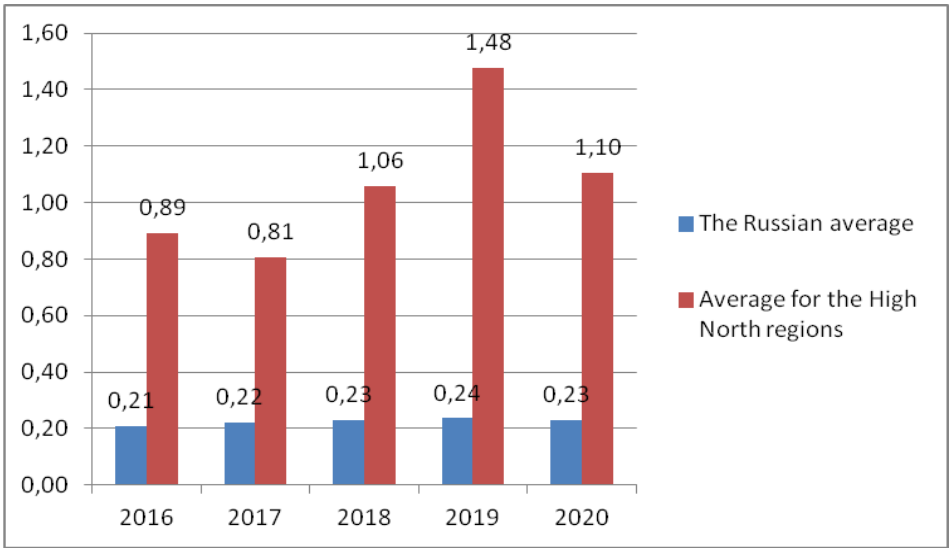

Fig. 5. Dynamics of the coefficient of tax efforts on income tax [6].

The expenditure priority ratio shows that the budgets of the FN regions are mainly socially oriented. At the same time, the Chukotka Autonomous Okrug has the lowest level of social spending, which amounted to 34% of all spending in 2016, 23.2% in 2019, and 32% in 2020. The coefficient below the average Russian level is shown in 2019 in the Nenets, Yamalo-Nenets and Chukotka Autonomous okrugs, the Republic of Sakha, Kamchatka Krai, Magadan and Sakhalin oblasts; in 2020, the situation worsened in Khabarovsk Krai. The average indicator for the FN regions, correlated with the average Russian level, showed negative dynamics in 2019 and 2020 and did not reach the Russian average, which was reflected in the decrease in the cost priority ratio and on the IQM, as well as on the total integrated indicator of the CII.

Investment activity in the FN regions and in the country as a whole, increased by 2018, was declining, which negatively affected the CII. The investment activity ratio in 2019 decreased in half of the FN regions (Nenets Autonomous Okrug, the republics of Komi and Karelia, Sakhalin, Magadan and Arkhangelsk oblasts, Krasnoyarsk Krai). At the same time, the level of investment activity in the Yamalo-Nenets, Nenets and Khanty-Mansi Autonomous okrugs and the Murmansk Oblast exceeded the national average throughout the whole period under analysis.

Conclusion

At this stage of the study, various approaches to assessing the budgetary potential and the indicators used in them are considered. It is determined that the available indicators do not allow to fully assess the level of budgetary potential in terms of its use. A methodical approach to evaluating the level of use of the budgetary potential is proposed, based on the developed system of indicators that assess the financial security of the territories and the quality of the management of the budgetary process, as a result of the adoption of managerial decisions by regional authorities. The use of

[6] Compiled by the author based on data from the Federal Tax Service of Russia.

a methodological approach in the study made it possible to quantify the level of use of the budgetary potential in the FN regions, to perform their ranking (the leader in terms of the level of use of the budgetary potential in 2016 and 2019 was the Nenets Autonomous Okrug, in 2020 — the Sakhalin Oblast. The Republic of Tyva remains the laggard in the ranking), to implement a typology of the northern subjects of the Russian Federation, highlighting regions with a high, moderate, reduced, low level of use of budgetary potential. High and moderate levels of use of the budget potential were noted in the highly developed extractive regions. In most of the regions that differ significantly in terms of economic development, the level of use of the budgetary potential is below the average for the Russian Federation. In dynamics, there is a relative stability of the position of the regions in terms of the level of use of the budgetary potential. Based on the formation of matrices that compare integral indices that assess the financial security of the territory and the quality of budgetary process management with the aggregate index of the use of budgetary potential, and the analysis of the coefficients included in the calculation of the indices, it was revealed that the value of the aggregate integral index characterizing the level of use of budgetary potential in the FN regions is decreasing in dynamics, which is largely due to the reduction of the ratios, assessing financial security of territories. The quality of budget process management remains at a low level in both economically developed and underdeveloped FN regions.

The analysis revealed the main problems of the process under study. Thus, regions with a high index of the use of budget potential are distinguished by a significant level of financial resources. With a relatively high quality of management in general, some regions of this group have problems in terms of weakening the tax efforts of regional authorities to ensure the collection of income tax, the payers of which are large export-oriented business structures; reducing the level of tax collection due to the growth of debt to the budget; slowdown in investment activity in the FN regions. Regions, the level of use of the budgetary potential of which is defined as moderate, are experiencing problems in terms of the quality of management: a decrease in activity in collecting income tax due to a reduction in the tax base; growth in tax arrears; decrease in the level of investment activity; limiting budget spending for social purposes. Northern subjects with a reduced and low level of use of the budgetary potential (did not exceed the average Russian indicator) are characterized by significant financial problems: low level of financial security due to limited opportunities to increase their own income; dependence on revenue sources coming from the federal budget; a decrease in the level of budgetary security. The financial problems are overlaid with managerial ones: low level of tax efforts made by the authorities in terms of collecting income tax and expanding the tax base; low effectiveness of measures to reduce tax arrears; reduction of expenditures on social obligations to the population; low investment activity.

In order to solve the identified problems, which determine the directions of further research, it is necessary to develop measures and mechanisms related to the strengthening of financial independence of regions, expanding the tax base, increasing the efficiency of tax administration, strengthening the role of “functional interaction between financial and tax authorities in the

budget process" [14, Borovikova E.V., p. 28], etc. Particular attention should be paid to the intensification of investment activity in the northern regions — the driving force behind the economic development of the territories, the source of tax revenues and improvement of living standards of citizens through the development of incentive instruments within the framework of state investment policy.

The practical significance of the study is due to the possibility of applying the proposed approach by the territorial authorities to solve the problems of improving the efficiency of managing the budgetary potential in the regions.

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The article was submitted 27.05.2022; approved after reviewing 15.06.2022; accepted for publication 20.06.2022.

The author declares no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 20–32.
Original article
UDC [338.22+620.9](985)(045)
doi: 10.37482/issn2221-2698.2022.49.23

Strategic Trends in Energy Development of the Northern Territories of Russia

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Abstract. The dynamic development of the energy market is the source of Russia's energy diversification processes. The study presents key areas in the development of the Russian energy sector, taking into account new trends and challenges. The Arctic zone of the Russian Federation is potentially becoming a growth driver for the energy market and opens up "new windows" for the country's economic development. It is determined that the structure of consumption, use of resources, generation and transmission of electricity is changing. Long-term trends in the energy transition demonstrate a change in the energy balance in favor of clean energy sources: wind, solar, nuclear, geothermal, hydropower, hydrogen, and bioenergy. The development of hydrogen energy, including in the northern territories of Russia, creates a reliable basis for integration into the global hydrogen infrastructure. The change in the energy balance in favor of renewable energy sources (RES) is presented. According to the International Energy Agency (IEA), RES will account for up to 95% of new energy capacity additions by 2026. The global climate agenda — the rejection of fossil fuels — creates new challenges for the Russian economy and the development of its Arctic investment projects. It has been established that the current situation in the context of global technological breakthroughs and climate change is shaping the transition from vertical integration to distributed generation and decentralization. The purpose of the study is to analyze current trends in the development of the energy market, based on the results of which it is necessary to adjust the approaches of the Russian energy sector to future development, making maximum use of the opportunities of the northern territories of Russia.
Keywords: *economics, energy, Russian Arctic zone, renewable energy source, nuclear energy, hydrogen energy, scientific and technological progress, generation*

Introduction

Modern trends of energy market formation, scientific and technological progress and political and economic relations determine the multi-vector trends of the progressive, sustainable development of the energy sector of the North and the Russian energy industry as a whole. The current large-scale energy system, which ensures the reliability and quality of power supply to the country's economy and household consumers, is economically justified and technically efficient. Nevertheless, modern economic incentives prescribe to the professional community of power engineers, with the consolidation of the scientific personnel of the industry, the need to minimize the payback period of investments. Economic interests, new technologies, new generation methods — solar, wind, modular gas with a high installed capacity utilization factor (ICUF), capable of competing with large power plants in these parameters — determine the vector of distributed generation development.

For citation: Vopilovskiy S.S. Strategic Trends in Energy Development of the Northern Territories of Russia. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 23–37. DOI: 10.37482/issn2221-2698.2022.49.23

Managerial decision-making for further energy development is largely based on one of the fundamental factors — increasing energy efficiency. In turn, increasing energy efficiency causes additional contradictions: on the one hand, new energy-efficient technologies are being introduced and energy costs are being saved; on the other hand, energy consumption grows with increase of socio-economic level of society, which is a leveling factor. Consequently, there are many questions, directions — how should the country's energy industry develop and what is the role of the state in its renewal?

The energy community of Russia chooses an evolutionary path of development inherent to an institutional, stable state, based on the foundation of a built and reliable energy system (ES). The current energy legislation is necessary and sufficient for its further development, updated in a timely manner as new trends emerge, including those imposed from outside. Russia systematically and in a balanced manner implements the regulatory documents, which are based on: "Energy strategy of the Russian Federation for the period up to 2035" [1], "Strategy for scientific and technological development of the Russian Federation" [2], a comprehensive program "Development of equipment, technologies and scientific research in the field of the use of atomic energy in the Russian Federation for the period up to 2024" within the framework of the 14th national project for the development of nuclear science and technology [3], federal law No. 296-FZ of July 2, 2021 "On limiting greenhouse gas emissions" [4], order No. 2634-r on approval of the action plan "Development of hydrogen energy in the Russian Federation up to 2024" [5], "Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2035" [6], etc.

[1] Energeticheskaya strategiya Rossiyskoy Federatsii na period do 2035 goda [Energy strategy of the Russian Federation for the period up to 2035]. URL: http://static.government.ru/media/files/w4sigFOiDjGVDYT4IgsApssm6mZRb7wx.pdf (accessed 11 April 2022).

[2] Ukaz Prezidenta RF ot 1 dekabrya 2016 g. №642 «O strategii nauchno-tekhnicheskogo razvitiya Rossiyskoy Federatsii» [Decree of the President of the Russian Federation of December 1, 2016 No. 642 "On the strategy of scientific and technological development of the Russian Federation"]. URL: https://www.garant.ru/products/ipo/prime/doc/71451998/ (accessed 11 April 2022).

[3] Pravitel'stvo utverdilo 14-y natsional'nyy proekt po razvitiyu atomnoy nauki i tekhnologiy [The government approved the 14th national project for the development of nuclear science and technology]. URL: https://strana-rosatom.ru/2021/02/08/31102/ (accessed 11 April 2022).

[4] Federal'nyy zakon ot 02.07.2021 g. №296-FZ «Ob ogranichenii vybrosov parnikovykh gazov» [Federal Law No. 296-FZ of 02.07.2021 "On limiting greenhouse gas emissions"]. URL: http://www.kremlin.ru/acts/bank/47013 (accessed 11 April 2022).

[5] Plan meropriyatiy «Razvitie vodorodnoy energetiki v Rossiyskoy Federatsii do 2024 goda» [Action plan "Development of hydrogen energy in the Russian Federation up to 2024"]. URL: http://static.government.ru/media/files/7b9bstNfV640nCkkAzCRJ9N8k7uhW8mY.pdf (accessed 11 April 2022).

[6] Ukaz Prezidenta RF ot 26 oktyabrya 2020 g. № 645 "O Strategii razvitiya Arkticheskoy zony Rossiyskoy Fede-ratsii i obespecheniya natsional'noy bezopasnosti na period do 2035 goda" [Decree of the President of the Russian Federation of October 26, 2020 No. 645 "On the strategy for the development of the Arctic Zone of the Russian Federation and ensuring national security for the period up to 2035"]. URL: https://www.garant.ru/products/ipo/prime/doc/74710556/ (accessed 11 April 2022).

Priority areas of energy modification

Russia's geographical location provides challenging climatic conditions in which energy reliability is extremely important. The Ministry of energy of the Russian Federation [7], interacting with industry companies, has the appropriate competencies to ensure reliability. In particular, innovative development, real-time modeling of power systems, new diagnostic system, formation of action algorithms and prevention of impact of weather and other conditions make it possible to ensure the specified reliability. The digitalization of processes in the industry makes it possible to effectively monitor the state of networks and equipment and respond to emerging technological disruptions in a timely manner.

The issue of high-quality and reliable energy supply is especially acute in isolated and hard-to-reach areas of the Far North (Fig. 1). At the current stage, the situation is being resolved at the state level, from the "northern delivery" along the Northern Sea Route (NSR) [1] to the installation of small modular reactors (Small Modular Reactors — SMRs) with a capacity of up to 300 MW per unit. SMRs are one of the most promising emerging nuclear power technologies. The world's first Russian floating nuclear power plant (FNPP) "Akademik Lomonosov" was put into operation in May 2020 in the northern seaport of Pevek; it generates energy from two SMR reactors with a capacity of 35 MW each.

With the use of the latest technologies, there is a steady trend towards a gradual transition from centralized power generation to increased use of distributed generation, which is created and located directly at the consumer's doorstep. A stable situation has developed when households, small, medium and large businesses can have their own generation sources and do not connect to the centralized electric grid or connect to it in order to distribute excess energy to the general grid, as well as to provide a guaranteed and high-quality main/reserve power source.

At the current stage, the existing district heating systems of small and medium-sized cities of Russia, based on boiler houses and heat networks, are losing their significance. The noted phenomenon has many factors; one of them is the tariff regulation of prices for thermal energy by municipalities. Medium and small thermal power plants and individual boiler houses have received an economic advantage, as it is easier to get these energy facilities out of the regulator's control. Consequently, the prospects for the development of cogeneration are largely associated with the construction of medium and small thermal power plants: this is specifically important in the regions of the Far North.

For the Arctic zone of the Russian Federation (AZRF), the use of autonomous hybrid energy sources (AHES) — a combination of a modern diesel, a renewable energy source — a wind power plant (WPP) or a solar power plant (SPP) and an electricity storage unit controlled by a unified automated control system (UACS) — can be considered a promising solution. UACS minimizes the consumption of fossil fuel and maximizes the generation of electricity from renewable energy sources (RES) [2].

[7] Ministry of Energy of the Russian Federation. URL: https://minenergo.gov.ru/node/234 (accessed 11 April 2022).

In the Arctic port of Tiksi (Republic of Sakha, Yakutia), a new hybrid generation facility was put into operation in December 2020: wind-diesel complex (WDC) with a capacity of 900 kW; diesel power plant with a capacity of 3000 kW; energy storage system with a capacity of 1000 kW. The elements of the WDC are united by an automated control system (ACS) for the production and distribution of electricity. This hybrid generation facility is capable of generating more than 12 million kWh of electricity, thereby providing reliable and high-quality power supply to consumers. The use of the best modern technologies in the creation of new generation makes it possible to reduce fuel consumption by up to 500 tons per year and creates an opportunity to obtain a positive economic and environmental effect. PJSC RusHydro plans to build such energy complexes in the settlements of Yakutia (Verkhoyansk, Moma, Sasyr, Tebyulyakh, Tabalakh, Kulun-Elbyut), which are part of the Russian Arctic. The application of autonomous hybrid sources and new technologies used in the energy sector will eventually lead to a reduction in tariff growth and create conditions for a more efficient and reliable power supply.

The Japanese company Mitsubishi Power is working on a hybrid solid oxide fuel cell (SOFC) system with a microgas turbine. The name of the new technology is Hybrid System jf Solid Oxide Fuel Cells (SOFC) and Micro Gas Turbines (MGT). SOFC is a multi-fuel reactor that operates with various types of fuel (biogas, hydrogen, natural gas), generates energy and heat with high efficiency and is used in a decentralized manner and independently of the existing local power grid. The introduction of this technology is planned in Germany in 2022. SOFC is one of the elements in the formation of decentralized and diversifiable energy. *Methods of applying multifuel reactor technology (natural gas, hydrogen) in the future may find application in the regions of the Far North, where traditional energy sources are mined and produced.*

Particular attention in this context is paid to the global processes for the development of Small Modular Reactors (SMRs) with a capacity of up to 300 MW per unit. SMRs are one of the most promising emerging nuclear power technologies. The structural advantage of SMRs is that they are modular and small, as a result, their design is simpler and relies on built-in and passive safety elements, which will require lower costs and provide flexibility for local networks and integration with renewable energy and non-electrical applications such as hydrogen production and water desalination.

The global professional energy community and leading nuclear physicists believe that modern civilization cannot live and develop without nuclear energy. This is due to the fact that the world's population is growing, consumer demands are increasing as well as demand for energy capacity. *The forecast of world energy consumption up to 2100 shows an average growth of 1.5 times [3] (Table 1). Due to the fact that the Arctic zone of the Russian Federation has the potential to become an energy market driver, energy consumption growth in the AZRF alone could potentially amount to up to 50%*. The average growth is expected to be 1.5–2 times [3] (Table 1).

Table 1

Energy consumption forecast for 2020–2100 [8]

Year	TWh
2020	166926
2050	226792
2100	228501

Increasing scientific and technological progress and generating significant benefits for society require impressive energy consumption. The economic EROI coefficient, the ratio of energy received to energy consumed, determines its energy profitability. This coefficient must be above 1 (one), which determines the significant availability of goods to society. The Association of Scientists has determined the proper EROI for various activities of modern society [4]. In developed countries, to maintain the quality of life, EROI must be at least 20 units, and breakthrough scientific and technological progress requires an energy source with an EROI more than 25 units. The minimum EROI value is 8 units — elementary existence, without attempts at scientific and technical progress, improvement, etc. Studies by European scientists have expressed the EROI values of modern and promising energy sources. Table 2 presents the EROI values of an energy source, taking into account its generation.

Table 2

EROI of modern energy sources [9]

No.	Type of activity	EROI (units)
1	Nuclear power plants (NPPs)	75
2	Hydropower plants (HPPs)	35
3	Coal thermal power plants (CTPPs)	30
4	Gas thermal power plants (GTPP)	28
5	Wind energy systems (WES)	3.9
6	Solar energy systems (SES)	1.6

Analyzing the events of the previous few years and the latest trends in the electric power industry, it can be confidently stated that the development of the “peaceful atom”, giving nuclear power the status of a clean energy source is a legitimate, unmistakable vector for the development of the energy industry in Russia and the world as a whole. The results of the Joint Research Centre (JRC) study on the use of nuclear energy and the full cycle of its environmental friendliness have resulted in the JRC Report “Science for Policy” [10] with the evidence of the ecological safety of nuclear power plants. It ranks the environmental friendliness of energy types as follows: 1 — wind; 2 — hydro; 3 — nuclear; 4 — solar; 5 — gas, 6 — oil; 7 — coal; 8 — lignite. This Report provided a strong basis for the European Commission’s decision to classify gas and nuclear as clean

[8] Source: [3].
[9] Source: [5].
[10] JRC science for policy report. Technical assessment of nuclear energy with respect to the ‘do no significant harm’ criteria of Regulation (EU) 2020/852 (‘Taxonomy Regulation’). Petten, European Commission, 2021, 387 p. URL: https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/210329-jrc-report-nuclear-energy-assessment_en.pdf (accessed 11 April 2022).

energy sources. Gas power plants, according to the Taxonomy (document of the sustainable development of the EU economy until 2050), must replace facilities using coal, oil and other heavy fossil fuels, and ensure that emissions do not exceed 270 g CO2 per kWh. The nuclear power plants have received building permission up to 2024, with the expectation that they will use the "best available technology" and meet high safety standards that will minimize the amount of radioactive waste.

The closure of coal thermal power plants, the depletion of gas deposits in Europe have a negative impact on the acceleration of the further promotion of renewable energy due to the low installed capacity utilization factor (ICUF). For example, as of 01.01.2022, the installed capacity of power plants of UES of Russia amounted to 246,590.9 MW, which is 1,277.65 MW (+0.52%) more than in 2021. Table 3 shows the data describing the installed capacity of power plants of UES of Russia by CPS, not taking into account power plants of industrial enterprises [11].

Table 3

Installed capacity utilization factor of power plants of UES of Russia in CPS in 2020, 2021 (%) [12]

Power plants	2020	2021	Deviation
TPP	41.34	46.05	+ 10.23
HPP	47.33	47.89	+ 1.17
NPP	81.47	83.98	+ 2.99
WES	27.47	28.31	+ 2.97
SES	15.08	14.4	- 4.72

Based on the analysis of the Report data, it was found that the number of hours of use of the installed capacity of power plants across the UES of Russia in 2021 amounted to 4514 hours (51.53%) of calendar time (installed capacity utilization factor), including: nuclear power plants — 7349 hours (83.89% of calendar time); hydroelectric power plants — 4195 hours (47.89% of calendar time); thermal power plants — 4034 hours (46.05% of calendar time); wind power plants — 2480 hours (28.31% of calendar time); solar power plants — 1261 hours (14.4% of calendar time). In 2020, this coefficient was 4238 hours (48.25%), the ICUF growth in 2021 was 276 hours (+3.28%).

The next vector of energy development is the use of renewable energy sources (RES) [6]. In order to achieve carbon neutrality, many countries have announced a large-scale transition to "green energy" with a higher level of decarbonized energy production [7, 8, 9]. The goal of the transition to alternative energy sources is the decarbonization of the economy and the maximum possible reduction of CO2 emissions during energy generation and in all areas of economic activity [10, 11, 12]. In this regard, the renewable energy sector is scaling up rapidly and extensively with a large proportion of new solar and wind power capacity coming from China, the European Union, the United States and India. They are also the world's largest economies — producers of goods, works and services, and consequently consumers of energy. According to the International Energy

[11] Report on the functioning of the UES of Russia in 2021. URL: https://www.so-ups.ru/fileadmin/files/company/reports/disclosure/2022/ups_rep2021.pdf (accessed 11 April 2022).
[12] Ibid.

Agency (IEA), by 2026, RES will account for up to 95% of the increase in new energy capacity. At the end of 2021, solar energy is the driver of the renewable energy sector: capacity growth increased by 17% (to 160 GW), followed by wind and hydropower. The IEA predicts that global renewable capacity will grow by 60% by 2026, compared with 2020, to more than 4800 GW. China is expected to remain the leader in terms of RE growth over the next five years (2021–2026), reaching 1200 GW of solar and wind capacity by 2026. India plans to reach 500 GW of renewable energy capacity by 2030. The EU and the US also plan to accelerate the development of renewable energy. At this stage, these four markets account for 80% of global renewable energy capacity growth [13].

In Russia, the growth rate of renewable energy looks much more modest; at the end of 2021, the share of renewable energy sources was 0.5% in energy production [13]. The distribution of the annual volume of electricity production by types of power plants in the UES of Russia in 2021 was the following: wind power plants — 3621.7 million kWh (+161.7% from 2020), solar power plants — 2253.8 million kWh (+13.7% from 2020) [14]. In the North-West, electricity generation in the CPS by types of power plants was as follows: thermal power plants — 53.4%; WPP, HPP, SPP — 11.8; NPP — 34.9. However, the Kola WPP with a capacity of 200.97 MW, built by Enel Russia — controlled by Italian Enel, has not been put into operation in Murmansk Oblast. Murmansk wind park “Octagon. Severo-Zapad” of the Kola wind farm was supposed to deliver capacity to the market in December 2021, but due to “force majeure circumstances”, the deadlines were shifted to 2022, but under the new circumstances, they were postponed to a later date [15].

Energy consumption in the world is growing steadily, as mentioned above, in particular, in Russia, electricity consumption increased by 6% in 2021 compared to 2020, and by 2.6% in 2020 from 2019; electricity generation increased by 6.6% in 2021. Electricity with a consumption share of more than 50% could potentially be the end product of the energy market in the future. Table 4 shows the prospects for world energy transitions, the 11.5^0 C trajectory [16].

Table 4

Forecast of final electricity consumption up to 2050 [17]

Energy sources	Balance of global final consumption, 2018 (%)	Projection of final consumption by 2050 (%) (in the 1.5^0 C warming containment scenario)
Oil	37	4

[13] Report of the International Energy Agency for 2021 and renewable energy pans for 5 years. URL: https://zen.yandex.ru/media/solarnews/otchet-mejdunarojnogo-energeticheskogo-agenstva-za-2021-god-i-plany-viena-5-let-61b21e4ddc065960a505f342 (accessed 11 April 2022).

[14] Report on the functioning of the UES of Russia in 2021. URL: https://www.so-ups.ru/fileadmin/files/company/reports/disclosure/2022/ups_rep2021.pdf (accessed 11 April 2022).

[15] Enel gotovitsya k vykhodu [Enel is getting ready to go out]. URL: https://www.kommersant.ru/doc/5270154 (accessed 11 April 2022).

[16] World Energy transitions outlook, 1,5^o C pathway. URL: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/IRENA_World_Energy_Transitions_Outlook_2021.pdf (accessed 11 April 2022).

[17] Ibid.

Electricity	21	51
Gas	16	4
Coal	11	2
Conventional biomass (biogas, presscake, etc.)	8	-
New biomass (wood, peat, etc.)	3	18
Heat generation	3	5
Other RES	0.5	4
Hydrogen	-	12

In parallel with the changes in electricity production, the industry is being transformed, for which hydrogen will become the basis [14]. As a result, the use of renewable energy sources for the production of "green" hydrogen is increasing. According to IEA estimates, electrolysis capacity will increase from 0.3 GW in 2020 to 17 GW by 2026. In July, 2020 the European Commission adopted the hydrogen strategy up to 2050, which foresees the construction of electrolysis facilities based on RES with investments of €470 billion, as well as the construction of new wind and solar power plants with investments of €340 billion. Leading transport operators plan to upgrade the existing gas transport infrastructure and form a system of 6800 km of gas pipelines by 2030, which will connect the "hydrogen valleys" — consumption clusters H_2, and to increase the transportation system to 23000 km by 2040.

In accordance with the plans of the Energy development strategy of Russia, large-scale work is underway to modify the country's energy complex and introduce new technologies in energy, transport and industry that are related to decarbonized energy production, the basis of which are Law No. 296-FZ of 02.07.2021 "On limiting greenhouse gas emissions", Decree No. 2634-r on approval of the action plan "Development of hydrogen energy in the Russian Federation up to 2024", etc. Russia has an opportunity to become a reliable supplier of hydrogen for the domestic market, as well as an exporter of hydrogen with integration into the hydrogen infrastructure of Europe. Gazprom is currently able to move 20 to 70% of hydrogen to Europe through its pipeline network and, with the launch of Nord Stream-2, will be able to increase supplies. A bench-top hydrogen production test facility is being built at the Kola NPP in the Murmansk Oblast.

The Russian Federation has chosen the right course in public and corporate governance, and investments in nuclear power development, the core of which is the country's hydrocarbon resources, have allowed new technologies to be developed, generation 3 and 3+ reactors to be redesigned, bringing nuclear technology to the limits of humanity's technological development. Generation 3+ reactors are listed as the most highly advanced in terms of operational safety.

Rosatom State Corporation [18] has unique competencies and is the only Company in the world capable of providing a full cycle of construction, supply and disposal of irradiated nuclear fuel (INF) and nuclear power plants. Active and successful research by Russian scientists indicates the availability of technologies and competencies to start a unique experiment — closing the nuclear fuel cycle (CNFC), the next step in the development of nuclear energy, the implementation of which will solve the problem of spent nuclear waste: "waste" will be converted into new fuel and

[18] State Corporation Rosatom. URL: https://www.rosatom.ru (accessed 11 April 2022).

reused at nuclear power plants. As a result, radioactive actinoids are incinerated during repeated use.

Priority in the expansion of domestic carbon-free energy is focused on the development of nuclear technologies. The Proryv project implemented by Rosatom is aimed at creating nuclear power complexes that improve large-scale nuclear power and meet the basic requirements [15]. The launched modernized thermonuclear reactor TOKAMAK T-15MD is a unique installation for carrying out thermonuclear processes in terms of a number of physical characteristics; it is of great interest in scientific and energy terms.

Possessing the "best available technologies" that meet high safety standards, Rosatom intends to initiate the construction of more than 50 nuclear reactors in 19 countries in the near future. In the long term (up to 2030), more than 80 facilities will be created.

At present, there are 11 nuclear power plants in Russia, with 37 power units in operation. The total installed capacity of all power units exceeds 29.5 GW, the share of nuclear energy is about 20% of the total electricity generation. The prospect is to increase the share of nuclear generation in the country to 25%, with reactors (including those with spectrum control) being safer, better and more efficient.

For the sustainable development of the Arctic zone of the Russian Federation (AZRF), projects are being implemented to use autonomous energy, isolated from the unified energy system of Russia [16].

The floating power unit (FPU) "Akademik Lomonosov" was delivered to the Arctic seaport of Pevek in 2020 to provide remote areas with electricity and heat. The floating nuclear thermal power plant (FNPP) is a new class of mobile energy sources based on modern Russian nuclear technologies; its launch was a real breakthrough in electricity and heat generation. The power plant is equipped with two KLT-40 (water-cooled nuclear) reactors. Importantly, the main designer, manufacturer and supplier of modern technological equipment is JSC "Experimental Design Bureau of Mechanical Engineering named after I.I. Afrikantov", Nizhniy Novgorod, an enterprise of Rosatom State Corporation.

The Government of the Republic of Sakha (Yakutia) and State Corporation Rosatom entered into an agreement in December 2020 to fix the electricity tariff for the implementation of a low-power nuclear power plant (LPNPP) project. LPNPP will be the first project in the world to use nuclear energy and preserve the ecology of the Arctic. This project can become a "pilot" for our country and will allow it to work out new technologies for providing energy when creating isolated energy systems, to actively develop not only remote areas, but also in general to create new city-forming enterprises of the national economy in hard-to-reach areas.

The use of small modular reactors (SMR) for settlements in the Far North can have a number of advantages:

- compactness: these nuclear installations consist of separate modules, occupy a smaller area — the dimensions of the promising domestic reactor RITM-400 are 8.2*9*17 m, design features allow them to be installed on land and sea vessels;
- transportability: reactors can be assembled at the factory and then transported and installed on site;
- capacity: the ability to increase capacity depending on energy consumption; 1, 2 or more SMR units can be installed in a given region;
- serialization: reduces the cost of SMRs and makes them affordable for consumers [17].

Providing the population and production capacities of the Far North with guaranteed energy supply creates a favorable climate for socio-economic development and environmental safety.

Another promising area of scientific and technological development of the nuclear industry is hydrogen energy based on the country's nuclear power plants. The technologies used by Rosatom State Corporation in the medium term can ensure the production of hydrogen in industrial volumes, subject to environmental standards, as well as with highly competitive cost parameters.

The Kola NPP was chosen as a pilot site for creating a bench test complex (BTC) for hydrogen production and handling (Fig. 2). Nuclear energy experts are exploring options for using excess electricity from nuclear power plants to produce hydrogen and use it to fuel trains, cars and other hydrogen fuel cell vehicles [19]. The Kola energy system is energy surplus, which determined the choice of the Kola NPP as the BTC, and the availability of the entire necessary infrastructure, experience in hydrogen production for own needs and low energy costs created favorable economic conditions. It is planned to create a system for handling hydrogen on an industrial scale — production, compression/liquefaction and transportation, and to put into operation a complex with 1 MW electrolysis units in 2023, and subsequently to increase the capacity and output of the BTC to 10 MW. According to the results of the efficiency of the complex, this technology can get a large-scale expansion throughout Russia. Rosatom plans to start construction of the second Kola nuclear power plant, Kola-2, in 2028, two new PWR reactors with a capacity of 600 MW. The project is now at the preparation and development stage; a construction site has been selected and surveys have been carried out; the site is located a few kilometers from the existing Kola NPP.

According to the forecasts of experts from the Ministry of Energy, in the case of a favorable scenario, Russia can export up to 1 million tons of hydrogen in three years, and the volumes can grow thirty times by 2050 and bring significant income [18]. The markets of the Asia-Pacific Region (APR) and the European Union are considered the most promising. In order to supply the foreign consumers, an effective model of hydrogen transportation for medium and long distances by means of sea-going vessels and efficient modular hydrogen liquefaction unit is being developed. A

[19] Na Kol'skoy AES nachnut proizvodit' vodorod v 2023 godu [Hydrogen production to start at Kola NPP in 2023]. URL: https://www.rosenergoatom.ru/stations_projects/sayt-kolskoy-aes/press-tsentr/novosti/38627/ (accessed 11 April 2022).

special project is being developed to create a system based on liquid organic carrier for hydrogen accumulation, storage and transportation by ice-class maritime transport along the Northern Sea Route (NSR) to the Asia-Pacific region. As a result, hydrogen energy as a separate segment of the fuel and energy complex (FEC) may be formed by 2025 and will require investments of 2.2 to 4.0 billion US dollars per year.

Conclusion

The scenario of energy development in the XXI century, when mankind was predicted to master controlled thermonuclear fusion and start transition to thermonuclear energy, a powerful and clean source of energy, turned out to be out of reach in practice. The large-scale expansion of wind and solar energy, the entry of hydrogen energy into this field, both in the form of generation by means of fuel cells and direct use of hydrogen as combustible fuel, and in the future application of thermonuclear energy (TNPP) leads to the processes of diversification of world energy.

Breakthrough technologies and climate change are causing a structural market transformation. Energy is changing from a commodity to a service and modern trends are creating a shift from vertical integration to distributed generation and decentralization. Consumers are now ready to become market players along the entire chain: able to manage their demand in response to market signals; able to become solicitors, i.e. energy consumers at some hours and producers at others, with their own generation and the tools to release excess energy into the common grid. A new, active consumer, perhaps indirectly and to a small extent, but involved in managing and balancing the power system, is preparing to do without centralized energy supply.

Of great importance is the increase in electricity consumption, which in turn entails an increase in electricity generation. Generating companies ensure a reliable, high-quality and uninterrupted supply to consumers. The single-rate electricity price in the wholesale electricity and capacity market (WECM) changed in 2021 at a rate lower than inflation: the wholesale price growth was 5.3%, while the forecast inflation rate was 8%. For example, in Russia the single-rate wholesale electricity price in 2021 was about 30 euro/MWh; in France it was 443 euro/MWh, in Germany it was 432 euro/MWh, in Austria and Belgium — above 430 euro/MWh. In the Baltics and Finland, the wholesale electricity price reached 1,000 euro/MWh in different periods. In the face of these new challenges, the Russian wholesale market remains one of the least volatile and competitive segments of the energy market definitely insure consumers against sharp increases in electricity prices.

The global climate agenda creates acute issues for the Russian economy. Abandonment of fossil fuels, development of renewables and other challenges will create additional risks of reduced demand for hydrocarbons already in the medium term. For reference, the fifth set of sanctions against Russia included an embargo on coal imports from Russia and a ban on Russian-flagged ships entering European ports. A report by the Global Wind Energy Council (GWEC) fore-

casts that an additional 557 GW of wind farms will be built globally between 2020 and 2026, which means an average of over 110 GW per year will be produced.

The key trend of the energy transition is the development of hydrogen energy, and in the medium term, hydrogen technologies will develop at an accelerated pace. Russia has significant potential to become an exporter of hydrogen and integrate into the global hydrogen infrastructure. The introduction of hydrogen together with nuclear, solar, wind and hydropower will create the prerequisites for the transition to a new energy mode.

Innovative energy projects are being successfully and systematically implemented in the Arctic zone of the Russian Federation as part of the country's economic enhancement. Application of the latest nuclear power technologies and installation of Small Modular Reactors (SMRs) in the Far North contributes to socio-economic development of these territories and is an important foundation for the use of the “peaceful atom” and scientific research. Distributed generation creates additional incentives to improve the efficiency of business processes in the northern territories of the country. The application of green energy is a priority for all activities in the Arctic zone of the Russian Federation.

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The article was submitted 18.04.2022; approved after reviewing 19.07.2022; accepted for publication 27.07.2022.

The author declares no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 33–47.
Original article
UDC [332.14+622.24.085.5](98)(045)
doi: 10.37482/issn2221-2698.2022.49.38

The Arctic Geo-Economy: Mobility of Strategic Oil Resources at the End of Globalization

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Abstract. A distinctive feature of the cyclical dynamics of global development is the rapid transformation of the maxim of "global superiority" into softer forms of leadership on the geopolitical and economic atlas of the modern world, such as "national power" and/or "regional advantage". This requires a concentration of resources to achieve the latter's mobility on the strategic movement trends of contemporary Russia. The importance of oil and petroleum products in the formation of the Russian Federal Budget and the National Welfare Fund cannot be overestimated. Today, oil is essentially the main source for the successful implementation of the special military operation and, at the same time, ensuring the progressive development of Russia. The article substantiates the necessity to maintain the economic turnover of oil resources development, including in the Arctic, carries out an expert assessment of three options for the development of oil production: reduction of production; reduction of oil exports against the background of increasing domestic consumption; and ensuring the mobility of export supplies to find and develop new markets.
Keywords: *globalization, anti-Russian sanctions, Arctic oil, maritime communications, oil export mobility*

Acknowledgments and funding

The work was carried out within the framework of the topic No. 0226-2019-0028 of the IEP "Interaction of global, national and regional factors in the economic development of the North and the Arctic zone of the Russian Federation" under the state order of the FRC KSC RAS.

Introduction

The special military operation (SMO) of the Russian Armed Forces has caused a synergetic effect of defragmentation (destruction) of the liberal economic model (LEM), which in practice embodies the ideas of the global liberal project (GLP), mainly in the countries of the "collective West", through its indirect impact on the world economy. This means the beginning of the decline of globalization as the dominant direction of modern geopolitics and geoeconomics.

The cyclical dynamics of global development is determined indistinctly and somewhat approximately by P. Krugman [1], Nobel Laureate in Economics in 2008, the founder of the theory of

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For citation: Kozmenko S.Yu., Kozmenko A.S. The Arctic Geo-Economy: Mobility of Strategic Oil Resources at the End of Globalization. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 38–54. DOI: 10.37482/issn2221-2698.2022.49.38
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new economic geography, whose main scientific works are well known to Russian specialists in the field of spatial economics.

From the standpoint of P. Krugman's theory, the scale of globalization is determined by the degree of development of the world communications system at various levels (local, regional, national, global), and these communications determine access to the relevant markets for goods and services. This is how the LEM is built, the target function of which is the implementation of a global liberal project that involves ensuring high-quality consumption of goods and services in the community of countries belonging to the leaders of this project, in other words, accepted into the circle of the "collective West".

The whole world participates in ensuring the consumption of the countries of the "collective West", hence the global character of tasks of value creation but not of value distribution.

The first upward globalization wave dates back to the beginning of the 20th century and is associated with the development of communications, which caused a massive expansion of world trade as a result of the synergistic effect from the introduction of railways, steamships and the telegraph into everyday life, which made communications more comfortable and affordable.

The state of the world economy at the beginning of the 20th century was called by J.-M. Keynes (1919) as "an outstanding episode of human economic progress" — "on the eve of the World War I, a citizen of London could easily order various goods in different quantities from all over the world, reasonably expecting that they would be delivered to his doorstep" [2]. However, the citizen had to be a member of the circle of the "collective West", at that time — the British Empire.

The decline of globalization occurred during the World War I, the post-war depression (the Great Depression in the United States, 1929–1939), which continued during the World War II and the Cold War.

The Cold War is a geopolitical construct based on the confrontation of the two sides; it is not yet a war, but a specter of war, when a chain of successive "casus belli" creates the illusion of an impending military clash.

During this period, the search for a cumulative "casus belli" is transferred and localized in the non-military (civilian) sphere; the result of the global confrontation in the era of the "cold" ("non-cold") war is the destruction of a military scale, achieved with the use of non-military tools (sanctions). At the same time, "gunpowder is kept dry", which requires significant resources and costs for the so-called arms race.

It is possible to resist such pressure only if there is an appropriate "security cushion" and a high level of economic stability of the national economy. Both of these phenomena are associated with the development of oil resources, which have become strategic since the mid-1960s.

[2] Keynes J.M. The Economic Consequences of the Peace. New York: Harcourt, Brace and Howe, 1920. URL: https://www.gutenberg.org/files/15776/15776-h/15776-h.htm (accessed 07 July 2022).

The competencies acquired during the heyday of the Soviet Union (approximately 20 years, 1964–1982) in withstanding the emerging challenges and threats of the Cold War helped Russia not only survive the "perestroika" and the so-called "market reforms", but also to face the current challenges of the "collective West".

Peculiarities of the global confrontation along the "Russia–West" line

The second upward globalization wave is identified at the beginning of the 21st century and is also predetermined by global achievements in the field of communications. These results are related to the development of network planning, the creation of transport networks and container transport logistics, the modernization of the cargo fleet, including the tanker fleet, the development and implementation of fundamentally new projects of gas tankers, for example, the Q-max (2007–2010) and Q-flex (2007–present) series with a cargo capacity of 260 and (165–216) thousand m^3, respectively, based on membrane tanks.

The global division of labor in the LEM is reduced to a narrow specialization required for the countries of the "collective West" with the dominant thesis that the diversification of the national economy will not bring the desired effect, since goods are a priori (excluding transport costs) cheaper on the global market. Such a "reasonable division of labor" creates an image of consumerist welfare from the fact that "we were accepted into the elite circle". The LEM involves the following order: you place and trade your goods on the global market, and, with the proceeds, you buy everything you need.

The global market generates total dependence and, in this way, the market for the global consumer is transformed into a market for the producer. That is, the consumer can really buy any product only on the condition that the manufacturer agrees to sell it. This is how the total dependence of participants in global development on each other is formed; this becomes the basis for imposing sanctions, a tool that is very common in modern geopolitics.

Certainly, the temptation to join the benefits of the global market as part of this elite consumer society is great. The goal of economic and social development is based on the familiar motif (from each according to his ability, to each according to his need), which has already been seen in our history.

Actually, in the 20th century, two models of general consumption are known: the first one — on a class basis (the slogan "to each according to his needs" could be implemented in the proletariat countries), the second one — on a regional basis (as realized in the countries of the "collective West").

That is why it is quite understandable that the course on implementation in the Western civilization, i.e. in the GLP, became the mainstream in the system of the global development of our country in the 1990s, which had predetermined the geopolitical drama of Russia that had started at the turn of the century [1].

But we should mention an important peculiarity: in the 17th–19th centuries, Russia was expanding its territories on the western and southern borders, that is, it was "friendship with the West" under the leadership of Russia. In the 20th century, Russia lost territories as a result of the collapse of the Russian Empire and the Soviet Union.

Russia's exit, or rather, Russia's pushing out of the unipolar LEM, indicates the onset of the decline of globalization as a phenomenon. This period is characterized not only by the cessation of a large-scale expansion of world trade, but also by the violation of the chains of interchangeability.

The main positive statement of the GLP is the satisfaction of almost any need. The anti-Russian sanctions epic confirms that not all Russian goods can be replaced in an acceptable timeframe in the required quantity, as the stock of goods is distributed unevenly across the global space. This applies primarily to energy resources.

A characteristic feature of the "Russia-West" confrontation is the development of such an element of the "Cold war" as the introduction of mutual restrictions (sanctions) on foreign policy and geo-economic activities.

The sanctions confrontation between Russia and the US has a long history — for almost 50 years (since 1974), some American restrictions have been placed against Russia.

Economic pressure on Russia is accompanied by geopolitical expansion in the form of NATO's eastward expansion.

The five known NATO expansions to the east in the last 25 years (since 1999) and the involvement of countries that are dubious in strengthening the combat readiness of the Alliance and in strict accordance with Newton's third law ("the force of action is equal to the force of reaction") caused the opposite Russian movement to the west and southwest. This will bring the Russia–NATO balance back to its original position in the near future.

NATO's eastward expansion was largely due to Russia's vague position in the Baltics, Ukraine and Belarus, the Warsaw Pact countries and the Balkan countries of the former Yugoslavia in the late 20th and early 21st centuries, which allowed NATO to almost double (from 16 to 30) the number of participating countries during this period.

To prevent NATO from moving eastwards, an alternative geopolitical strategy should be formulated. Russia should act as the center of a new continental integration, possessing modern means of defense on land and at sea.

The current aggravation of the sanctions confrontation began in 2013 and continued in March 2014 with the return of Crimea to Russia; then, among other things (cheap loans, etc.), restrictions were imposed on the import of technologies for prospecting, exploration and production of oil and gas (upstream stage of development of oil and gas resources) of the continental shelf. This could not but affect the intensity of the development of the Russian Arctic, especially in the gas sector during the implementation of the Nord Stream 1 and 2 projects.

In July 2017, the US Congress initiated the Countering America's Adversaries Through Sanctions Act — CAATSA — the law "On Countering America's Adversaries Through Sanctions" was

adopted. The law is stylized as the introduction of restrictions in the energy sector and is directed mainly against the Nord Stream 2 project. The adoption of this law makes it possible to limit Russia's influence not only in the energy markets of the EU countries, but also in the system of European international relations, since *oil and natural gas have been so organically implemented in the daily life of Europeans that they have become an integral part of ensuring national security. Moreover, disruptions in the supply of energy resources can lead to social conflicts on a national scale in European countries.*

The significance of oil resources for Russia's economy

Russia is one of the leaders in oil production. In 2021, the top three of them (USA — 711.1; Russia — 536.4 and Saudi Arabia — 515.0 million tons) accounted for 41.8% of world production, about 38.1% of crude oil exports (Saudi Arabia — 323.2; Russia — 263.6 and Canada — 197.4 million tons) and 36.1% of oil product export (USA — 244.4; Russia — 140.7 and Saudi Arabia — 57.7 million tons) [2, p. 16; 27].

Such competitive positions in the world market of oil and petroleum products testify to the dominance of these energy resources in the structure of the Russian economy.

The economic turnover of oil and gas forms the oil and gas revenues of the Federal budget of Russia due to the two main types of payments: MET — the tax on the extraction of minerals, oil, natural gas and gas condensate, and the export customs duty on crude oil and goods produced from oil, as well as natural gas. Moreover, the mineral extraction tax on oil and customs duties on oil and oil products together account for more than 82% of the total structure of these payments. In general, oil and gas revenues according to the current budget rules (since 01.01.2018) and the content of the current BTM — big tax manoeuvre [3, p. 66–72] amounted to 46.4% and 39.3% of revenues in 2018 and 2019, respectively, with some reduction in the COVID-19 pandemic years to 28% and 35.8% in 2020 and 2021 (Table 1).

Table 1

Structure of federal budget revenues of the Russian Federation [3]

Indicator	2018	2019	2020	2021
Urals oil price (USD/bbl)	70.0	63.6	41.7	69.0
Revenues of the Federal Budget of the Russian Federation (trillion rubles)*	19.5	20.2	18.7	25.3
Non-oil and gas revenues (% to *)	53.6	60.7	72.0	64.2
Oil and gas revenues (% to *)	46.4	39.3	28.0	35.8
Including MET on oil and customs duties on oil and oil products (% of oil and gas revenues)	82.4	85.6	74.3	85.0

In August 2018, a new six-year (until 2024) procedure [4] for matching MET and export customs duty on crude oil was approved. At the end of 2018, in the structure of "oil" payments,

[3] Calculated according to: Ministry of Finance of the Russian Federation. Federal budget. URL: https://www.minfin.ru/ru/statistics/fedbud/ (accessed 20 July 2022).

66.6% accounted for MET and others, 33.4% — for export customs duties on crude oil. According to the new procedure, the export duty on crude oil is reduced by 5% annually for six years so that by 2024 the value of this indicator will be 0. At the same time, MET on oil increases proportionally each year. Thus, almost the entire tax burden of the oil and gas sector will be transferred to the domestic market, which will stimulate an increase in the export of oil and oil products, intensify the work of refineries and return part of the income from duty-free trade in oil and oil products with the EES countries.

In addition, there is a globally accepted budget rule in countries with a raw-material-oriented economy, the economic content of which is to regulate oil and gas revenues and accumulate sovereign funds. In Russia, this is the National Welfare Fund (NWF) since January 1, 2018.

Since that time, the current configuration of budget rules has been introduced, according to which the cut-off price of one barrel of Urals oil in 2017 prices is set at USD 40 and indexed by 2% each year: in 2018 — 40.8, in 2019 — 41.6, in 2022 — USD 44.0. “Oil” revenues from exceeding the cut-off oil price are transferred to the NWF.

In 2018, the National Wealth Fund was replenished to 4036.0 billion rubles, and in the subsequent 2019–2021 — up to 7773.0, 13545.7 and 13565.35 billion rubles, respectively [5].

Thus, thanks to the development of oil resources at the beginning of 2022, Russia has a “safety cushion” of more than 13.5 trillion rubles, which is more than 70% of the annual federal budget revenues of the Russian Federation.

The importance of oil in the socio-economic development of Russia is confirmed by the growing share of the oil sector in GDP: in the first quarter of 2022, this share was 21.7% against 17.3 and 17.1% in 2021 and 2020, respectively. In a period of general economic downturn, this means that the downward trend in the oil and gas sector is not as great as the downturn in the economy as a whole. The dynamics of capital outflow from the Russian economy during this period grew from USD 50.4 billion in 2020 to USD 71.0 billion in 2021 and USD 138.0 billion in the first six months of 2022.

Therefore, it is not surprising that with the beginning of the SMO on February 24, 2022, the next packages of sanctions followed precisely in the energy sector. The sixth and, obviously, not the last package of sanctions against Russia was introduced at the beginning of June 2022. The EU countries refused to import Russian oil by sea, leaving pipeline supplies for now.

The main importers of Russian oil in 2021 were (in mln t): Europe (138.7), China (79.6) and the US (9.9) for crude oil and Europe (75.9), the US (22.6) and China with other Asia-Pacific countries (20.4) for oil products [2, p. 27].

[4] Federal'nyy zakon RF «O vnesenii izmeneniy v chast' vtoruyu Nalogovogo kodeksa Rossiyskoy Federatsii» [Federal Law of the Russian Federation "On amendments to part two of the Tax Code of the Russian Federation"]. URL: https://base.garant.ru/72005496/ (accessed 20 July 2022).

[5] Ministry of Finance of the Russian Federation. Federal budget. URL: https://www.minfin.ru/ru/statistics/fedbud/ (accessed 20 July 2022).

Thus, the field for ensuring the mobility of strategic resources of oil and oil products under Western restrictions is about 150 million tons of crude oil and about 100 million tons of oil products, supplied in two directions — Europe and the USA.

The economic content of the concept of mobility of oil flows consists in such a change of the logistical directions of oil transportation, which would provide the planned (taking into account the implementation of the state defense order during the implementation of the SMO) indicators of currency proceeds.

At the same time, the physical volume of exports of crude oil and oil products remains at the level agreed upon in the OPEC+ system. This corresponds to a production of 10.5–11 million barrels per day.

Russian oil transportation systems

Marine deliveries of oil and petroleum products to the United States are relatively insignificant and total 32.5 million tons, or 7.8% of all US oil imports (3.3% for crude oil and 20.0% for petroleum products). However, it should be emphasized that Russia supplies the United States with Urals heavy oil and dark oil products (all types of fuel oil, distillate oils, gas turbine and motor fuels, vacuum gas oils, tars and bitumen) obtained from heavy mixtures. It is difficult, if not impossible, to find a replacement on the world market for such, albeit small, supplies, as the closest supplier of such oil, Venezuela, is also under sanctions and supplies have been stopped.

Sea transportation of oil from Russia to Europe and the USA is carried out from the ports of Primorsk (capacity of 60 million tons per year) and Novorossiysk (capacity of 40 million tons per year), located in the waters of the Baltic (northern coast of the Gulf of Finland) and Black Seas. The average load in the port of Primorsk, which has a declining trend over the last five years, is around 91.5% (66.5% for crude oil and 25.0% for oil products). The Baltic Pipeline System-2 supplies oil to the port of Ust-Luga (capacity of 30 million tons) on the southern coast of the Gulf of Finland with an average load of over 90%.

The depths of the Novorossiysk Bay allow receiving and handling oil tankers with a draft of up to 19.0 m and a deadweight of about 250 thousand tons (VLCC — VeryLargeCrudeCarrier or Malaccamax), optimized for passage through the Strait of Malacca. The depths of the ports of Primorsk and Ust-Luga (16.5 and 17.5 m) allow handling vessels with a deadweight of 150 and 160 thousand tons, respectively (Suezmax size), these vessels are optimized for the passage of the Suez Canal, that is, they have a draft of no more than 16 m and the corresponding dimensions.

Urals oil, the main export brand of Russian oil, is transshipped in these ports, which is a mixture of heavy oils from the Volga region and Siberian Light oil produced in the fields of the West Siberian oil and gas province. The density of the mixture is about 865 kg/m^3 or 31.50 API with a sulfur content of 1.2–1.6%. This blend accounts for about 80% of Russian oil exports and is usually traded at a USD 3–4 discount relative to the benchmark Brend blend. However, under the sanctions, the average discount (in June–July 2022) was at the level of 28–30%, i.e., during this pe-

riod, Urals oil is traded with a discount of USD 77–80 per barrel. This price is almost twice the cut-off price in 2022, that is, it ensures the profitability of the sale of oil reserves.

Oil is also transported to Europe via the Druzhba pipeline with a total capacity of 66.5 million tons per year. In the area of Mozyr (Belarus), Druzhba is divided into two branches: three lines of the southern branch with a capacity of 16.7 million tons deliver oil to Ukraine, Hungary, Slovakia, the Czech Republic and Croatia, two lines of the northern branch with a capacity of 49.8 million tons — to Poland, Germany, Latvia and Lithuania. Over the past five years, Druzhba has carried only 48.0–49.0 million tons, or 72–73.5% of the total capacity. In March 2022, oil supplies through the northern and partially southern branches were practically stopped. Oil is supplied to East Germany (for refineries on the territory of the former GDR, which were optimized for Russian oil) and almost in full to Hungary and Croatia. On August 4, 2022, Ukraine stopped pumping oil along the southern branch to Hungary, the Czech Republic and Slovakia, since Russia was unable to fulfill the transit payment in August of this year due to EU sanctions.

According to the experience of March-July 2022, the total annual deliveries through the Druzhba oil pipeline can be at the level of about 15.0–16.0 million tons.

In the east, sea transportation of oil is carried out through the port of Kozmino (Nakhodka Bay, Sea of Japan) with an actual capacity of 36 million tons per year with an average load in 2020–2021 at the level of 34.0 million tons. Up to 80% of oil is sent to China. The recipients of oil from the port of Kozmino are (2021): Japan — 7%, USA — 6%, South Korea — 4%, Malaysia — 2%, Singapore — 1% [6].

After reconstruction and modernization in 2017, the port of Kozmino has been optimized for receiving Suezmax tankers with a deadweight of up to 150 thousand tons.

Sovcomflot's ICE-1A (Arc-4) ice-class tankers are expected to be used here, as the Sea of Japan is one of the freezing non-Arctic seas. Oil is delivered to the port of Yeosu (South Korea, Korea Strait), where it is reloaded onto conventional tankers of larger capacity for further transportation to the ports of the South China Sea.

In addition, oil is delivered eastward through the Eastern Siberia-Pacific Ocean (ESPO) main oil pipeline. Since November 2019, the oil pipeline has been brought to a maximum capacity of ESPO-1 "Taishet–Skovorodino" of 80 million tons/year, ESPO-2 "Skovorodino–Kozmino Port" of 50 million tons/year. The capacity of the Russian–PRC Border "Skovorodino–Mohe" branch is 30 million tons per year.

In the east, oil is delivered directly to China through this branch (30 million tons), by the oil pipeline through Kazakhstan "Border of the Russian Federation–Kazakhstan–PRC" (10 million tons), through the port of Kozmino (about 28.0 million tons) and by rail — thus, transport communications in the east of Russia make it possible to supply China with no more than 70–72 million tons of oil.

[6] Eksport nefti cherez port Koz'mino v 2021 godu uvelichilsya do rekordnykh 35,1 mln ton [Oil exports through the port of Kozmino in 2021 increased to a record 35.1 million tons]. URL: http://nr-citynews.ru (accessed 20 July 2022).

The obvious advantages of Russian oil are, firstly, the security of supplies. The main imported oil is supplied to China by the southern route (Southern Silk Road) through the straits located in the zones of international terrorism. Moreover, these straits (for example, Malacca and Singapore) can easily be blocked by the US Navy in the event of an escalating geopolitical confrontation. Russian oil comes from the north, and supply lines are not accessible to outside influence. The location of the oil pipeline "Eastern Siberia – the Pacific Ocean" eliminates these risks and provides a clear logistical advantage — shorter transport line, which affects the price of oil.

Secondly, the quality parameters of the oil supplied through the ESPO pipeline. This is a mixture named after this oil pipeline — "East Siberia-Pacific Ocean" — ESPO. Premium oil relative to the benchmark for the Asia-Pacific countries of the Dubai crude oil grade in terms of density (34.8 and 31 API) and sulfur content (0.53–0.62 and 2%). Therefore, it is traded at a premium of USD 3.5–4.5 per barrel.

In May 2022, offshore imports of ESPO oil to China surged to a record 1.1 million bpd from 800.000 bpd in 2021, or 37.5%. The ESPO grade thus claims to be the benchmark in the North Asian market.

However, the main ESPO blend fields, particularly, Vankorskoye (Krasnoyarsk Krai), Verkhnechonskoye (Irkutsk Oblast) and Talakanskoye (Republic of Sakha (Yakutia)), have already reached the maximum possible level of depletion [4, 5]. Therefore, an increase in production at these fields should not be expected; however, with the decline in supplies to Europe, some oil from European Russia may be directed eastward through the Transneft system.

Thus, the lack of production capacity, as well as the limitation of the capacity of the ESPO oil pipeline (to 80 million tons) and the Kozmino port (to 36 million tons) are significant obstacles to increasing oil exports to China [3, p. 64–72].

Increasing the oil export potential to China and South Korea to 100 million tons or more will inevitably face a shortage of production capacities in Western and Eastern Siberia, including the Republic of Sakha (Yakutia). In addition, the oil transportation system in the east direction requires modernization and expansion, strengthening of the ESPO through the construction of additional oil pipelines or the organization of oil transportation along the Northern Sea Route (Polar Silk Road) in the east direction.

At the same time, it should be emphasized that the southeastern and eastern provinces of China are the most developed, so the ESPO oil pipeline will increase by at least 4–5 thousand km. That is, oil is needed mainly in the coastal provinces of the East and South China Seas.

Taking into account all these circumstances, the "free balance" from trade with Europe can be a means of generating oil revenues for the Russian Federal Budget and the National Welfare Fund for the successful completion of the SMO and ensuring the progressive development of the Russian economy.

The problem is how to deliver 150 million tons of crude oil and 100 million tons of petroleum products to promising consumers in the Asia-Pacific countries, primarily China, India, and South Korea, under sanctions.

Ensuring the mobility of strategic oil reserves in the Arctic

Arctic oil is represented by three large energy projects located in the Pechora Sea and the Gulf of Ob, that is, in relatively favorable ice-covered areas of the Arctic.

There are two large oil ports in the Arctic. This is Murmansk with 17 berths with a total length of about 3 thousand meters. The port can receive vessels with a draft of up to 15.5 m and deadweight of up to 150 thousand tons. Two roadstead transshipment centers (RTC) are located in the Kola Bay: "Nord" on the basis of the storage tanker "Umba" with a capacity of 15 million tons per year and "Kola" on the basis of the storage tanker of the same name with a capacity of 12 million tons of oil per year.

Since 2004, the Arkhangelsk oil loading terminal has been operating in the delta of the Northern Dvina River, which operates year-round and is optimized for handling tankers with deadweight of up to 30 thousand tons. The capacity of the production complex is 4 million tons per year.

Oil is shipped in the Pechora Sea as part of two projects: Varandey and Prirazlomnoye, from the Varandey fixed offshore ice-resistant off-loading terminal (FOIROT) and the Prirazlomnaya offshore ice-resistant fixed platform (OIRFP), respectively.

The production base of the Varandey project (PJSC Lukoil) is the deposits of the Arctic oil-and-gas bearing regions of the Timan-Pechora OGP. Production capacity of the project and the Varandey FOIROT is 12 million tons of oil per year (240 thousand barrels per day). The export grade, "Varandey blend", is comparable in terms of the quality characteristics of the sulfur content to the benchmark Brend blend (up to 1%), but is generally inferior to it. Since 2018, the roadstead transshipment center (RTC) "Kola" has been operating in the Kola Bay with the storage tanker of the same name with deadweight of about 300 thousand tons and a throughput capacity of 12 million tons of oil per year. The operator of the RTC "Kola" is LLC Volga.

Arctic Oil (ARCO), produced from the Prirazlomnoye oil field, first entered the world market in April 2014. This is a project of PJSC Gazprom (Gazprom Neft). Oil is produced and shipped from the Prirazlomnaya OIRFP and delivered to the Nord RTC in the Kola Bay. The basis of this RTC is the Umba storage tanker with deadweight of more than 300 thousand tons. The maximum production level at this project is 6.0 million tons per year, and the total throughput capacity of the RTC Nord is 15 million tons per year.

Export grade ARCO is the heaviest (906 kg/m^3; 24 degrees API) and sulphurous (2.3%) low paraffin oil among Russian export marker grades. The main export grade with a share of about 80% in the total volume is Urals (a mixture of heavy oils from the Volga region and Siberian Light) with a density of about 865 kg/m^3; 31.5 degrees API with a sulfur content of 1.2–1.6%.

On the global market, ARCO trades at a discount to Brent oil (density 825–828 kg/m^3, about 39 degrees API; sulfur content — 0.4%), the discount is USD 4–5 per barrel. This grade is exported for use in sophisticated refineries in northwestern Europe and can be supplied to the United States.

In order to ensure the transportation of oil from the waters of the Pechora Sea to the RTCs "Kola" and "Nord", a fleet of project 1660 shuttle tankers was created, consisting of five units of the reinforced ice class Arc6. All Panamax size tankers were built by order of Sovcomflot — three at the South Korean shipyard Samsung Heavy Industries for the Varandey project and two (after obtaining competencies) at Admiralty Shipyards, St. Petersburg, for the Prirazlomnoye project. The fleet of shuttle tankers in the Pechora Sea sails under the flag of Russia (Table 2).

For year-round operation of the third Arctic Gateway project, Samsung Heavy Industries shipyard (Busan, South Korea) built a fleet of six Project 42k Arc7 Arctic Shuttle Tankers of MR standard size. Later, by order of Sovcomflot, the seventh shuttle tanker, Mikhail Lazarev, was ordered (Table 2).

Table 2

Arctic shuttle tanker fleet

Name	Deadweight (t.)	Project	Shipyard	Operation, year	Operator
Vasiliy Dinkov	71250.0	Varandey	SHI*	2008	Sovcomflot
Kapitan Gotskiy	71230.0	Varandey	SHI*	2008	Sovcomflot
Timofey Guzhenko	71290.0	Varandey	SHI*	2009	Sovcomflot
Mikhail Ulyanov	69830.0	Prirazlomnoye	AS**	2010	Sovcomflot
Kirill Lavrov	70050.0	Prirazlomnoye	AS**	2010	Sovcomflot
Shturman Albanov	41455.0	Arctic Gateway	SHI*	2016	Sovcomflot
Shturman Malygin	41541.8	Arctic Gateway	SHI*	2016	Sovcomflot
Shturman Ovtsyn	41550.8	Arctic Gateway	SHI*	2016	Sovcomflot
Mikhail Lazarev	41012.0	Arctic Gateway	SHI*	2019	Sovcomflot
Shturman Skuratov	44354.0	Arctic Gateway	SHI*	2017	GNS***
Shturman Shcherbinin	44354.0	Arctic Gateway	SHI*	2017	GNS***
Shturman Koshelev	44354.0	Arctic Gateway	SHI*	2017	GNS***

* Samsung Heavy Industries, Busan, South Korea
** JSC Admiralty Shipyards, St. Petersburg, Russia
*** LLC Gazprom Neft Shipping

Since the Arctic Gateway is also a project of PJSC Gazprom (Gazprom Neft), Novy Port oil is delivered to the Nord RTC in the Kola Bay. The two grades of oil Novy Port and ARCO are treated separately.

Novy Port oil is classified as light crude (density equal to Brent with low sulfur content (about 0.1%) and is traded at a premium to Brent of USD 3.0 per barrel in the world market.

If we try to solve the problem of transporting Arctic oil by the Northern Sea Route to the East, we will get the following initial data. The southern route of the NSR (through the Vilkitskiy Strait) is ice-free for a maximum of 100 days a year. According to the state of the Arctic ice fields in 2020, when the historical minimum of the Arctic ice extent was recorded (September 16, 2020) at the level of 3.818 million km^2, the southern route was ice-free for 107 days: from July 15 to October 29. During this period, the speed of shuttle tankers of the reinforced ice class Arc6–Arc7 in clear water is about 15–16 knots.

The average distance from shipping centers in the Pechora Sea (Varandey and Prirazlomnoye projects) to the Korean port of Yeosu (transshipment point for conventional tankers with deadweight of 150 tons or more) is about 4850 miles, from Cape Kamenniy (Arctic Gateway project) — 3650 miles. On clear water, a circular voyage will be only along the course at a speed of 16 knots for 26 and 19 days, 4 and 5 circles, respectively. During this period of navigation, a maximum of 4x5x70 = 1400 thousand tons can be transported from the Pechora Sea and the same amount 5x7x40 = 1400 thousand tons from the Gulf of Ob; in all, 2.8 million tons, or approximately 12–13% of oil produced in the Arctic. To ensure transportation in ice fields of varying intensity, icebreaking support is necessary [6]. Even with the mobilization of all existing nuclear-powered icebreakers, these forces would not be enough to ensure safe communications in the eastern Arctic: from the Vilkitskiy Strait to the Bering Strait.

There is some experience of passage along the NSR from west to east during the summer navigation period of 2019 of two shuttle tankers of Sovcomflot of Aframax size, ice class ICE–1B, average deadweight — 113.2 thousand tons, flag of Liberia, built in 2018 by South Korean shipyard Hyundai Heavy Industries. Two “green” (operating on LNG, i.e. Dual Fuel) tankers “Prospect Mendeleev” and “Lomonosovskiy Prospekt” during 02.10.—01.11.2019 and 28.09.—28.10.2019, respectively, performed a voyage from the port of Primorsk to China (most likely, to the port of Yeosu for transshipment to conventional tankers) and delivered a total of 200 thousand tons of crude oil. The length of the route is about 8500 miles, that is, the average speed on the route was quite decent — 12 knots.

This was a test passage, and in order to organize commercial transportation of oil along the NSR year-round to the east from the oil loading ports operating in the north-west of Russia, it is necessary to ensure the operation of the southern route in the “canal mode”. This will require a significant increase in the number of reinforced ice-class shuttle tankers allowed to operate in the Arctic ice fields.

At the same time, it is necessary to take into account the increasing danger of environmental pollution during oil transportation in difficult arctic conditions [7, 8].

Therefore, traditional routes remain for the transportation of Russian oil by sea to the Asia-Pacific countries: Murmansk, Arkhangelsk, Primorsk, Ust-Luga — Gibraltar — Port Said — Suez — Red Sea — Indian Ocean and further along the routes of the “Southern Silk Road”; the same from Novorossiysk through the Suez Canal. To eliminate the risk of sanctions when passing through the

Strait of Gibraltar, a route around Africa can be used. This route is 6000 miles longer than the Gibraltar–Port Said-Suez–Red Sea route. If the sanctions risks are somehow compensated for by discounting prices, in any case, understanding the importance for the Russian economy of oil exports under the conditions of the announced restrictions, in order to minimize the disruption of oil supplies by sea, it is necessary to mobilize the forces and means of the Russian Navy to ensure solution to this problem.

As a positive example of coordinating the interaction of fleets, we should cite the experience of ensuring the transition of the Akademik Cherskiy pipe-laying vessel from the Power of Siberia-3 gas project area (Sea of Japan) to complete the Nord Stream-2 project (Baltic Sea), that is from the port of Nakhodka to Kaliningrad, 09.02–03.05, 2020.

Details about this transition can be found in [9, p. 58–60]. The Akademik Cherskiy crossed the Pacific section of the passage accompanied by the Pacific Fleet's large anti-submarine ship Admiral Vinogradov, and at the exit from the Strait of Malacca, the escort was reinforced by the Baltic Fleet patrol ship Yaroslav Mudryy.

Then the group of ships continued moving towards the Gulf of Aden to meet with the auxiliary vessels of the Russian Navy: the tanker Yelnya and the tugboat Viktor Konetskiy, ensuring the safe passage of ships through the Bab-el-Mandeb Strait, the Red Sea and the Suez Canal. In this way, the Russian Navy ensured the safety of the passage through the turbulent areas of the oceans of an important civilian ship.

However, even with such escort by the Russian Navy, at the end of March, Akademik Cherskiy abruptly changed course to the Suez Canal and continued moving towards Europe around Africa.

One of the reasons for this maneuver was the unfriendly actions of the British authorities of Gibraltar: at the request of the United States in connection with sanctions, on July 4, 2019, a tanker under the Panamanian flag Grace1 (Adrian Darya 1) was detained in international waters in the Gibraltar area by British special forces. The ownership of the tanker, which delivered Iranian oil to Syria in circumvention of EU sanctions (the legality of these sanctions is highly doubtful), is attributed to the Russian company Russian Titan Shipping Line.

The highly probable unfriendly actions of Great Britain should be taken into account when tankers with Russian oil pass through both the Strait of Gibraltar and the English Channel. Therefore, the Akademik Cherskiy made the transition to the Baltic Sea through the English Channel and across the North Sea, accompanied by the ships of the Northern Fleet — the rescue tug Nikolay Chiker and the tanker Akademik Pashin, as well as the patrol ship of the Baltic Fleet Yaroslav Mudryy, without entering European ports.

Thus, correctly chosen route and optimally arranged traffic on the sea routes contribute to safe oil deliveries to the given regions and ensure the principle of commercial expediency.

Conclusion

The main task of sea and pipeline exports of crude oil and oil products in 2022 is to fill the oil and gas revenues of the Federal Budget of the Russian Federation and the National Welfare Fund to ensure the development of the Russian economy with the unconditional fulfillment of the state defense order for the successful implementation of the goals of the SMO.

The age-old Russian question is "what to do?" with 150 million tons of crude oil and 100 million tons of petroleum products. This is almost half of Russian production — 46.6%. From the standpoint of only two considerations — filling the budget + holding SMO — we need the same oil and gas revenues that were mentioned above, including the NWF. So far, there are resources, but it is not known how long the SMO will last.

It is impossible to reduce production in general, and oil in particular. At the same time, for some, maybe a long time, we will have to accept a discount on Russian oil. It is necessary to work subtly and diplomatically in the OPEC+ system to keep oil prices that ensure profitability, taking into account the forced discount.

Oil production in Russia in 2021 amounted to 536.4 million tons, and domestic consumption — 132.1 million tons, or 25%. If we follow the logic of China in terms of focusing on the domestic market, then Russia will not be able to master the same 150 and 100 million tons of oil and oil products. In China, the population is approximately 1420 million people, in Russia — 146 million people. The difference is 10 times. Consumption in China is about 720 million tons, therefore, in Russia it should also be ten times less, or about 72 million tons. Taking into account Russian mismanagement and Chinese thrift, the optimum is somewhere in the middle — a little over 100 million tons.

In order to develop additional resources in the indicated volumes, it is necessary to build new modern refineries, develop petrochemistry, and create technologies of oil consumption, rather than of oil extraction. We need to work on this. It will take a lot of time. Therefore, it is necessary to develop new sales markets, build our own tanker fleet, an insurance system for this fleet and develop new sea communications, that is, ensure the mobility of the export of oil reserves.

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The article was submitted 08.08.2022; approved after reviewing 16.09.2022; accepted for publication 19.09.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 48–60.
Original article
UDC [339.564:656.6](98)(045)
doi: 10.37482/issn2221-2698.2022.49.55

Developing Russian Arctic Exports in a Changing Logistics Environment

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Abstract. Delivery of cargoes by water transport to the Far North and equated territories is one of the most important tasks of the national economy, as it unlocks the huge socio-economic potential of the Arctic region, improving the quality of life of people living there, which is of particular importance due to the demographic situation in the region. The purpose of the study is to determine economically justified changes in the Russian Arctic export development system for Arctic projects in the context of logistics changes. The subject of the study is the organizational and economic relations that arise during the delivery of goods. The following methods were used in the study: logical and structural-system analysis, content analysis, statistical and economic analytics, analogy method, various modeling options, etc. The most significant results of the study: the main factors determining the need to transform the cargo turnover management system in the conditions of uncertainty of logistics systems are identified, the priority ways of changing the logistics systems of development and management of transportation and delivery of various goods are identified, the conditions for effective functioning of carriers of the Russian Arctic are revealed and structured, the functionality of the Northern Supply Management Center is developed. The novelty of the scientific research is primarily the development of economic and organizational approaches, the development of methodological theses for changes in logistics management and increasing export transportation in the Russian Arctic in the framework of the uncertainty of logistics of Northern supplies and, consequently, the economic justification for the effective implementation of the proposed changes in the logistics management of Arctic cargo flows.
Keywords: *export development, Arctic project, water transport, Northern supplies, Arctic, risk, delivery management*

Introduction

Exporting Russian Arctic cargo for Arctic projects is one of the most important tasks of the national economy and the challenge of changing logistical conditions. The constant growth of cargo turnover by an average of 18.6% over the last five years and the tightening requirements defined in various programs for the development of the Arctic (“Infrastructure development plan for the Northern Sea Route up to 2035”, “Comprehensive plan for the modernization and expansion of the main infrastructure on period up to 2024”, the State Program of the Russian Federation “Socio-economic development of the Arctic zone of the Russian Federation”, etc.) indicate a constant increase in the transport and logistics potential of the NSR. The dynamics of the increase in cargo transportation along the Northern Sea Route also demonstrates the revival of this route,

For citation: Osipova E.E., Avagina O.I. Developing Russian Arctic Exports in a Changing Logistics Environment. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 55–69. DOI: 10.37482/issn2221-2698.2022.49.55

which is primarily associated with the strengthening of Russia's position in the world economic system, ensuring transport security, economic integration of the regions of the Arctic, gravitating towards the NSR [1, Osipova E. E., p. 6–21].

The main differences in the organization of the logistics management of cargo turnover when it is used in Arctic deliveries is the large number of participants used in the transportation process — these are forwarding operators; water port enterprises; water shipping companies, FSUE "Rosmorport", FSBI "Administration of the Northern Sea Route", State Corporation "Rosatom", etc.

Natural, climatic risks, geographical factors and a huge number of intermediate links involved in the logistics export of cargo flows to the Arctic predetermine an impressive level of quality requirements for logistics management. But the whole system of logistics management of cargo turnover in the Russian Arctic has many flaws and errors. This includes lack of reliable information for the effective functioning of logistics management, lack of interdepartmental relations, repeating of some functional tasks of logistics management, etc. All this leads to delays in delivery times, inefficient use of funds allocated to the budget, and the emergence of logistics errors.

Consequently, it is logical to change the structure of the methodological support for logistics management of export cargo. The identified problematic "points", their practical significance and the insufficient effect of the traffic of goods in the context of the export of Arctic supplies using sea and river transport, determined the relevance of the stated topic.

The problems of developing methods of logistics management, formation and development of the organization of cargo transportation, as well as the theoretical and methodological foundations of economics and management in the field of transport are presented in the works of Antipov E.O., Aronov A.M., Buyanova L.N., Kachenovskoy Z.S., Kirillova E.V., Komkova N.I., Lukina Yu.F., Mitko A.V., Moskvitina G.I., Municha D.O., Osipova E.E., Prokofieva T .Yu., Prokhorenkova A.M., Rodionova V.N., Chertkova A.A., Clegg S.R., Staun J., Zellen B.S.

The purpose of the study is to provide an economic justification for various changes in the system of logistics management of cargo exports to the Russian Arctic when using sea transport.

In accordance with the goal set by the authors

- analyzed the economic, social parameters of development of the Far North and equated territories;
- analyzed the process of logistics management of cargo turnover in the Arctic region by sea and river transport, identifying the main problems leading to inefficient logistics management;
- proposed methodological recommendations to improve the system of support for Russian Arctic exports for the implementation of Arctic projects under the conditions of changing logistics, and clarified the content of the resulting economic effect.

The scientific results of the study are as follows: development of economic and organizational approaches, elaboration of methodological proposals to change the logistics system of the Arctic export, as well as socio-economic substantiation of the effect of the proposed structural changes.

The results of the conducted scientific research allow:

- identify the priority factors affecting the change in the logistics management system of the Arctic supply freight turnover by sea and river transport, taking into account the economic and social elements of the development of the Russian Arctic;
- determine the key areas for transforming the export development system of the Russian Arctic for Arctic projects under the changing logistics of cargo flows to the Arctic based on the division of the logistics management process and conclusions on the current problems leading to inefficient logistics management;
- build a hierarchy of the main conditions for the effective functioning of carrier organizations (marine) with elements of their self-regulation in the Russian Arctic, namely, the procedure for dividing forwarding operators according to the levels of their technical and organizational potential;
- propose the creation of a single center responsible for Arctic supplies, and define the functions of the logistics management of the center, taking into account the grouping of basic information to support various logistics processes in the management of entities ensuring the implementation of Russian Arctic cargo exports for Arctic projects;
- determine the components of the economic effect of the transformation of the system of logistics management system of cargo flows to the Arctic.

Problems and methods of export development in the Russian Arctic

The theory and methodology of scientific research on the chosen topic formed the basis for fundamental research, while a large volume of analyzed scientific and practical works and developments of both domestic and foreign scientists in the field of economic management, theory of economics and social systems, logistics management made it possible to solve the set tasks.

The study of the conducted scientific research, the justification and argumentation of the theories provided the authors with the use of such scientific methods as analysis, mathematical and economic modeling, analytical research, statistics, didactics, interpretation, comparative analysis, questioning, etc.

The scientific research was based on the analysis of various works of both Russian and foreign scientists related to the theory of logistics and management theory, which made it possible to determine the general methodological approaches. These approaches are relevant as they are preferably used in logistics management for cargo turnover in Arctic supplies. The authors identified two main management approaches: process-functional and organizational.

In [2, Prokhorenko A. M., p. 103–114], cargo turnover management is considered from a technological point, but the basis is the method of systematization of logistics management during transshipment operations in river and sea ports. In [3, Chertkova A.A., p. 196–204], logistics management of cargo turnover is considered by the tangents of logistics systems, which involves the use of methods of optimization recurrence.

According to the authors, due to the lack of clear classification methods of logistics management, the division of methods into two groups — economic-social and organizational-economic — is justified. It should be noted that the second method of logistics management of cargo turnover can form the basis for the application of other grouping methods and techniques [4, Buyanova L.N., p. 102–116]. At the same time, social methods, which are components in the grouping of economic and social methods of logistics management, have an advantage when applied in personnel policy (application of socio-economic methods of logistics management of cargo flows to the Far North: percentage bonus to wages, article 317 of the Labor Code, regulation of tariffs for ports and transport and logistics enterprises, etc.) [5, Munich D.O., p. 30–32].

Organizational-economic methods of logistics management during cargo turnover can be divided into administrative and regulatory, used both for coordinating the actions of management elements (issuing orders, instructions and orders, directives, various resolutions), by which logistics management is performed.

The normative method, which is included in the organizational-economic group of methods of logistics management, refers to the organization of transport-technological elements of cargo turnover [6, Kirillova E.V., p. 44–54].

Based on the analytics of works [7, Komkov N.I., p. 4–11; 8, Zellen B.S.], the authors have developed their own classification of transport-logistics and logistics-technological systems of cargo turnover for Arctic projects. In this classification, the authors combined general timber cargoes, and cargoes in container ships according to the nomenclature into an independent group, which will allow the introduction of the transport-logistics and logistics-technological system of the Russian Arctic to detailed and single nomenclature cargoes, which are similar in terms of cargo turnover characteristics. Detailed elaboration forms the class of managerial decisions for development of export cargo turnover in Russian Arctic, taking into account nomenclature and specific features of transport-logistic systems of freight turnover within the region under consideration (Table 1).

Table 1

Distinctive features of transport and logistics systems of cargo turnover in Arctic regions [1]

1 difference	Due to the lack of off-port infrastructure or its outdated legacy of strategically important facilities on archipelagos and islands (hydrometeorological stations, polar stations, airfields, military facilities, border checkpoints and branches of large resource-producing organizations), it is common to apply various types of unloading [9, Antipov E.O., p. 72–79].

[1] Compiled by the authors.

2 difference	Transport and logistics technological systems of cargo flows connected with the conditions of transportation within the corresponding region (adjacent geographic-spatial and economic nature of the points of cargo turnover), which facilitates the delivery of different cargoes to several customers to a greater extent [10, Antipov E.O., p. 159–164].
3 difference	Specialization of transport and logistics facilities due to natural and technical and technological factors in the Arctic basin. Existing ships have specialized technical equipment for various types of offshore loading and unloading (unpacking and unloading directly onto ice or an existing ice berth, loading and unloading by helicopter), as well as for escorting ships in the ice of the Arctic: icebreakers are used, which are an integral part of the NSR in the form of the main rolling stock. Consequently, according to the authors, the existing number of icebreakers does not satisfy the demand for ice pilotage, which is described in detail [11, Moskvitin G.I., p. 338].
4 difference	The conditions of cargo flows within the region under consideration, the specifics of the logistics management of transport and logistics systems of the cargo flows of the Russian Arctic show the current absence and the need to create a single logistics management center for the effective management of the cargo flows of the Northern deliveries.

Thus, each method has its own direction of use, but the specifics of the region should always be taken into account.

Study of the logistics management problems and the impact of proposed changes in logistics on the development of exports of Arctic supplies

The authors' statistical analysis reveals that the volume of Arctic cargoes transported by sea in the period 2015–2020 increased annually by an average of 19.6%. At the same time, the volume of goods transported by inland water transport in the period under review changed insignificantly (annual growth was 0.8%). Taking into account the identified trends, as well as data from a number of state program documents in the field of strategic planning and development of water communications in the Arctic (Decree of the President of the Russian Federation dated October 26, 2020 No. 645 "On the strategy for the development of the Arctic Zone of the Russian Federation and ensuring national security for the period up to 2035, etc.), using the method of simple exponential smoothing (SES), the authors carried out forecast calculations for the transportation of goods to the Arctic by water transport for the period up to 2035, the results are shown in Figure 1.

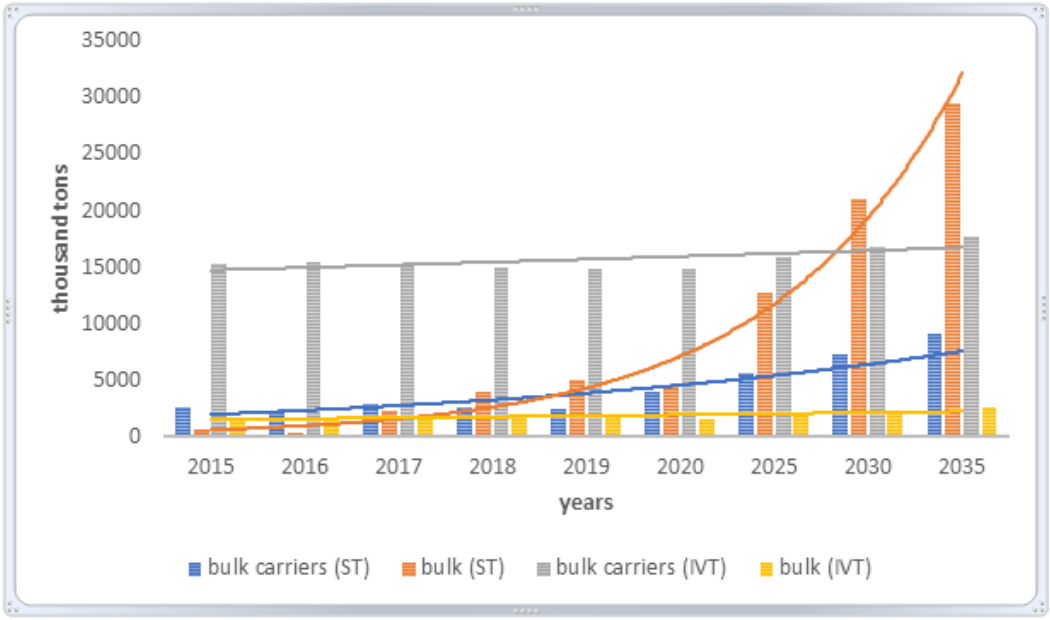

Fig. 1. Volumes of cargo exported by sea transport (ST) and inland water transport (IWT) in the Arctic region, and projected values under the conditions of changing logistics, thousand tons [2].

The analysis of the socio-economic characteristics of the region indicates that, despite the declining demographic indicators, the volume of investment in fixed capital of economic entities has been growing in the last twenty years by approximately 13.6% on average, and by 2020 it reached the level of 2.45 trillion rubles in real prices [3].

The indicator of the gross regional product of economic entities of the Russian Arctic is similarly growing by approximately 13.5% on average and amounted to 6.66 trillion rubles for 2020 [4]. This dynamics is achieved through the construction and commissioning of marine infrastructure facilities. Detailed information on the financing of cargo flows to the Arctic is not presented in sufficient volume, since the relevant activities are of a negative nature. Considering that in the State program "Socio-economic development of the Arctic zone of the Russian Federation for the period up to 2020", the financial support of the Sea and River Transport subprogram in the total amount of allocated funding is 28.95 billion rubles; an important problem is that despite the increasing cargo flow to the Far North and equivalent territories, there is a constant outflow of the local population.

Based on the statistical and content analysis, the authors identified the following factors which determine the impact of changes in the logistics management of the cargo turnover of the Arctic deliveries by water transport:

- increased business activity of organizations, improving regional efficiency;
- certain conditions of cargo turnover due to the limited time of navigation;

[2] Compiled by the authors.
[3] Rosstat. Ekonomicheskie i sotsial'nye pokazateli rayonov Kraynego Severa i priravnennykh k nim mestnostey v 2000–2018 godakh [Rosstat. Economic and social indicators of the regions of the Far North and areas equated to them in 2000–2018] // Federal'naya sluzhba gosudarstvennoy statistiki [Federal State Statistics Service]. URL: https://www.gks.ru/bgd/regl/b19_22/Main.htm (accessed 08 November 2022).
[4] Ibid.

- state policy in the field of development of the Far North and territories equated to it (socio-economic development to reduce the outflow of residents from the Arctic regions);
- inadequate information support for the logistics management of cargo flows to the Russian Arctic, etc.

In order to assess the relevance of the problems of Russian Arctic developing exports for Arctic projects in the context of changing logistics in the implementation of Arctic supplies, the methods of applied sociology (questionnaires and processing of the results) were used in the work.

The main selection criteria for the respondents were experience and competencies in the implementation of Northern supplies. The respondents were the heads and specialists of the structural divisions of forwarding agents directly involved in the process of cargo transportation in the Arctic. The assessment of the significance of the identified problems was carried out by the ranking method.

The results obtained during the study of the process of logistics management of cargo flows indicate the different significance of the existing problems that impede the effective functioning of logistics management and the export of goods to the Arctic (Table 2).

Table 2

Ranking of urgent problems hindering reliable Arctic deliveries [5]

Problem	Average value	Rating
1. Decentralization of logistics management of Arctic supplies	0.18	1.6
2. Instability of payment for transportation services by customers	0.18	1.6
3. Low liability for cargo transportation in the Russian Arctic	0.16	4
4. Undeveloped new requirements for forwarding operators of Arctic supplies	0.15	5
5. Lack of coordination of transport and logistics operations performed by carriers	0.12	6
6. Incomplete level of logistics management of cargo turnover	0.1	7
7. Underdeveloped infrastructure for Arctic supplies	0.08	8
8. Inadequate cash distribution schemes between the participants of the cargo transportation process (disruption of logistical links)	0.05	9

Using the process approach, the authors carried out decomposition of the investigated logistics management process, which identified classes of managerial decisions and types of management actions. Thus, the results of the decomposition revealed the key problems of the economic and organizational mechanism:

- absence of a responsible body at forwarding operators, whose logistics management functions should include control and responsibility for cargo transportation to the AZRF areas, as well as regulation of pricing of transport and logistics organizations;

[5] Compiled by the authors.

- inadequate quality of incoming information for making management decisions in the export cargo flows of Arctic supplies, which entails the need to organize information and analytical space;
- lack of a well-developed practical procedure for the competitive selection of forwarding operators, which leads to the failure to fulfill the logistics tasks of cargo flows and, as a result, to a low level of management and organization of routes along the NSR.

Based on the results obtained, the authors identified ways to change the logistics management of cargo deliveries to the Arctic and the content of methodological developments, which include:

- creation of a unified Arctic Supply Control Center with the following functionality: organization of information and analytical space providing export in the implementation of Arctic deliveries. This development is relevant in connection with the instruction of the President of the Russian Federation — "to develop and submit to the State Duma a special law on Northern delivery by March 2023". This is stated in the list of instructions published on the Kremlin website after meeting on the development of the Arctic zone of the Russian Federation;
- maintaining the effective functioning of self-regulatory organizations of transport logistics include: availability of algorithm for development for developing initiatives of organizations; differentiation of forwarding agents-operators in accordance with the selected criterion; complete and timely information support of participants; providing participants with financial guarantees to improve the support system for Russian Arctic exports in the face of changing logistics;
- providing cargo participants in the Russian Arctic with up-to-date information in the form of generated information arrays used in decision-making in various areas of logistics management, such as pricing strategy for cargo transportation services; determination of subsidies for the renovation of means of transportation; development of proposals for improving the technical condition of ports and pre-port infrastructure in the Russian Arctic.

Up-to-date information received online will allow developing a concept for the transport and logistics development of the region based on real-time indicators, eliminating dumping prices when providing services of forwarding operators in collaboration with the Federal Antimonopoly Service and the Federal Tax Service, further clarifying the optimal loading of individual sections of the NSR, ports and approaches to them, which will ensure the rational operation of the port and pre-port infrastructure, as well as the operation of icebreaking fleets.

At the same time, it can be assumed that the Arctic Supply Control Center should be included in the Arctic Division formed by the State Atomic Energy Corporation Rosatom. Consequently, FSUE Atomflot, together with the Arctic Supply Control Center and FSUE Hydrographic Enterprise, will be in cooperation, having a common information and analytical space, which will give the economic effect of applying the changed logistics management.

The authors have also identified the components of the projected economic effect arising from the creation and implementation of the functions of the Arctic Supply Control Center. It has three levels of detail and two main areas: sectoral and regional (Fig. 2).

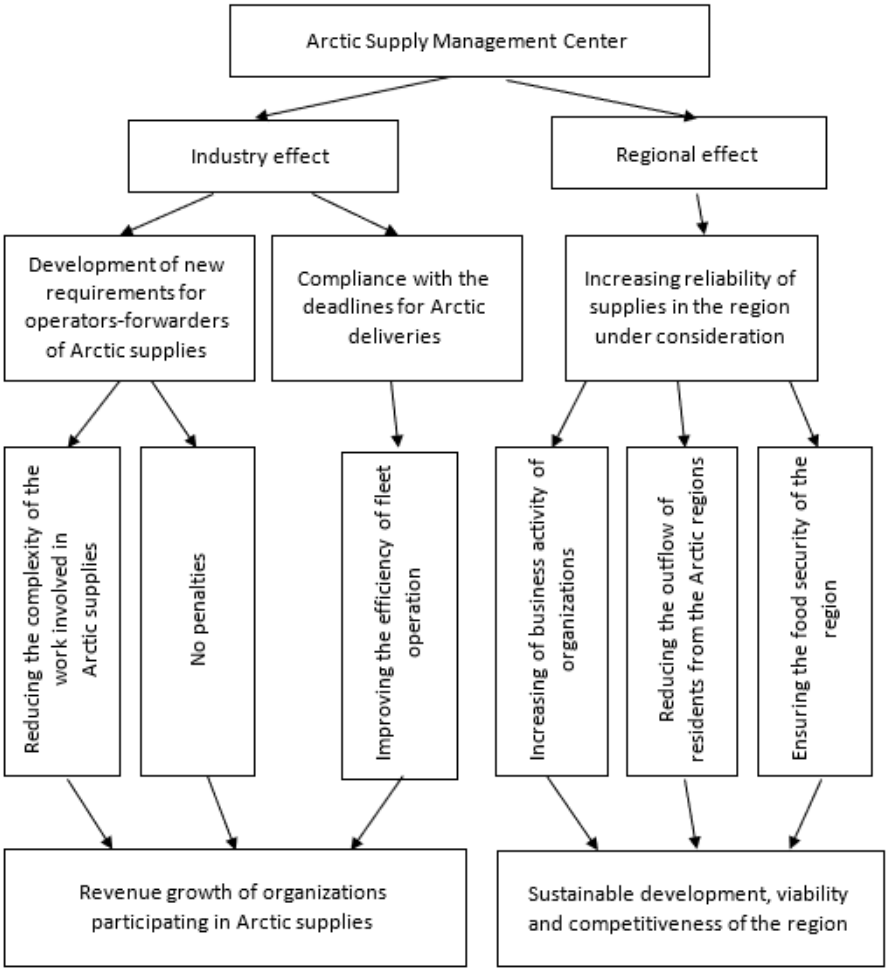

Fig. 2. Expected economic effect from the establishment and implementation of the functions of the Arctic Supply Control Center [6].

As part of the study, the authors calculated the economic efficiency as a result of the proposed transformations of logistics management in the framework of the export transportation of Arctic supplies for the transport and logistics organization — CJSC "ACS" Arkhangelsk. The authors used the parameters of the existing schemes of cargo flow, which are compared with the parameters of the projected scheme, obtained in the proposal to create an Arctic Supply Control Center.

Two technological schemes of cargo delivery organization are also considered in detail: the current (actual) and the project scheme. Within the framework of these schemes, the following have been clarified: the initial conditions for export, the characteristics of technological and logistics schemes, the sequence of satisfying freight demand and finding a contractor, the terms for concluding a contract. The accompanying calculations of economic efficiency were made by the authors as part of their dissertation research. The effectiveness of the application of logistics management methods is

[6] Compiled by the authors.

manifested in the competitiveness and economic efficiency of organizations, regions, and by saving delivery time, optimizing material resources and labor resources, etc., which can be implemented within the framework of the Arctic Supply Control Center, being created. The result of the economic efficiency of the implementation of the proposed transformations is presented in Table 3.

Table 3

The result of economic efficiency of the implementation of the proposed transformations [7]

Delivery options	Ship-day, actual costs	Occupied vessels, units	Total distance with cargo, NM	Costs for the delivery of goods, thousand rubles	Additional profitability, thousand rubles
Factual	60	5	14 148	24 000	-
Projected	45	3	10 775	18 000	6 000

In general, the realization of logistics management tasks as the creation and implementation of the functions of the Arctic Supply Control Center will lead to the expected results (Fig. 2, Table 3)

Any investment policy is of paramount importance to meet the needs of the state, region, business [12, Kornienko A.A., p. 94–101], and the developed ways make it possible to improve the standard of living of the population in the face of economic sanctions and falling incomes [13, Zheleznyakov S., p. 53–55]. In general, an example-calculation of economic efficiency as a result of changes in logistics management during the delivery of goods in the Arctic supplies, within the framework of this organization — CJSC “ACS” showed that the average decrease in turnaround time of material resources is 15 days; reduction of time intervals per voyage — 15 days; the number of free vessels — 2 units; economic efficiency from the proposed transformations is expressed in additional profitability — 6 million rubles.

The results of the assessment confirm the economic feasibility of the developed program for the transformation of the logistics management of the export of Arctic supplies.

It is necessary to continue the research work:

- in the field of a graphical model of the economic and organizational mechanism of the logistics management of Arctic supplies: this will justify the economic effect of the choice of logistics management methods;
- to identify problems that hinder the effective export of cargo flows in the Russian Arctic;
- on the development of methodological provisions for improving the logistics management of cargo flows of Arctic deliveries;
- on the application and use of the model for evaluating the effect and optimizing the logistics supply chain in coastal ports [14, Yi Y., p. 763–767];
- to provide the inhabitants of the Far North with food depending on consumption.

[7] Compiled by the authors.

Conclusion

The significance of the research results in terms of application in practice is in the fact that they are scientifically substantiated and are given as recommended for improving the logistics management of export cargo flows to the Russian Arctic. The proposed methodological recommendations for the creation of an Arctic Supply Control Center and self-managed transport and logistics companies (sea and river carriers) in the Russian Arctic will solve the problems of concentrating the logistics management of cargo turnover and developing new transport and logistics schemes. Besides, when implementing the developed proposals, it will increase the rate of efficiency of industries and the region.

Conclusions from the results of the study:

1. The results of the analysis of socio-economic characteristics of the Arctic region development made it possible to identify the main prerequisites that determine the need to transform the export system of the Russian Arctic for the development of Arctic projects with a change in logistics (increase in business activity; special conditions of cargo delivery due to navigation conditions; poor information support of the logistics management of cargo flows; difficult demographic situation in the Far North).

2. The decomposition of the investigated process of logistics management and the ranking of the significance of problems that impede effective logistics management in cargo transportation identify the key areas of transformation in logistics management in the implementation of export cargo flows to the Arctic.

3. The conducted studies allowed the authors to prove the necessity of improving the process of self-regulation of cargo flows by organizations involved in the Arctic deliveries, since the absence of a self-regulatory management body for forwarding operators leads to a lack of control and responsibility for the delivery of goods to the regions of the Arctic zone of the Russian Federation. The economic and organizational conditions for the work of self-managed maritime transport and logistics companies in the Russian Arctic are proposed, the goal, objectives and basic principles of its activity are specified.

4. Identified problems were solved due to the following proposals: the functionality of the Arctic Supply Control Center was designed and proposed. The components of the projected economic effect resulting from the implementation of the functions of this center are determined. On the example of a transport organization, the calculation of the economic efficiency of changes in the logistics management of cargo flows by sea and river transport in the framework of Arctic deliveries was carried out.

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The article was submitted 08.11.2022; approved after reviewing 09.11.2022; accepted for publication 11.11.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 61–73.
Original article
UDC [332.14:338.45-048.57:001.895](985)(045)
doi: 10.37482/issn2221-2698.2022.49.70

Innovation Potential of the Arctic Regions of Russia

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Abstract. The paper provides a comparative analysis of foreign and Russian methodologies for assessing innovation potential. It is shown that foreign methodologies cannot be used to determine the innovation potential of the Arctic regions of Russia due to specific indicators that are not calculated by Russian statistics. It is determined that the use of Russian methodologies for an objective assessment of the Arctic regions in terms of innovation potential is difficult. In this regard, the authors developed a comprehensive methodology for assessing innovation potential, the principal novelty of which consists, firstly, in the use of specific indicators (in other methods, the authors use not specific, but absolute statistical indicators); secondly, only indicators that characterize innovation development are used; thirdly, expert research methods are excluded. According to the results of the analysis of statistical data, it is determined that the Arctic regions have low rates of innovation development and lag behind the average Russian values. Based on the proposed methodology, the innovation potential was calculated and the Russian regions were ranked for ten years, including 2011, 2013, 2017 and 2020, in order to compare the dynamics of the Arctic regions. It is shown that the Arctic regions are characterized by rather low values of innovation potential and are mostly below 50th place in the ranking of Russian regions.
Keywords: *innovation potential, Arctic region, methodology, ranking, assessment, rating*

Introduction

Innovative potential and implementation of innovative projects are of paramount importance for supporting sustainable economic growth and competitiveness of the Arctic regions [1].

Monitoring of innovative development of the Arctic economic systems is the basis for formation of innovative activities, taking into account the peculiarities of the territories.

Literature review and research methodology

Recently, much attention has been paid to the study and evaluation of the innovative development of countries and regions. Foreign organizations have developed various assessment methods at the country level, including the Commission of the European Communities — Innovation index [1], the World Bank — Knowledge index [2], the Organization for Economic Cooperation and

For citation: Tsukerman V.A., Goryachevskaya E.S. Innovation Potential of the Arctic Regions of Russia. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 70–85. DOI: 10.37482/issn2221-2698.2022.49.70
[1] European Innovation Scoreboard 2021. URL: https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis (accessed 12 April 2022).
[2] Knowledge economy index 2020. URL: https://gtmarket.ru/ratings/knowledge-economy-index (accessed 12 April 2022).

Development — Knowledge, Technology and Industry index [3], the World Economic Forum — sub-index of the Global Competitiveness index [4], INSEAD — Global Innovation index [5]. Some methods were developed by foreign specialists, such as B. Lundvall [2], M. Fisher [3], R. Nelson [4], K. Freeman [5].

Foreign methodologies use specific indicators that are not calculated by Russian statistics in a territorial context, for example, expenditures of private companies on research and development, industrial value added, total business density. Many indicators are based on the results of surveys of company executives, which are not included in the statistical reporting. Thus, the methodology cannot be used to determine the innovative potential of the Russian Arctic regions.

Foreign methodologies, due to specific indicators that are not calculated by Russian statistics, cannot be used to determine the innovative potential of the Russian Arctic regions. In this regard, organizations have developed appropriate Russian methodologies. Thus, the Higher School of Economics annually forms an innovation rating of regions based on 53 different indicators that characterize the scientific and technical potential, innovation activity, socio-economic status, export activity and the quality of innovation policy [6]. The regions were ranked in four groups within the framework of descending values from the leading region. According to the 2018–2019 ranking, the first group with the highest rating was made up of six regions: Moscow, St. Petersburg, the Republic of Tatarstan, Tomsk, Nizhniy Novgorod and Moscow oblasts. The second group includes the Murmansk Oblast, which occupies 41st place. The third group includes the Yamalo-Nenets Autonomous Okrug (61st place). The lowest fourth group includes the Nenets and Chukotka Autonomous okrugs, which occupy 84th and 85th place out of 85, respectively.

The Innovation Index, developed by the Center for Strategic Research “North-West”, provides for the calculation of 15 indicators combined into four groups on human capital, innovative products, creation of new knowledge, and application of knowledge [6]. According to the latest data for 2016, Moscow, St. Petersburg, Nizhniy Novgorod Oblast occupy the first three places. The next three places are occupied by the Republic of Tatarstan, Tomsk Oblast, Moscow Oblast. The Arctic regions occupy places in the second half of the ranking. Thus, the Murmansk Oblast ranks 44th, the Yamalo-Nenets Autonomous Okrug — 70th, the Chukotka Autonomous Okrug — 79th, the Nenets Autonomous Okrug — 83rd.

Expert RA rating agency calculates the investment potential innovation index according to 9 indicators that characterize the development of the scientific and technical sphere and innova-

[3] OECD Reviews of Regional Innovation: Regions and Innovation Policy. URL: https://www.oecd.org/innovation/oecdreviewsofregionalinnovationregionsandinnovationpolicy.htm#:~:text=Regions%20and%20Innovation%20Policy%20addresses,the%20innovation%20capacity%20of%20regions (accessed 12 April 2022).

[4] The Global Competitiveness Report 2020. URL: https://www.weforum.org/reports/the-global-competitiveness-report-2020 (accessed 12 April 2022).

[5] The Global Innovation Index. URL: https://tind.wipo.int/record/42316 (accessed 12 April 2022).

[6] Innovation ranking of regions. URL: http://innovation.gov.ru/map (accessed 23 May 2017).

tion activity [7] [7]. According to the results of 2020, according to the criterion of innovative potential, Moscow takes the 1st place, the Moscow Oblast — the 2nd place, St. Petersburg — the 3rd place, the Nizhniy Novgorod Oblast — the 4th place, the Republic of Tatarstan — the 5th place, the Novosibirsk Oblast — the 6th place. As for the Arctic regions, the Yamalo-Nenets Autonomous Okrug ranks 49th, the Murmansk Oblast — 63rd, the Nenets Autonomous Okrug — 84th, the Chukotka Autonomous Okrug — 85th.

The Association of Innovative Regions of Russia calculates the rating of regions based on 29 indicators, which are divided in four areas: socio-economic, research and development, innovative activity, innovative performance [8]. The latest data on the ratings of regions is presented for 2018. St. Petersburg has the highest rating, the Republic of Tatarstan is the second, Moscow is the third, Tomsk Oblast is the fourth, Moscow Oblast is the fifth, and Novosibirsk Oblast is the sixth. The Arctic regions — the Murmansk Oblast, the Yamalo-Nenets, Nenets and Chukotka Autonomous okrugs — occupy 59th, 70th, 83rd and 84th place out of 85, respectively.

Russian scientists have developed original methods for assessing innovative potential. Thus, the work of A.A. Bykova and M.A. Molodchik [8] proposes an assessment of innovation potential on the basis of 13 indicators characterizing human resources, creation, as well as transfer and application of knowledge, implementation of innovation. The authors carried out the study only for ten regions, the Arctic regions were not included.

T.S. Zimnyakova [9] suggests applying the methodology based on 70 indicators, united in three blocks on formation, use, dissemination of innovation technologies and new knowledge to assess innovation potential of the regions, providing raw material specialization. Assessment of the innovative potential of 22 selected regions was carried out in 2016. The first three places were taken by the Republic of Tatarstan, the Samara Oblast and the Tyumen Oblast. The Arctic regions (Murmansk Oblast, Nenets, Yamalo-Nenets and Chukotka Autonomous okrugs) took 9th, 19th, 20th and 21st places out of 22, respectively.

I.S. Vladimirova [10] proposes to use a methodology of assessing innovative potential based on four blocks of indicators that characterize scientific personnel and the effectiveness of research, the effectiveness of innovative activities. The paper assessed and presented 10 leading regions in terms of innovation potential. The first place was taken by Moscow, the second — by St. Petersburg, the third — by the Republic of Tatarstan.

S.V. Makar and A.M. Nosonov [11] propose a typology of Russian regions in terms of innovative development based on three blocks of indicators: objects of innovative infrastructure, scientific and technical potential, and innovative activity. All regions are divided into four groups in decreasing order of innovative potential. Calculations were made for 2015.

[7] Ratings of investment attractiveness of Russian regions 2021. URL: https://raex-a.ru/ratings/regions/2020 (accessed 04 April 2022).
[8] Rating of innovative regions of Russia 2018. URL: https://i-regions.org/reiting/rejting-innovatsionnogo-razvitiya/ (accessed 12 April 2022).

The monograph [12] considers a methodology for assessing the scientific and innovative potential based on 19 indicators divided into 4 blocks (scientific personnel, research funding, formation of scientific personnel, innovative potential). According to 2000–2006 data, Northern regions are grouped into 4 clusters, the Murmansk Oblast is assigned to the second cluster with an average level of scientific and innovative potential, the Chukotka, Nenets and Yamalo-Nenets Autonomous okrugs — to the fourth cluster with a low level of potential.

V.K. Zausaev, N.Yu. Krivoruchko and S.P. Bystritskiy [13] propose a methodology that allows assessing the innovative potential of regions. The calculation is made according to five groups of indicators that have a direct impact on the implementation of innovative activities (legal, macroeconomic, economic, infrastructural, personnel).

S.V. Panikarova and M.V. Vlasov [14] suggest assessing innovation potential by three components, including the knowledge index, economic and social position of the region. The Northern and Arctic regions are divided into groups. The first group (with high potential) includes the Murmansk Oblast. The fourth group (with low potential) includes the other three Arctic regions.

E.S. Gubanova and O.S. Moskvina [15] propose to evaluate the investment and innovation potential on the basis of 7 evaluation blocks (labor, production, material and technical, financial, educational, scientific and technical, information and communication potential). According to the data for 2017, the regions of Russia are divided into 9 groups according to potential reduction. The Murmansk Oblast was in the sixth group “Problem regions”. Chukotka, Nenets and Yamalo-Nenets Autonomous okrugs were assigned to the last group “Crisis regions”.

I.L. Tukkel, N.E. Egorov, G.F. Detter and G.S. Kovrov [16] propose a methodology for rating the regions of the North and the Arctic in terms of innovative development based on the triple helix model, which provides for determination of patent activity, share of innovative products in the total volume of shipped products and budget expenditures for scientific research in the expenditures of regional budgets. The calculations were carried out for eight northern regions. According to 2015 data, the Krasnoyarsk Krai ranked first, the Arkhangelsk Oblast — second, the Yamalo-Nenets Autonomous Okrug — third, the Murmansk Oblast — fifth, the Chukotka Autonomous Okrug — seventh, the Nenets Autonomous Okrug — eighth.

It should be noted that the reviewed methodologies provide for the calculation of various indicators, including socio-economic conditions, which, as a rule, indirectly affect innovative development. In addition, some methods use highly specialized data that are not available in the public domain, as well as expert research methods, which reduces the possibility of their application for an objective assessment of the Arctic regions in terms of innovative potential.

Analysis of the innovation development of the Arctic regions

The paper considers regions fully related to the Arctic zone of the Russian Federation [9].

[9] Ukaz Prezidenta Rossiyskoy Federatsii «O sukhoputnykh territoriyakh Arkticheskoy zony Rossiyskoy Federatsii» № 296 ot 02 maya 2014 g. (v red. Ukazov Prezidenta Rossiyskoy Federatsii ot 27.06.2017 № 287, ot 13.05.2019 № 220,

The study showed a positive dynamics of industrial production growth in the Arctic regions of the Russian Federation, as shown in Figure 1.

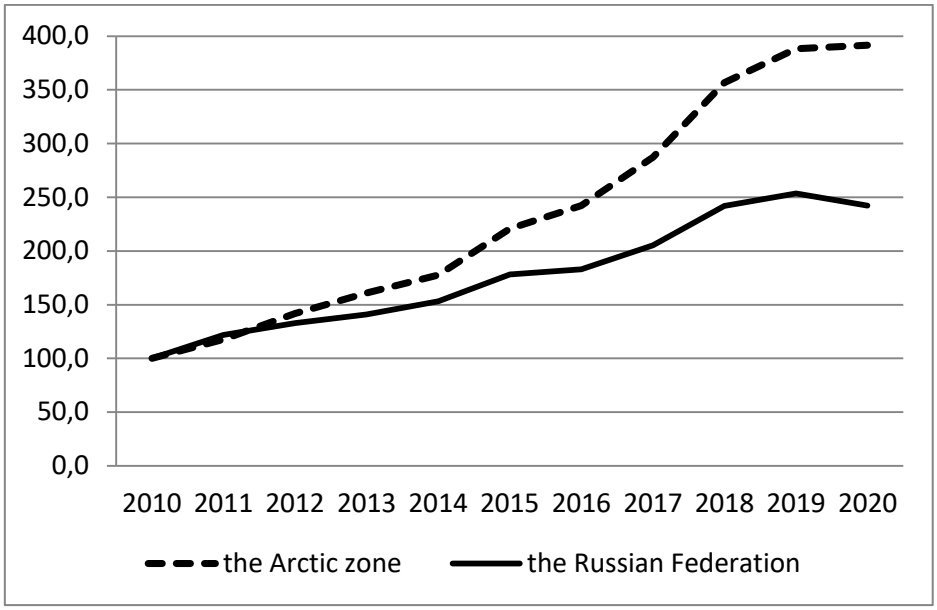

Fig. 1. Dynamics of industrial production growth in % compared to 2010.

Undoubtedly, the implementation of innovative technologies and projects affects the improvement of industrial production indices in the Arctic regions [17]. This applies primarily to the Murmansk Oblast and the Yamalo-Nenets Autonomous Okrug (Fig. 1).

Table 1

Organizations implementing technological innovations (as a percentage of the total number) [10]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Chukotka AO	12.5	14.3	21.4	29.2	17.8	7.2	10.7	10.7	9.4	11.7
Nenets AO	8.6	5.3	4.7	3.1	5.0	3.1	4.6	2.8	5.3	4.9
Yamalo-Nenets AO	7.4	7.2	4.7	7.3	6.3	6.8	7.0	15.0	13.2	9.0
Murmansk Oblast	5.9	6.6	9.9	8.2	7.8	5.7	6.8	16.3	19.0	19.9
The Russian Federation	8.9	9.1	8.9	8.8	8.3	7.3	7.5	19.8	21.6	23.0

Only two regions (Nenets and Chukotka Autonomous okrugs) show a decrease in innovation activity.

Table 2 shows the share of innovative products as a percentage of total innovation output.

ot 05.03.2020 № 164) [Decree of the President of the Russian Federation "On the land territories of the Arctic zone of the Russian Federation" No. 296 dated May 02, 2014 (as amended by Decrees of the President of the Russian Federation No. 287 dated June 27, 2017, No. 164)]. URL: http://pravo.gov.ru/proxy/ips/?docbody=&firstDoc=1&lastDoc=1&nd=102349446 (accessed 09 June 2022).

[10] The share of organizations that carried out technological innovations in the reporting year in the total number of surveyed organizations. URL: https://rosstat.gov.ru/folder/14477 (accessed 31 January 2022).

Table 2

Share of innovative goods as a percentage of shipped products [11]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Yamalo-Nenets AO	1.3	1.4	0.0	0.0	0.2	0.1	0.0	-	0.4	0.4
Murmansk Oblast	0.0	0.1	0.3	2.4	1.6	1.1	0.9	0.5	5.6	12.1
Chukotka AO	0.0	0.9	1.5	0.0	0.1	0.7	1.0	0.5	0.4	0.3
Nenets AO	0.0	-	-	-	-	0.0	0.0	0.0	0.0	0.0
The Russian Federation	6.1	7.8	8.9	8.2	7.9	8.4	6.7	6.0	6.1	6.4

In 2020, the Murmansk Oblast is characterized by an excess of the share of innovative products over the Russian Federation indicator. Despite the growth in the share of innovative products, the values of the Chukotka Autonomous Okrug lag behind the Russian average. The Nenets and Yamalo-Nenets Autonomous Okrugs are characterized by a negative trend in the volume of innovative products.

There is a serious backlog of the Arctic regions in terms of developed innovative technologies compared to the average Russian values (Table 3).

Table 3

Developed innovative technologies (units) [12]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Yamalo-Nenets AO	4	1	4	16	13	22	12	12	15	20
Chukotka AO	-	-	-	2	2	-	-	-	-	0
Nenets AO	-	1	1	-	-	-	-	-	-	0
Murmansk Oblast	-	-	-	-	-	-	-	-	-	0
The Russian Federation	1138	1323	1429	1409	1398	1534	1402	1565	1620	1989

Among the Arctic regions, only the Yamalo-Nenets Autonomous Okrug is characterized by positive dynamics of innovative technologies development.

Meanwhile, it should be noted that there is a serious imbalance in the number of developed and used production technologies in the Arctic regions (Table 4).

Table 4

Innovative technologies in use (units) [13]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Yamalo-Nenets AO	3769	3920	3971	3930	4052	3627	4354	4242	5178	4288
Murmansk Oblast	1557	1154	1106	1135	1201	1236	1145	1380	1375	1535
Nenets AO	18	25	8	n/d	25	36	63	78	103	143
Chukotka AO	-	-	-	392	402	410	221	247	142	189
The Russian Federation	191650	191372	193830	204546	218018	232388	240054	254927	262645	242931

In the Arctic regions, there is a significant lag in the implementation of developed innovative technologies compared to the average indicators for the Russian Federation. Many of the im-

[11] The share of innovative goods, works, services in the total volume of shipped goods, works, services. URL: https://rosstat.gov.ru/folder/14477 (accessed 31 January 2022).
[12] Developed advanced manufacturing technologies. URL: https://rosstat.gov.ru/folder/14477 (accessed 31 January 2022).
[13] Advanced manufacturing technologies in use. URL: https://rosstat.gov.ru/folder/14477 (accessed 31 January 2022).

plemented technologies at industrial enterprises in Russia can be effectively used for resource enterprises in the Arctic regions.

A serious lag is observed in the Arctic regions in terms of the number of patent applications (Table 5).

Table 5

Number of patent applications in the Russian Federation (per 10.000 people) [14]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Murmansk Oblast	0.55	0.74	0.40	0.40	0.47	0.38	0.40	0.24	0.36	0.31
Yamalo-Nenets AO	0.45	0.31	0.26	0.48	0.60	0.62	0.58	0.70	0.62	0.77
Nenets AO	-	-	-	-	-	0.23	-	-	-	-
Chukotka AO	-	-	-	-	-	0.20	-	-	-	-
The Russian Federation	1.85	2.00	2.00	1.65	2.00	1.83	1.55	1.70	1.59	1.63

It should be noted that inventive activity in the Arctic regions is below the average Russian level. The Murmansk Oblast is characterized by a decrease in patent activity by 43%, which is incommensurable with a decrease in the number of scientific personnel by 10% (Table 6).

Table 6

Number of researchers (persons) [15]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Murmansk Oblast	984	1030	1007	1029	1023	977	923	876	873	885
Yamalo-Nenets AO	27	45	49	52	55	59	62	69	68	65
Nenets AO	20	23	25	26	27	24	20	22	18	24
Chukotka AO	11	11	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d
The Russian Federation	374746	372620	369015	373905	379411	370379	359793	347854	348221	346497

According to statistics, the Murmansk Oblast had the largest decrease in the number of researchers among the Arctic regions and in relation to the average Russian values.

There is neither know-how nor industrial designs in the Arctic regions among the intellectual activities presented in Table 7.

In the Arctic regions, certain types of intellectual property are typical for the Murmansk Oblast and the Chukotka Okrug.

[14] Coefficient of inventive activity. URL: https://rosstat.gov.ru/folder/11186 (accessed 31 January 2022).
[15] Number of staff involved in research and development. URL: https://rosstat.gov.ru/folder/11186 (accessed 29 April 2022).

Table 7

Intellectual property indicators (2020) [16]

	Type of intellectual property				
	Inventions	Utility models	Industrial designs	Databases	Computer programs
Murmansk Oblast	5	3	-	25	39
Chukotka AO	-	-	-	-	2
The Russian Federation	20636	7098	2825	2517	16920

Comprehensive ranking of the Arctic regions by innovation potential

The authors of the article have developed a comprehensive methodology for assessing the innovative potential according to statistical data [18]. The fundamental novelty of the comprehensive methodology lies, firstly, in the use of specific indicators (in other methods, the authors use not specific, but absolute statistical indicators). The methodology uses only indicators that characterize innovative development (in most methods, in addition to these indicators, indicators of socio-economic conditions are calculated, which, as a rule, indirectly affect innovative development). The proposed methodology does not use expert methods (for example, when determining the significance of factors). The rating is based on an assessment of all specific indicators, for which the Russian regions were ranked in descending order of values.

Based on a comprehensive methodology, indicators were calculated and the Russian regions were ranked for 2011, 2013, 2017 and 2020 in order to compare the dynamics of the innovation potential of the Arctic regions.

Table 8 presents the ranking of the Arctic regions by patents per person employed in the economy, calculated according to the comprehensive methodology.

Table 8

Ranking of the Arctic regions by patents per person employed in the economy [17]

	Place among Russian regions			
	2011	2013	2017	2020
Murmansk Oblast	64	57	68	71
Yamalo-Nenets AO	78	69	67	65
Nenets AO	81	81	83	84
Chukotka AO	81	81	85	84

The Arctic regions rank below 57th in terms of patents employee. The Nenets Autonomous Okrug, the Murmansk Oblast and the Chukotka Autonomous Okrug are characterized by negative dynamics by 3, 7 and 3 points. The Yamalo-Nenets Autonomous Okrug moved up 13 places in terms of patent activity due to an 8-fold increase in the number of issued patents.

Table 9 presents the ranking of Arctic regions in terms of developed technologies per person employed in the economy.

[16] Information on the use of intellectual property objects by constituent entities of the Russian Federation. URL: https://rosstat.gov.ru/folder/14477 (accessed 31 January 2022).
[17] Calculated by the authors.

Table 9

Ranking of the Arctic regions by developed technologies per person employed in the economy [18]

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Yamalo-Nenets AO	28	40	18	9
Nenets AO	62	16	65	52
Murmansk Oblast	62	67	65	52
Chukotka AO	62	67	65	52

In terms of technologies, the leader among the Arctic regions is the Yamalo-Nenets Autonomous Okrug, which improved its position from 28th place in 2011 to 9th place in 2020 due to a 5-fold increase in the number of developed technologies, while the growth in the number of employees was 12.6 %. The Chukotka Autonomous Okrug and the Murmansk Oblast are below 50th place, although these regions are characterized by a positive trend of the indicator by 10 points due to a decrease in the number of people employed in the economy. The Nenets Autonomous Okrug in 2020, compared to 2013, improved its position by 10 points, but in 2013 the region ranked 16th among all Russian regions in the presence of developed advanced technology.

Table 10 presents the ranking of Arctic regions in terms of technologies used per person employed in the economy.

Table 10

Ranking of the Arctic regions by technology used per person employed in the economy [19]

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Yamalo-Nenets AO	1	1	2	3
Murmansk Oblast	23	35	39	27
Nenets AO	75	77	63	23
Chukotka AO	82	81	8	10

It should be noted that the Yamalo-Nenets Autonomous Okrug and the Murmansk Oblast have reduced their indicators in terms of the advanced production technologies used by 2020. The Chukotka and Nenets Autonomous okrugs improved their rating by 72 points (from 82nd to 10th place) and 52 points (from 75th to 23rd place), which can be explained by a significant increase in the number of advanced technologies used in industry.

Table 11 presents the ranking of Arctic regions in terms of innovative products per person employed in the economy.

Table 11

Ranking of the Arctic regions by innovative products per person employed in the economy [20]

[18] Calculated by the authors.
[19] Calculated by the authors.

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Yamalo-Nenets AO	23	68	78	35
Nenets AO	71	79	77	79
Murmansk Oblast	76	60	55	1
Chukotka AO	77	32	35	51

In terms of the volume of shipped innovative products, the Murmansk Oblast and the Chukotka Autonomous Okrug showed a positive trend by 75 and 26 positions due to the growth in the volume of innovative products by 381 and 66 times and a decrease in the number of employees by 18% and 2%, respectively. The Yamalo-Nenets and Nenets Autonomous Okrugs are characterized by negative dynamics by 12 and 8 points.

Table 12 presents the ranking of Arctic regions in terms of expenditures on technological innovations to GRP.

Table 12

Ranking of the Arctic regions by expenditure on technological innovation as a percentage of GRP [21]

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Yamalo-Nenets AO	61	73	71	81
Murmansk Oblast	68	55	67	59
Chukotka AO	74	70	53	79
Nenets AO	81	79	82	85

The Arctic regions are below 50th place in terms of expenditure on innovation. The Yamalo-Nenets, Chukotka and Nenets Autonomous okrugs are characterized by a decrease in the rating by 20, 5 and 4 points, respectively, due to a larger growth in GRP compared to the costs of technological innovation. Only the Murmansk Oblast is characterized by a positive trend of 9 points due to a 4-fold increase in costs compared to the GRP, which increased by 2 times. Table 13 presents the ranking of Arctic regions in terms of research and development costs to GRP.

Table 13

Ranking of the Arctic regions by research and development costs (as a percentage of GRP)

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Murmansk Oblast	24	24	37	41
Chukotka AO	76	78	82	83
Nenets AO	82	82	85	84
Yamalo-Nenets AO	83	83	84	85

In terms of research and development costs, the Murmansk Oblast has the best rating — 24th place in 2011 and 41st in 2020, which is explained by the functioning of the Federal Research Center in the region, specializing in scientific research and problems of the Arctic [19, 20]. The de-

[20] Calculated by the authors.
[21] Calculated by the authors.

crease in the rating of the region by 17 positions can be explained by the fact that costs increased by 36%, and GRP doubled. Chukotka, Nenets and Yamalo-Nenets Autonomous okrugs also lowered their ratings by 7, 2 and 2 positions, respectively, mainly due to the growth of GRP.

Table 14 presents the ranking of Arctic regions in terms of the number of organizations that implement technological innovations.

Table 14

Ranking of the Arctic regions by the share of organizations implementing technological innovations (as a percentage of the total number) [22]

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Chukotka AO	16	1	12	48
Nenets AO	22	53	59	60
Yamalo-Nenets AO	28	53	31	50
Murmansk Oblast	38	21	33	36

According to the implementation of technological innovations among the Arctic regions, only the Murmansk Oblast improved its rating by 2 positions. The Nenets, Chukotka and Yamalo-Nenets Autonomous okrugs are characterized by negative dynamics by 38, 32 and 22 points due to a decrease in innovation activity by 72%, 46% and 41%, respectively.

Table 15 shows the place of the Arctic regions in the rating of innovative potential, calculated using a comprehensive methodology.

Table 15

Rating of the Arctic regions by innovative potential, calculated using a comprehensive methodology [23]

Arctic regions	Place among Russian regions			
	2011	2013	2017	2020
Yamalo-Nenets AO	40	56	54	44
Murmansk Oblast	57	37	56	33
Chukotka AO	74	62	50	60
Nenets AO	75	68	83	70

The Arctic regions are mostly ranked below 50th place by innovation potential. Only the Yamalo-Nenets Autonomous Okrug is characterized by a negative dynamics of the innovation development rating by 4 positions during the period under consideration, mainly due to a decrease in the rating of innovation activity and costs for technological innovation. In the Murmansk Oblast, the Chukotka and Nenets Autonomous okrugs, there is an improvement in the rating of innovative development by 24, 14 and 5 positions.

Conclusion

Foreign and Russian methodologies for assessing innovation potential have been analyzed. It has been determined that foreign methodologies, due to specific indicators that are not calculated by

[22] Calculated by the authors.
[23] Calculated by the authors.

Russian statistics, cannot be used to determine the innovative potential of the Arctic regions of Russia. The considered Russian methodologies provide for the calculation of various indicators, including socio-economic conditions, which, as a rule, indirectly affect innovative development. In addition, some methods use highly specialized data, as well as expert research methods, which reduces the possibility of their use for an objective assessment of the Arctic regions in terms of innovation potential.

According to the results of the analysis of statistical data, it was determined that the Arctic regions have low rates of innovative development and lag behind the average Russian values.

The authors of the article developed a comprehensive methodology for assessing the innovative potential. Based on the methodology, the indicators were calculated and the Russian regions were ranked for 2011, 2013, 2017 and 2020 in order to compare the dynamics of the innovation potential of the Arctic regions. The analysis of the innovation potential of Russia's Arctic regions according to the developed comprehensive methodology has shown that the Arctic regions are characterized by low values of innovation potential and are mostly below 50th place in the overall ranking of Russian regions.

The practical significance of the work is due to the fact that the developed methodology allows assessing the level of innovative potential of the regions, which can help in choosing a development strategy for the territories and formulating science-based solutions to increase innovation activity, which is several times lower in the Arctic regions of Russia compared to the subarctic countries.

Further scientific research is required to increase the innovative potential of the Arctic regions, especially those with resource enterprises.

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The article was submitted 24.05.2022; approved after reviewing 08.06.2022; accepted for publication 10.06.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 74–89.
Original article
UDC [332.12+622.2](985)(045)
doi: 10.37482/issn2221-2698.2022.49.86

Spatial Organization of Gas Resources Development on the Arctic Shelf of the Russian Federation

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Abstract. Being strategic, the Arctic shelf is a region with an extremely low level of exploration. The undiscovered hydrocarbon resources on the Russian Arctic shelf exceed 90%. The long-term development of strategic programs and projects for the development of gas production on the shelf are constrained by insufficient technical accessibility of industrial development, as well as the difficulty of assessing the actual volume of initial potential oil and gas resources. The reproduction of free gas reserves has been assessed, the level of parity between production and growth of explored reserves has been determined. The state of the gas resources of the Arctic shelf was studied taking into account localization in oil and gas regions, which allowed to make a conclusion about the degree of exploration of the resource base and to identify the basis for the gas potential. The factors restraining the development of offshore projects were identified and analyzed. It was determined that offshore projects should be presented to investors with more attractive operational, technological and economic indicators than alternative onshore projects. The lack of tested methods for the development of hydrocarbons at superdeep depths under severe ice conditions does not allow to fully assessing the economic efficiency of offshore gas projects in the Arctic. It is concluded that within the resource base of Arctic offshore fields, it is necessary to allocate the static (probabilistic) potential of hydrocarbon resources of the Arctic region. The need to transform the Arctic foreign policy is identified.

Keywords: *reproduction of natural gas reserves, oil and gas fields of the Russian Arctic shelf, productivity of deposit, probabilistic potential of natural gas*

Acknowledgments and funding

The work was carried out within the framework of research project No. 0226-2019-0028 of the Luzin Institute for Economic Studies of the Kola Scientific Center of the Russian Academy of Sciences "Interaction of global, national and regional factors in the economic development of the North and the Arctic zone of the Russian Federation" on the state assignment of the Federal Research Center "Kola Scientific Center of the Russian Academy of Sciences".

Introduction

The problem of stable, efficient and safe reproduction and industrial development of the Arctic hydrocarbon resources has been identified as a priority for the sustainable development of the Arctic zone of the Russian Federation (AZRF), since this region is the main hydrocarbon resource base in Russia. The Arctic shelf, where the main reserve of the oil and gas industry is con-

For citation: Shchegolkova A.A. Spatial Organization of Gas Resources Development on the Arctic Shelf of the Russian Federation. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 86–104. DOI: 10.37482/issn2221-2698.2022.49.86

centrated, is a powerful strategic resource for the development of the Russian economy in general and the northern regions, including the Northern Sea Route, in particular. In the long term, the elaboration of strategic programs and projects for the development of gas production on the Arctic shelf will ensure "sustainable reproduction of natural gas reserves, maintain a fairly high competitive position of Russia in the global hydrocarbon market" [1, p. 133]. However, the scale and pace of development, additional exploration of offshore fields will depend on a number of constraining factors.

The spatial organization of the economic development of the oil and gas resources of the Russian Arctic, sustainable development and strategic management of the oil and gas complex are used as a methodological approach in scientific papers [2, Agarkov S.A., Saveliev A.N.], [3, Kozmenko S.Yu., Saveliev A.N., Teslya A.], [4, Kozmenko S., Saveliev A., Teslya A.], [5, Kozmenko S., Teslya A., Fedoseev S.], [6, Fadeev A.M., Cherepovitsyn A. .E., Larichkin F.D.] and others.

Scientists and specialists made a great contribution to the study of the geology and gas and oil presence of the Arctic region, the development of geophysical methods for prospecting and exploration of oil and gas resources, technical and technological processes for the development of hydrocarbons [7, Ananenkov A.G., Mastepanov A.M.] , [8, Laverov N.P., Bogoyavlenskiy V.I., Bogoyavlenskiy I.V.], [9, Kontorovich A.E.], [10, Kontorovich V.A., Kontorovich A.E.], [11, Skorobogatov V.A., Kabalin M .Yu.] and others.

A significant but not fully resolved problem in studies of the spatial organization of gas production centers in the Arctic region of the Russian Federation is the assessment of reproduction and substantiation of the value and structure of the initial potential and undiscovered natural gas resources in the fields of the Arctic shelf.

The reformatting of approaches to international energy cooperation in the context of sanctions pressure, the presence of restrictive and deterrent factors for the development of oil and gas projects in the Arctic region determine the relevance of the problem of a reasonable determination of the volume of recoverable hydrocarbon resources.

The purpose of the study is to solve the scientific problem of analyzing the spatial organization of hydrocarbon potential development, determining the sector of technical availability of industrial development of hydrocarbons in the Arctic, which will allow to identify the static (probabilistic) volume of natural gas, which can be taken into account when developing strategic programs and projects for the development of gas production in the Arctic shelf.

The goal set requires solving the following tasks: assessment of the equilibrium correlation between production and reproduction of natural gas reserves, study of the spatial organization of gas production centers in the Russian Arctic, analysis of the influence of constraining factors on the industrial development of hydrocarbon deposits of the Arctic shelf.

The factual basis of the study is provided by the official data of the state balance of mineral reserves of the Federal Agency for Subsoil Use and the Federal State Statistics Service. The study was conducted using comparative-analytical, statistical methods of economic analysis.

Natural gas reserves replacement rate

The Arctic zone includes deposits of the South Kara oil and gas region (OGR), Prednovozemelskaya OGR, Yamalskaya OGR, Gydanskaya OGR, Nadym-Purskaya OGR, Pur-Tazovskaya OGR, Shtokman-Luninskaya OGR, South Barents OGR, Finnmarkenskaya OGR, Pechoro-Kolvinskaya OGR, Khoreyverskaya OGR, and Yenisei-Khatangskaya OGR.

Maintaining a balance between production and reproduction of hydrocarbons is a strategic task for the Russian gas industry. In recent years, serious prospects for the discovery of high-potential deposits and deposits of hydrocarbon raw materials, including those unique in terms of recoverable resources, are associated with five Arctic OGRs of the West Siberian oil and gas field (Yamalskaya, Nadym-Purskaya, Pur-Tazovskaya, Gydanskaya and Yuzhno-Karskaya) [12, Shchegolkova A.A.].

Table 1 presents an assessment of the equilibrium ratio between production and the growth of natural reserves for 2017–2021.

Table 1

Assessment of the replacement of free gas reserves in the Russian Federation [1,2]

Year	Production, bcm*,	Increase in free gas reserves **, bcm	Parity level, bcm	K_r	Proven reserves, trillion m^3 ***	Share in global volume ***	R/p*****
2017	690	890	+200	1.29	35	18.1	55
2018	725	673	-52	0.93	38.9	19.8	58.2
2019	738	560	-178	0.76	38	19.1	55.9
2020	693	747	+54	1.08	37.4	19.9	58.6
2021	762	1017	+255	1.33	48.9****	23.7****	64.2

Average reproduction rate for the period 2017–2021 at the level of 1.08 illustrates the parity between production and growth, indicates the preservation of this balance and ensuring the reproduction of natural gas in the future (for the period 2012–2021, the same coefficient was 1.207).

For the period under study, the increase in free gas reserves outstrips its production, but in 2018 and 2019, the parity was not in favor of reproduction. The recorded decline in recoverable natural gas reserves in categories A+B1+C1 was due to a recalculation of the gas recovery factor. In 2019, there was a decrease in recoverable natural gas reserves at the Zapadno-Tarkosalinskiy oil and gas condensate field, the Severo-Kamennomysskiy gas condensate field, as well as on the Kara Sea shelf. Despite the overall decline in reserves, the natural gas resource base of the Yamal Gas Production Center (GPC) has increased significantly due to the discovery of two new fields on the Priyamalskoe shelf — V.A. Dinkov and Nyarmeiskiy, with total reserves of more than 500 billion

[1] Reproduction Rate (KR) from 2017 to 2021 — 1.08.

[2] Source: compiled by the author * According to the Ministry of Energy of the Russian Federation. **According to the Ministry of Natural Resources of the Russian Federation; ***According to statistics for 2012–2020. ; ****According to OPEC Bulletin 2021; ***** R/P – reserves to production ratio, shows the number of years during which productivity will remain, based on current production rates.

m^3. Additional exploration was carried out on the reserves of the Bovanenkovskaya and Tambeyskaya fields; the results of test drilling of exploration wells also corrected the data on higher productivity of the Leningradskoe field compared to earlier geological exploration data. The recoverable free gas reserves of the Leningradskoe gas condensate field are currently estimated at 1.9 trillion m^3, which makes the field unique. Thus, the Yamal gas production region, the center of which is the Bovanenkovo cluster, will eventually replace the depleting gas fields of the Nadym-Purskaya and Pur-Tazovskaya oil and gas fields.

In the last two years, the explored reserves of free natural gas have been growing at the expense of increased exploration rates in the Russian Arctic, mainly in the area of the Yamal Peninsula and on the continental shelf, which makes it possible to maintain the "production/reproduction" parity. In particular, according to the Federal Agency for Subsoil Use, 33 hydrocarbon fields were discovered in 2020. The main growth in current recoverable natural gas reserves occurred in the Arctic region. For example, on the Kara shelf within the Prednevozemelskaya OGF, the Marshal Zhukov field, with total reserves of over 800 billion m^3 and classified as unique, and the Marshal Rokossovsky field, with estimated gas reserves of 514 billion m^3 and condensate of 53 million tons, were discovered. Earlier in 2014, the Pobeda field was discovered in the Kara Sea, Prednovozemelskaya OGF, with 130 million tons of oil reserves in category C1 + C2, 21.7 billion m^3 of gas category A +B1+C1, 477.5 billion m^3 — B2+C2, classified as unique. Oil reserves were found in Jurassic sediments and gas reserves — in Aptian-Albian and Cenomanian Cretaceous sediments. Drilling of the world's northernmost well Universitetskaya-1 took place in record time, and in September 2014, the first oil was obtained — ultra-light, with density and sulfur content surpassing the benchmark grades Brent, as well as WTI and Siberian Light. In total, more than 30 promising structures have been identified on the shelves of the Kara Sea by the Prednovozemelskaya OGF. The results of exploration show their high prospects. According to experts (Rosneft), the new province may surpass the largest provinces of the Middle East, the Brazilian shelf, the Gulf of Mexico and the Arctic shelf of Alaska and Canada in the volume of recoverable hydrocarbon reserves. A gas field "75 Years of Victory" was discovered on the Priyamalskiy shelf of the Kara Sea within the South Kara OGF with a preliminary estimate of natural gas reserves of 202.4 billion m^3.

Assessment of the gas potential of the Arctic shelf

The recoverable hydrocarbon reserves of the Arctic region are estimated by experts in terms of liquid hydrocarbons at 245 billion tons, while the Western Arctic shelf accounts for 50 billion tons of fuel equivalent. The Arctic shelf is predominantly gas-bearing. The share of gas resources in the total hydrocarbon potential is about 90% [7, Ananenkov A.G., Mastepanov A.M.], [11, Skorobogatov V.A., Kabalin M.Yu.].

Table 2 presents an assessment of free gas reserves of the West Arctic shelf according to the state balance of mineral reserves of the Federal Agency for Subsoil Use, PJSC Gazprom, PJSC Rosneft.

Table 2

Assessment of the free gas reserves of the West Arctic shelf [3]

Deposit	Category by reserves	Free gas, bcm		Degree of development	Subsoil user
		$A+B_1+C_1$	B_2+C_2		
Kara Sea, including the Ob and Taz Bays					
Yuzhno-Karskaya OGF					
GCF Rusanovskoe	unique	240.4	538.6	explor.	PJSC Gazprom
GCF Leningradskoe	huge	71.0	980.6	explor.	PJSC Gazprom
GF named after Dinkov	unique	>150	>300	explor.	PJSC Gazprom
GF 75 years of Victory *	large	72.7	129.7	explor.	PJSC Gazprom
GF Nyarmeiskoe *	large	>80	>60	explor.	Department for Subsoil Use in the North-Western Federal District, on the shelf and the world ocean of PJSC Gazprom
Prednovozemelskaya OGF					
OGCF Pobeda	unique	21.7	477.5	explor.	PJSC Rosneft
GF named after m. Zhukov **	unique	>800		explor.	PJSC Rosneft
GCF named after m. Rokossovskiy **	unique	>514		explor.	PJSC Rosneft
Yamalskaya OGF					
GF Kamennomysskoe (sea)	unique	555.0	-	devel. explor.	Department for Subsoil Use in the North-Western Federal District, on the shelf and the world ocean, OOO Gazprom dobycha Yamburg
GF Kamennomysskoe (shelf)	average	1.2	-	devel.	Department for Subsoil Use in the North-Western Federal District, on the cont.shelf and the world ocean
GF Obskoe	average	4.8	-	explor.	OOO Gazprom dobycha Yamburg
GCF Severo-Obskoe	unique	>320		explor.	Arctic LNG 3
GCF Kruzenshternskoe (shelf)	unique	731.9	-	explor.	Department for Subsoil Use in the North-Western Federal District, on the shelf and the world ocean, PJSC Gazprom
GCF Kharasaveyskoe (shelf)	unique	92.9	250.0	devel.	Department for Subsoil Use in the North-Western Federal District, on the shelf and the world ocean, OOO Gazprom dobycha Nadym
GCF Yuzhno-Tambeyskoe (shelf)	unique	82.0	35.7	explor.	OAO Yamal LNG, OOO NOVATEK-Yurkharovneftegaz

[3] Source: compiled by the author * according to PJSC Gazprom; ** according to PJSC Rosneft.

Gydanskaya OGF					
GCF Severo-Kamennomysskoe	large	404.9	27.1	devel.	OOO Gazprom dobycha Yamburg
GF Antipayutinskoe (shelf)	large	>300		explor.	PJSC Gazprom
GF Semakovskoe (shelf)	large	>320		devel.	Department for Subsoil Use in the North-Western Federal District, on the cont.shelf and the world ocean, RusGazAlliance LLC
GF Tota-Yakhinskoe (shelf)	large	>100.5		explor.	PJSC Gazprom
GCF Chugoryakhinskoe	average	4.4	46.9	explor.	OOO Gazprom dobycha Yamburg
Total for Gydanskaya OGF		>1203.8			
Nadym-Purskaya OGF					
OGCF Yurkharovskoe	unique	346.5	67.5	devel.	OOO NOVATEK-Yurkharovneftegaz
Total Kara Sea		>2900	>3000		
Barents Sea					
Shtokmanovsko-Luninskaya OGF					
GCF Shtokmanovskoe	unique	3939.4	-	explor.	PJSC Gazprom
GF Ludlovskoe	large	80.1	131.1	explor.	PJSC Gazprom
GCF Ledovoe	unique	91.7	330.4	explor.	PJSC Gazprom
Yuzhno-Barentsevskaya OGF					
GF Murmanskoe	large	59.1	61.6	explor.	Department for Subsoil Use in the North-Western Federal District, on the shelf and the world ocean
Finmarkenskaya OGF					
GF Severo-Kildinskoe	average	5.1	10.5	explor.	Department for Subsoil Use in the North-Western Federal District, on the shelf and the world ocean
Total Barents Sea		4175.4	533.6		
Pechora Sea					
Pechoro-Kolvinskaya OGF					
GCF Pomorskoe	average	6.0	15.9	explor.	PJSC Rosneft
Khoreyverskaya OGF					
OGCF Severo-Gulyaevskoe	large	10.4	41.4	explor.	PJSC Rosneft
Total Pechora Sea		16.4	57.3		
Total		>7100	>3600		

The assessment of the potential natural gas reserves of the Western Arctic shelf indicates a low level of exploration of the resource base. The degree of exploration, taking into account the newly discovered deposits of the Kara Sea shelf, does not exceed 20%, while most of the discovered deposits are classified as unique and large. However, discovered deposits need additional research due to the low degree of exploration. The best indicator of exploration of gas reserves was recorded in the fields of the Barents and Pechora Seas and is over 80%. The highest gas content is predicted on the shelf of the Kara Sea — about 63% (Fig. 1).

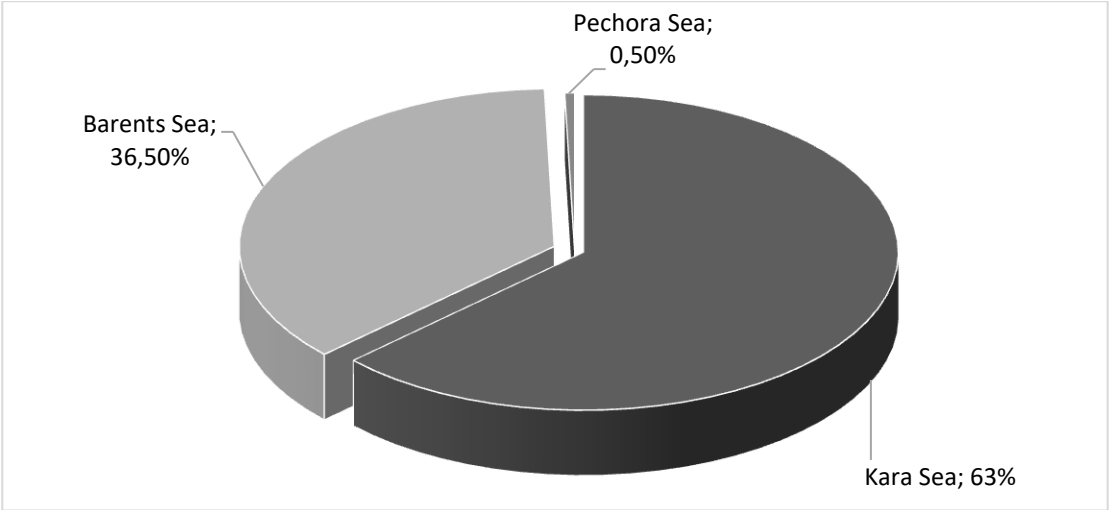

Fig. 1. Structure of the gas content of the Western Arctic shelf (compiled by the author).

Obviously, the main problem of geological exploration in the fields of the Arctic shelf is their assessment, determination and justification of the real value, as well as the structure of the initial potential natural gas resources. In recent years, despite the hard-to-recover hydrocarbon reserves, there has been an intensification of geological exploration of gas deposits directly on the shelf. However, their development is constrained by the presence of large volumes of explored and developed gas reserves on the Yamal Peninsula [12, Shchegolkova A.A., p. 63].

In the Kara-Yamal region, significant industrial hydrocarbon deposits have been recorded in a wide stratigraphic range — from the area of contact of the basement with the platform (sedimentary) cover to the Cenomanian deposits inclusively. The main reserves of hydrocarbon raw materials (mainly gas and gas condensate) of the Yamal OGF (onshore) are noted in the Albian-Cenomanian and Aptian-Albian productive complexes [13, Lyugay D.V., Soin D.A., Skorobogatko A.N.]. The main share in the structure of natural gas reserves belongs to the Cenomanian and Lower Cretaceous deposits, which are characterized as easily recoverable deposits with a relatively shallow occurrence depth of 1000–1700 m and are mainly methane accumulations. “The total reserves and resources of all fields of the Yamal OGF, including the Priyamalskaya shelf, are: explored and estimated gas reserves (A + B + C1 + C2) — about 16 trillion m^3, prospective and forecast (C3 - D3) — about 22 trillion m^3; recoverable condensate (A + B + C1) — more than 226 million tons; oil — 292 million tons” [12, Shchegolkova A.A., p. 64].

In previous studies, an “analysis of the distribution of the fields of the Yamal OGF (onshore) was carried out, taking into account their mining and geological characteristics, which made it possible to differentiate them according to the degree of prospects and highlight the proposed stages of the project for the development of hydrocarbon resources. At the same time, the following were taken into account: natural and climatic conditions, ecological component and presence or absence of industrial and social infrastructure (Table 3)” [12, Shchegolkova A.A., p. 68].

Table 3

Distribution of free gas by types of deposits in the Yamal gas-oil-bearing region (onshore) of the distributed fund (%) [4]

Jurassic-Cretaceous deposits				Paleozoic deposits
Alb-cenomanian	Aptian	Valanginian (neocom)	Jurassic	Carbon
Fields under development				
5.4	-	62.2	32.4	-
1st stage of project implementation				
30.7	48.4	11.7	9.2	-
2nd stage of project implementation				
45.2	30.7	13.0	11.0	0.1
3rd stage of project implementation				
18.6	40.7	15.5	25.2	-
unpromising				
-	-	100.0	-	-
Total for all deposits of the distributed fund				
32.13	42.83	15.4	9.6	0.04

The distribution of free gas by types of deposits (Table 3) showed that “according to the nature of the expressed productivity, the key dominant complex is the Albian-Cenomanian and Aptian, where the main reserves of natural gas are concentrated” [12, Shchegolkova A.A., p. 70].

Analysis of constraints in developing offshore projects

The development of new gas fields requires the solution of a complex technical tasks with high scientific intensity and, consequently, significant capital investments. “Decision on the development of new hydrocarbon deposits in conditions of high uncertainty is a strategic task that requires consideration of all components (organizational, technical and investment). The successful implementation of projects based on hydrocarbon deposits is largely due to their uniqueness. Only huge and unique fields are considered the most profitable in the Arctic region, in which more than 90% of the initial gas reserves are concentrated” [12, Shchegolkova A.A., p. 68]. Under these conditions, for their practical promotion and introduction into commercial operation, gas projects in the offshore fields of the Arctic should be presented to investors with more attractive operational, technological and economic indicators than alternative projects onshore.

The following factors are identified as determining the possibility of further development, supplementary exploration and exploitation of the Arctic offshore fields at the present stage (Fig. 2).

[4] Developed by the author [12, Shchegolkova A.A., p. 70].

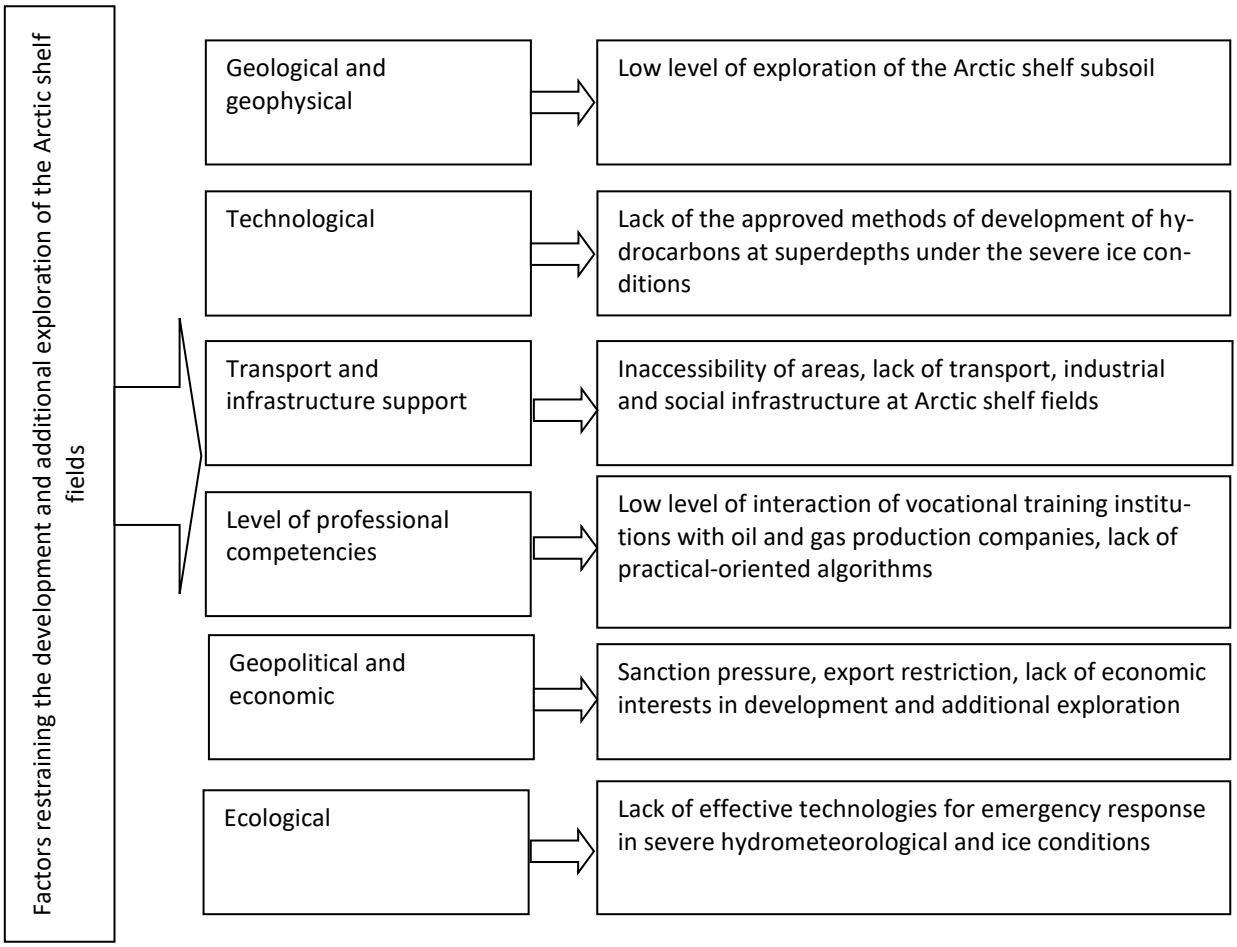

Fig. 2. Factors influencing the decision-making process with regard to the opportunities for further offshore field development, additional exploration and exploitation [5].

Geological and geophysical factor. The level of subsurface exploration of the Arctic shelf is low, particularly by means of drilling. However, in recent years, exploration by PJSC Gazprom and PJSC Rosneft has increased through seismic surveys (CDPM-2D and 3D) [6]. The highest degree of exploration of hydrocarbon fields is in the Priyamalskaya shelf, as well as in the Ob and Tazovskaya Bays. Geological-geophysical and drilling knowledge of the Arctic shelf decreases from west to east. At the moment, 28 gas and gas condensate fields have been identified (Table 2): both directly offshore and at the land-sea boundary. The current ranking classifies most of them as unique and large. However, at the moment, the Yurkharovskoye OGCF is the actual offshore field which is directly under development and where the production is performed by means of horizontal wells from the shore.

Technological factor. Involvement in the industrial circulation of the hydrocarbon resources of the Western Arctic is possible if technological, innovative and infrastructural problems in the field of exploration are solved, which is currently difficult due to the technical and technological

[5] Developed by the author.
[6] "The common depth point method, CDPM, is a modification of the reflected wave method (RWM). The main geophysical method is used to determine the depth and nature of the boundaries of the section of geological strata, to identify structural and non-structural traps of minerals, and under favorable conditions, to obtain data on lithology, rock composition, and the nature of fluids. [14, Vyakhirev R.I., p. 399].

backwardness of the oil and gas industry in the Russian Federation, primarily this applies to the formation of a system of geological exploration, drilling and hydrocarbon production. One of the factors limiting access to hydrocarbon resources is ice conditions — compression and intense drift of ice, ice intrusion into the production area, earlier ice formation, etc., which requires ensuring hydrometeorological safety in the area of exploration and development of hydrocarbon deposits. Among other things, severe hydrometeorological conditions, difficult ice conditions and a sea depth of more than 50 m reduce the range of technical and technological solutions, which limits exploration activities and complicates further development of offshore hydrocarbon fields in the Arctic. In modern oil and gas production practice, there is no successfully tested arsenal of technical and technological methods for solving the problem of industrial production of hydrocarbons at a sea depth of more than 50 m in difficult hydrometeorological and ice conditions. Russian scientists offer two possible approaches to solve this problem: the use of stationary offshore platforms and the construction of underwater production complexes [15, Vyakhirev R.I., Nikitin B.A., Mirzoev D.A.], [16, Nazarov V., Krasnov O., Medvedeva L.]. For offshore hydrocarbon fields, options of deep drilling and development of gas resources from the shore using onshore drilling equipment are considered; an example is the Yurkharovskoe oil and gas condensate field, where production is carried out through horizontal wells from the shore. The lack of proven methods for the development of hydrocarbons at superdeep depths under severe ice conditions does not allow fully assessing the economic efficiency of offshore gas projects in the Arctic, determining the level of operational and capital costs, evaluating geological and economic solutions and analyzing capital intensity.

Transport and infrastructure support. Estimation of economic efficiency of the offshore gas fields development involves taking into account the transport and infrastructure support of the Arctic oil and gas provinces. The state of the transport and logistics system of the Arctic mainland, as well as the lack of industrial, service and social infrastructure necessary for the development of offshore hydrocarbon facilities, is a factor hindering the development of new fields and the adoption of strategic decisions on the implementation of oil and gas projects, and also does not fully meet the requirements of the Arctic territories and national security [17, Tutygin A.G., Korobov V.B., Gubaidullin M.G., Chizhova L.A.].

In modern gas production practice, there are several ways of transport and logistics support of offshore oil and gas projects applied to coastal hydrocarbon fields. Among them:

- shipment of hydrocarbons directly from production platforms to oil tankers (gas carriers), similar to oil and gas condensate shipment from the Prirazlomnaya oil platform, liquefaction of natural gas from an offshore production platform or from a technological platform located in the vicinity with subsequent shipment;

- deep drilling and development of hydrocarbon deposits from the offshore using onshore drilling equipment through horizontal wells, similarly to the Yurkharovskoe oil and gas condensate field;
- transportation of hydrocarbons to onshore technological complexes by means of a pipeline system, integration of the offshore gas transportation infrastructure into the existing or newly created one, following the example of the gas projects being implemented in the Ob and Tazovskaya Bays;
- transportation of natural gas from offshore fields via pipeline to shore with subsequent liquefaction and further supply of LNG using tankers, following the example of the Norwegian gas project at the Snevit (Snow White) field in the Barents Sea. The operator of this project is Statoil. The gas and condensate produced in the Snevit field is piped to the liquefaction plant on the Melkøya peninsula near Hammerfest by an underwater production unit operated from the shore [15, Vyakhirev R.I., Nikitin B.A., Mirzoev D. A.], [18, Dmitrievskii A.N., Eremin N.A.].

Due to the inaccessibility of areas, the complete lack of transport, industrial and social infrastructure, the commissioning of new offshore fields in the Russian Arctic has been repeatedly postponed. In this regard, the basis for the development and implementation of transport, logistics and infrastructure projects necessary for the effective development of hydrocarbon fields on the Arctic shelf is the creation of a complex of coastal technological bases for the provision of oil and gas projects, including the associated oil and gas transport infrastructure and auxiliary production and social facilities focused on the development and commercial operation of specific offshore fields.

Level of professional competencies. The possibility of further development, additional exploration and exploitation of offshore Arctic fields depends to a large extent on the level of professional competence of the personnel. At the moment, the structure of the system of professional training for work in the offshore Arctic fields is presented at an insufficient competence level, in comparison with the training of personnel for work in the fields of the continental part of the Arctic. There is a low level of interaction between vocational training institutions and oil and gas companies, the lack of practice-oriented algorithms used in the training of specialists in LNG technologies, the implementation of underwater work on the shelf in the extreme Arctic conditions, as well as other competencies necessary for professional activities in deposits of the Arctic shelf.

The agreement contains practical recommendations aimed at achieving dominance in the Arctic in the face of strategic rivalry and everyday competition.

Geopolitical and economic factor. Recent events confirm the thesis that geopolitical factors are decisive in the process of evolution of the modern architecture of the global economy. In modern conditions, geopolitical and geo-economic risks are an integral part of the activities of Russian oil and gas companies, as they affect the structure of relationships in the field of geologi-

cal exploration, field development, production of hydrocarbon raw materials, their processing, storage and transportation.

Analysis of the strategic documents of the United States [7] and its NATO allies, which determine the Arctic as the region of "growing uncertainty" [8] and strategic competition [9], defines the character of interrelations between the Arctic countries as "strategic competition" [10], and mentions the necessity of "restoring the Arctic dominance" [11] and achieving dominance in the conditions of uncertainty and strategic competition [12] , which allows to state that activities of the NATO and their satellites in the Arctic are based on opposition to the Russian presence in the Arctic region [19, Shchegolkova A.A.]. In order to limit the activities of Russia in the economic development of the Arctic, the countries of NATO and the European Union are taking steps to challenge the legal status of the NSR, to expand the military presence of the NATO bloc in the Arctic, including by joining the military alliance of the countries of the Arctic Council — Finland and Sweden, the implementation of unprecedented sanctions pressure on the Russian economy in general and on energy companies in particular. The introduction of anti-Russian sectoral sanctions led to the refusal of participation of foreign oil and gas producing and service companies in Russian projects on the Arctic shelf, despite the fact that the oil and gas sector of Russia is currently limited in its activities due to dependence on the equipment and oilfield services of countries that have become unfriendly. Sanctions restrictions are aimed at hindering Russia's activities in the development of the Arctic shelf, while Western countries have ceased to hide the fact that these measures are based on competition for energy markets.

The global gas market was influenced by the unfavorable situation caused by the political confrontation between Russia and Western countries. Export and sanctions restrictions in the first half of 2022 led to a decrease in Russian gas production by 5%. Pipeline gas supplies to non-CIS countries decreased by 38.8% (according to the results of the first three quarters of 2022), with

[7] USCG Arctic Strategic Outlook. 2019 / Department of Defensehttps. URL: https://www.uscg.mil/Portals/0/Images/arctic/Arctic_Strategic_Outlook_APR_2019.pdf (accessed 21 May 2022).
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[12] Advantage at Sea Prevailing with Integrated All-Domain Naval Power /U.S. Navy, U.S. Marine Corps, U.S. Coast Guard December 17, 2020. 29 p. URL: https://news.usni.org/2020/12/17/u-s-maritime-strategy-advantage-at-sea (accessed 21 May 2022).

the exception of natural gas supplies to China via the Power of Siberia gas pipeline (growth was over 60%).

Unprecedented sanctions pressure is forcing Russia to asymmetrically respond to geopolitical and economic threats, including the modernization of the export model of hydrocarbons, changes in the structure of supplies and approaches in the world energy markets. In the current geopolitical and economic conditions, the gas industry is faced with the following tasks: diversification of supply lines, including at the expense of the domestic market and development of gasification of the country; diversification of natural gas transportation means (further development of the LNG industry, construction of new and integration of existing gas pipelines into the Unified Gas Supply System); revision of existing sales models, modification of price mechanisms and conditions of supply.

Despite rising prices on the world market and increased income from natural gas supplies, it is not rational to increase production in the context of export restrictions, especially in the development and exploration of offshore fields. These geopolitical conditions should be taken into account when designing strategic programs for the development of offshore gas projects in the Arctic.

Ecological factor. In the process of expanding the resource and transport potential of the Arctic, developing offshore and onshore deposits, the ecosystem of the Arctic region is quite vulnerable, and therefore requires taking into account environmental risks, attention to possible emergency situations of a man-made and natural nature [20, Kokko K.T., Buanes A., Koivurova T.]. In the process of solving the problem of spatial organization of hydrocarbon resources development, it is necessary to timely assess the risk of impact and identify areas most exposed to pollution in order to effectively deploy means of responding to environmental threats [21, Lokhov A.S., Gubaidullin M.G., Korobov V.B., Tutygin A.G.]. An assessment of the investment attractiveness of a particular project for the development of offshore or onshore hydrocarbon deposits should take into account the costs of environmental protection throughout all stages of work, the prevention of environmental accidents, as well as compensation for possible damage. The Arctic shelf is the most sensitive to anthropogenic impact, requires a longer recovery time, which is exacerbated by the current lack of effective technologies for dealing with emergency situations in hydrocarbon production under difficult hydrometeorological and ice conditions.

Conclusion

1. Most of the hydrocarbon potential is offshore in the Arctic, but at the same time the degree of exploration of this strategically important region remains very low, not only in Russia, but also in other subarctic countries. According to experts, the volume of unexplored oil and gas resources of the Russian Arctic is over 90% on the Arctic shelf and about 50% on land, but, despite these limitations, the explored reserves on the Arctic shelf, according to the Ministry of Natural Resources of the Russian Federation dated January 1, 2016, amount to 585 million tons of oil and

10.4 trillion m^3 of gas in categories A+B+C1+C2. The only oil and gas project currently being implemented on the Russian Arctic shelf is an offshore ice-resistant stationary platform at the Prirazlomnaya field. The industrial development of this field began at the end of 2013, which required the development and subsequent implementation of a unique set of modern engineering and geological surveys and technical solutions, taking into account extreme natural and climatic conditions and drifting ice fields. Within the framework of the Prirazlomnoe project, all technical and technological operations are carried out: production drilling of wells using vertical and horizontal methods (Arctic Oil — ARCO oil); extraction and preparation of oil for shipment; shipment of oil to the tanker through a complex of direct shipment units; generation of heat and electricity. The timing of the implementation of other offshore projects, including the Shtokman gas condensate field, has not been determined. For coastal fields, there are options for deep drilling and development of gas resources from the coast using land-based drilling equipment.

2. As for the spatial organization of gas resources development in the Arctic region, in the foreseeable future, the achieved level of gas production (400–500 billion m^3 per year) [12] at the fields of the Arctic region will be provided and compensated through the expansion and development of satellite fields, primarily the Yamalskaya and Gydanskaya oil and gas fields (onshore), and a number of coastal fields. In the short term, the strategy for reproducing the gas potential of the Russian Arctic "will be aimed at carrying out prospecting and exploration work in order to convert the predicted resources of continental and coastal fields into industrial reserves of natural gas" [16]. In this case, the geological, technological and environmental risks of developing the oil and gas potential will be minimal compared to the Arctic shelf, and by 2040, the increase in category B+C1 by all operating companies in the Yamal OGF, Gydanskaya OGF (onshore and coastal fields) and South Kara OGF (shelf) is projected at 17.5–18 trillion m^3 [12].

3. The absence at the present stage of proven technological solutions for the development of hydrocarbons in the harsh conditions of the Arctic shelf, as well as effective methods for eliminating the environmental consequences of possible accidents during oil and gas production, hinders the development and exploitation of offshore fields, and, therefore, does not give the possibility to evaluate the level of recovery of gas resources. Proceeding from the above-mentioned, within the resource base of the Arctic offshore fields, it is necessary to single out the static (or probabilistic) potential of the hydrocarbon resources of the Arctic region, that is, the volume that can be developed only under certain conditions. The resource base of hydrocarbons, which is not included in the sector of technical availability of industrial development, should be excluded from further evaluation of strategic programs and projects for the development of gas production on the Arctic shelf.

4. The actions of NATO and EU countries require strategic decisions to reformat approaches to international cooperation in the Arctic region. The transformation of the Arctic foreign policy is based on the need to shift the vector of international energy cooperation from the European continent in the direction of mutually beneficial relations in the oil and gas sector with the BRICS

countries and promising partners of this association, despite the fact that European countries and the United States, unlike Russia, have limited geopolitical influence on these countries. In June 2022, at the last summit, the BRICS member countries expressed their interest in cooperation in the Arctic region, since the Arctic could become a promising development area for energy and new logistics routes in the future.

At the present stage, none of the Arctic states will be able to achieve the global goal of sustainable development of the Arctic independently. The expansion of multilateral cooperation with friendly countries and partners in the energy sector will not only increase the volume of oil and gas exports to these countries, but can also become an effective mechanism for solving technological, infrastructural, scientific, educational, social and environmental problems that impede development industrial production of hydrocarbons on the Arctic shelf, and will create prerequisites for the formation of a new model of sustainable development of the Arctic economic system in the format of Russia's cooperation with the BRICS countries and friendly partners.

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The article was submitted 04.08.2022; approved after reviewing 27.09.2022; accepted for publication 28.09.2022.

The author declares no conflicts of interests.

POLITICAL PROCESSES AND INSTITUTIONS

Arctic and North. 2022. No. 49. Pp. 90–106.
Original article
UDC [327+330+332](985)(045)
doi: 10.37482/issn2221-2698.2022.49.105

The Russian Arctic, Sanctions Pressure and Geopolitical Instability

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Abstract. The development of the Arctic region was strongly influenced by the international situation — on February 24, the Russian Federation launched a special military operation in Ukraine. The United States, Great Britain and the EU, as well as several international and regional organizations imposed extended sanctions restrictions against Russia in the fields of politics, economics (transport, finance, trade, defense industry, aviation) and scientific research, which had regional consequences. The article describes the factors that determine the Russian Arctic's development under the collective West sanctions pressure. The interrelation of the state policy and social and economic development of the Arctic regions of Russia during the period of general geopolitical instability is investigated. The study uses the dialectical method, as well as general logical, theoretical and empirical research methods. The study examined the measures taken by the Russian government to ensure sovereignty and economic and technological independence in the Arctic. The conditions for increasing stability in the Arctic zone are also decompounded, a number of proposals that are of the brightest and most pronounced interest for the formation of stability in the region are presented, and the established goals and motives of economic development are outlined. The authors analyzed the geopolitical conditions for the development of the Arctic region today, trying to reflect the intentions of the main Arctic players in the current situation and determine the vectors of their further political decisions. The conclusion is made that it is necessary to increase further efforts on the Arctic track, to strengthen defense and security in the Arctic region. The necessity of creating suitable conditions for the integrated economic development of the Russian Arctic is substantiated.
Keywords: *Russian Arctic, sustainable development, sanctions, geopolitical instability, international cooperation*

Introduction. Arctic policy and strategy

The Arctic has recently attracted a great deal of attention of scientists and the public. The main issues are global warming, reduction of ice cover in the Arctic Ocean, mineral resources and increasing opportunities for navigation. The Arctic is an underdeveloped space in both regional and global economies. It is a global reserve resource area with vast energy reserves. It is rich in rare earth metals, minerals, ores and other raw materials of strategic importance.

In view of these factors, international contacts at various levels have intensified, including those of the scientific community, and the role of the Arctic Council (AC, Council) [1] as a high-level

For citation: Zhuravel V.P., Timoshenko D.S. The Russian Arctic, Sanctions Pressure and Geopolitical Instability. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 105–124. DOI: 10.37482/issn2221-2698.2022.49.105
[1] The Arctic Council was formed on September 19, 1996 in Ottawa (Canada).

forum for regular intergovernmental dialogue on environmental issues, sustainable use of natural resources, cooperation in ensuring security and sustainable development of small indigenous peoples of the North has significantly increased. In addition to the founding countries ("Arctic G8": Canada, Denmark, including Greenland and the Faroe Islands, Finland, Iceland, Norway, Russia, Sweden and the United States of America), it includes 13 observer states (Great Britain, Germany, Spain, Italy, Netherlands, Poland, France, Switzerland, China, India, Republic of Korea, Japan and Singapore), a number of intergovernmental and interparliamentary organizations, including the International Council for the Exploration of the Sea (ICES), the International Federation of Red Cross Societies and Red Crescent (IFRC), International Maritime Organization (IMO), International Union for Conservation of Nature (IUCN), Nordic Council of Ministers (NCM), Nordic Environment Finance Corporation (NEFCO), North Atlantic Marine Mammal Commission (NAMMCO), OSPAR Commission, Standing Committee of Arctic Parliamentarians (SCAR), United Nations Development Program (UNDP), United Nations Environment Program (UNEP), World Meteorological Organization IA (WMO), Western Nordic Council. The composition of observers has also been expanded by non-governmental organizations: Advisory Committee for the Protection of the Seas (ACOPS), Arctic Institute of North America (AINA), Association of World Reindeer Herders (AWRH), Circumpolar Conservation Union (CCU), International Arctic Science Committee (IASC), International Arctic Social Science Association (IASSA), International Union for Circumpolar Health (IUCH), International Work Group for Indigenous Affairs (IWGIA), Northern Forum, International Ocean Protection, University of the Arctic (UArctic) , World Wildlife Fund [2].

All observer countries have their own national approaches to the exploration and development of the Arctic, justified by the territorial proximity to the Arctic through the access to the sea coast of the Arctic Ocean by any part of their land [3], national security issues, as well as financial, economic and technological opportunities for the development of the Arctic.

Norway (2006, 2011), Denmark (2011), Finland (2010, 2013, 2021), Sweden (2011) have their own strategies and are constantly improving them. Their content is reflected in sufficient detail in the publications of the journal "Arctic and North".

Among the observer countries of the Arctic Council, Germany has become increasingly active in recent years. In 2013, the German government adopted a national policy. In June 2016, France approved a national road map for the Arctic. In April 2018, the United Kingdom presented the second Arctic strategy, which addresses Arctic issues in the context of the country's exit from the European Union. Italy has not yet presented its Arctic strategy, but sees the region's attractiveness in energy, science, tourism and the development of mining infrastructure. Spain seeks to develop shipping. The Netherlands has considerable experience in off-shore hydrocarbon exploitation which could be used in the northern seas. Poland is making efforts to unite European AC ob-

[2] Arctic Council Observers. URL: https://www.arctic-council.org/about/observers/ (accessed 10 November 2022).
[3] The length of the Arctic coast is 38.7 thousand km.

server countries around itself. Switzerland is only looking at its new status, determines the interest in the AC working groups.

The Arctic European states have significantly expanded their agendas and forms of work. Observations on climate, monitoring of the natural environment and ecological systems, biodiversity, changes in the living conditions of local peoples, the state of the Arctic seas and studies of shipping possibilities in ice-covered waters are increasing. Although the European Union was not granted observer status to the Council in 2013, in April 2016 it adopted a Comprehensive Arctic Policy, and on October 13, 2021, a new Strategy was adopted that defines priorities, goals and objectives of the European Union in the Arctic macro-region [4]. The document demonstrates the EU's rapidly growing ambitions in the Arctic and its desire to become one of the leading players in the northern latitudes, countering the increasing role of the Russian Federation in the Arctic. The European Parliament makes a significant contribution to the consideration and development of policy in the Arctic.

On October 7, 2022, the White House released a new US Arctic strategy up to 2032, entitled the National Strategy for the Arctic Region [5]. It is emphasized that it is intended to serve as the basis for the leadership of the United States government to address emerging problems and threats in the Arctic. In reality, it is aimed at strengthening positions in the region, obtaining direct access to the NSR. One more notable event was at the beginning of August 2022 — the bill on the Arctic, introduced by the American Republican Senator from Alaska Lisa Murkowski (Arctic Bill, Bill), which literally says that "the term "Arctic countries" does not apply to the Russian Federation", and "Arctic organizations of indigenous peoples" do not include the Association of Indigenous Peoples of the North, Siberia and the Far East of the Russian Federation" [6]. The bill is filled with elements of the "cancellation" of Russia as an Arctic power, the intention is to eliminate the "Russian monopoly on Arctic shipping" [1, Timoshenko D.S.].

Canada's Northern Strategy: Our North, Our Legacy, Our Future (2009) outlines the key messages for Canadian sovereignty in the Arctic.

China, India, Japan, the Republic of Korea and Singapore (with observer status at the AC since 2013) have a significant influence on the Arctic policy of the European countries. Of the above, only China has its own Arctic strategy — the White Paper (published by the Press Office of the State Council of the PRC in January 2018). On March 17, 2022, India's Arctic Policy was released, the pillars of which are "science and research, climate and environmental protection, economic and human development cooperation, transport and communication, governance and in-

[4] Joint communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A stronger EU engagement for a peaceful, sustainable and prosperous Arctic URL: https://eeas.europa.eu/sites/default/files/2_en_act_part1_v7.pdf (accessed 26 October 2021).

[5] National Strategy for the Arctic Region. 2022. URL: https://www.whitehouse.gov/wp-content/uploads/2022/10/National-Strategy-for-the-Arctic-Region.pdf (accessed 25 October 2022).

[6] Murkowski Introduces Comprehensive Arctic Bill. Senate. 03.08.2022. URL: https://www.murkowski.senate.gov/download/arctic-commitment-act (accessed 08 August 2022).

ternational cooperation and building up national potential" [7]. Seoul's strategy in the Arctic is aimed at attracting a wide range of management, research and business structures to the implementation of projects. Japan is interested in the possibility of using the NSR, conducting scientific research of the Arctic seas. Singapore positions itself in the Arctic as one of the world's leading maritime powers. Having analyzed and compared positions we can conclude that Asian countries are becoming serious competitors to Europeans in the development of the Arctic.

It should be noted that for 25 years, the states of the Arctic Council have sought to work in a cooperative and collaborative manner, consistently improving the international legal framework for Arctic activities and their national Arctic policies. Its authority is evidenced by the fact that a group of scientists from 20 countries proposed in 2018 to nominate the Council for the Nobel Peace Prize.

In May 2021, the chairmanship of the AC passed from Iceland to Russia. In accordance with the program, the Russian Federation successfully developed cooperation with the countries participating in the intergovernmental forum in four priority areas that are closely interconnected:

- population of the Arctic, including the indigenous peoples of the North;
- protection of the Arctic environment, including climate change;
- socio-economic development of the region;
- strengthening the AC role as the main platform for multilateral cooperation in high latitudes.

In addition to the program, Chairman of the Government of the Russian Federation M.V. Mishustin on April 30, 2021, approved the plan, which included 116 major events in 11 areas [8]. All this created a good basis for the Russian chairmanship of the AC.

Sanctions policy towards Russia in the Arctic

Western sanctions against Russia are not a new phenomenon. In the mid-2010s, a number of restrictions emerged in the activities of the states in the Arctic, due to the sanctions regime of the US and EU countries against Russia. They have a negative impact not only on maintaining stability in the region, but have also led to the curtailment of a number of promising economic projects. This especially intensified after the start of Russia's Special Military Operation in Ukraine (SMO).

In March 2022, a non-parity "seven plus one" trend began to emerge in the Arctic Council: Canada, the United States, Norway, Sweden, Finland, Denmark and Iceland refused to take part in all meetings held under the chairmanship of the Russian Federation and on its territory. On June 8, it was decided to resume the activities of the AC in a limited format: without the participation of

[7] Ministry of Earth Sciences (MoES), India. India's Arctic Policy: Building a partnership for sustainable development, March 17, 2022. URL: https://www.moes.gov.in/sites/default/files/2022-03/compressed-SINGLE-PAGE-ENGLISH.pdf (accessed 18 July 2022).
[8] Plan of main events of Russia's chairmanship of the AU 2021–2023 April 30, 2021, No. 4161p-P2.

Russia. Russia, as the leading Arctic power, continued its chairmanship. The refusal of the mentioned countries to take part in meetings and events under the Russian chairmanship and subsequent events increased the uncertainty regarding the plans for the Arctic development, upset the balance of Arctic solidarity, which was formed and consistently strengthened during the AC chairmanship of the countries. The Arctic ceases to be a territory of political stability and successful development of multilateral international cooperation.

Some large European and Asian energy companies reacted to the events in Ukraine in February 2022 by withdrawing from Arctic projects. These include the Norwegian Equinor, the Anglo-Dutch British Petroleum, the French Total. Japanese companies have frozen new investments in the Arctic LNG-2. The European Commission imposed sanctions on the Kolarctic program. On March 9, members of the Barents Euro-Arctic Council announced the suspension of cooperation with Russia. The British Petroleum, the Indian State Corporation of Crude Oil and Natural Gas and the Singaporean company Trafigura revised their plans to invest in the Vostok Oil project of PJSC Rosneft in Taimyr [1, Timoshenko D.S.; 2, Zhuravel V.P.]. Scientific cooperation with the International Council for Science and the International Arctic Science Committee has also been terminated. The activities of the Russian Federation in the Barents Euro-Arctic Council and the Nordic Council of Ministers have been suspended.

In the context of the need to maintain the sustainable development of the Arctic region, Russia is now facing the primary task of activating domestic economic capacities.

It should be noted that the measures taken against Russia will have a negative impact on the AC states. The Arctic region is becoming the object of controversy between individual countries or their groups on a number of important issues. The problems of ecological, economic, technological, transport and military security were added to the territorial claims. In the medium and long term, international risks in the Arctic may increase if confrontation persists in Russia's relations with the West. Russia should use this temporary pause in the full-scale functioning of the Council to analyze the situation in the Arctic and work out specific steps to ensure national interests, improve the welfare of residents, and strengthen security in the northern direction.

The entry of Finland and Sweden into NATO greatly complicated the situation in the Arctic region. The capabilities of the Alliance in the region have expanded significantly, which poses a real threat to Russia in the Arctic [1, Timoshenko D.S.]. For example, tensions have arisen with Norway against the backdrop of sanctions pressure, including on the issue of Spitsbergen. In June 2022, Oslo blocked a cargo sent to the Russian settlement in Barentsburg for the Arktikugol trust. The conflict was resolved thanks to the efforts of the Russian Foreign Ministry and the position of Norway, which, adhering to the provisions of the Spitsbergen Treaty of 1920, itself proposed ways to circumvent EU sanctions. However, as early as 11 October 2022, the situation worsened when Norway continued to boycott the activities of the Russian tour operator Grumant, part of the Arktikugol trust.

Ensuring the Russian presence in the Spitsbergen archipelago is one of the main tasks of Russia's state policy in the Arctic. The Russian Federation has long-term plans for strengthening, diversifying and modernizing economic and scientific activities in the archipelago (coal mining in limited volumes (for its own needs), fishing, improving the infrastructure of Barentsburg, conducting comprehensive research on mineral exploration and climate change). The development of tourism will create favorable conditions for further socio-economic development [3, Timoshenko D.S.], and will also contribute to the justification of Russia's economic presence in the archipelago.

The sanctions policy has consequences of both negative and positive nature in matters of a social and economic nature and the general situation in the country. It is impossible to ignore the rapid growth of domestic industrial production, the efficiency in the formation of the necessary legal framework, the colossal support of certain sectors of the economy by the state for the purpose of import substitution. However, the rapid outflow of citizens and highly qualified specialists from Russia generates various problems [4, Potravnaya S.V., Tishkov E.V.]. The manufacturing sector requires the immediate replacement of mobilized citizens who left for a special operation, as well as specialists who emigrated abroad, with new personnel, which in the current realities is associated with certain difficulties. As of the end of August 2022, personal transfers from Russia since the beginning of SMO amounted to $14 billion. According to the BCS Global Markets report, the total amount of capital outflow from Russia by the end of 2022 may exceed $200 billion [9]. In the third quarter, 9.7 million citizens left Russia, which is almost twice as many as in the second quarter (5 million) [10]. According to Rosstat, the resident population of Russia as of August 1, 2022 amounted to 145.1 million people. Since the beginning of the year, the population has decreased by 475.500 people, or 0.32%, for the same period in 2021, the decrease was 351.500 people, or 0.24%. At the same time, in the period from January to July, the natural decline in the country's population amounted to 401.600 people, migration outflow — 73.900 people [11]. According to demographers' forecasts, the decline in the birth rate in Russia could be 12-15% [12].

The problems of declining birth rates, population aging and depletion of migration flows are also exacerbated by the sanctions policy. However, the listed factors of the socio-economic development of Russia and the Arctic regions in particular require a separate study and should be

[9] Iz Rossii vyveli za rubezh 11% VVP v 2022 godu [11% of GDP was transferred from Russia abroad in 2022]. URL: https://pravo.ru/news/242610/ (accessed 26 August 2022).
[10] FSB raskryla dannye po vyezdu rossiyan za granitsu s iyulya po sentyabr' [FSB disclosed data on the departure of Russians abroad from July to September]. URL: https://www.kommersant.ru/doc/5651512 (accessed 06 November 2022).
[11] Proekt «Esli byt' tochnym» sprognoziroval vozmozhnoe sokrashchenie chislennosti naseleniya [The project "To be precise" predicted a possible decline in the population]. URL: https://www.vedomosti.ru/society/articles/2022/11/03/948693-rossiya-opustilas-na-devyatoe-mesto (accessed 03 November 2022).
[12] Demograf Aleksey Raksha: «Chislo rodivshikhsya cherez 1,5 goda umen'shitsya na 12-15%» [Demographer Alexey Raksha: "The number of births in 1.5 years will decrease by 12-15%"]. URL: https://newizv.ru/interview/31-10-2022/demograf-aleksey-raksha-chislo-rodivshihsya-cherez-1-5-goda-umenshitsya-na-12-15 (accessed 09 November 2022).

carried out in correlation with the recent adoption of a number of political decisions that stimulate support for the development of the family institution, social measures to support the population, as well as the entry of four new subjects into the Russian Federation.

Representatives of the scientific community need to analyze the processes taking place in the Arctic in real time, to propose additional steps to ensure Russian interests in the region.

Responses to Western sanctions

Russia was preparing for possible Western sanctions. Since 2020, a lot has been done for the development and exploration of the Arctic. A legislative framework has been created to increase the investment attractiveness of the Russian Arctic, the Fundamentals of the state policy of the Russian Federation in the Arctic, the Strategy for the development of the Arctic Zone of the Russian Federation and ensuring its national security for the period up to 2035, six federal laws, 40 normative acts have been developed and adopted.

These decisions were supported by more than 15 billion rubles from the federal budget to finance Arctic projects in the period 2021–2024. While maintaining the continuity of the AC agenda, the Russian Federation has introduced a lot of new things. An innovative step was the creation in 2021–2024 international Arctic station "Snezhinka" — a scientific and educational platform based on renewable energy sources. The first 8 months of the chairmanship were successful and efficient.

Measures were taken in time to refine the program and plan of Russia's chairmanship of the Arctic Council (2021–2023), according to which about 50 events were scheduled for 2022 alone. A number of conferences, forums, festivals were canceled, the number of participants was reduced, financing was cut. More attention was paid to the Russian northern territories.

In order to understand the direction and consequences of sanctions against the Russian Federation, to develop the necessary decisions in a timely manner, the President of the Russian Federation V.V. Putin held an expanded meeting involving a wide range of participants on April 13, 2022. Speaking about the development of the Russian Arctic zone, he noted: "Now, taking into account various external restrictions and sanctions pressure, we need to pay special attention to all projects and plans related to the Arctic: not to postpone them, not to shift them, but on the contrary, we must respond to attempts to restrain our development by increasing the pace of work both on current and long-term tasks as much as possible" [13].

According to the Head of State, in the conditions of sanctions, the most important issues in the Arctic region of Russia are to solve the problems of social sphere of the residents of Arctic territories and shift workers; complex modernization of infrastructure, energy, residential and social facilities in the Murmansk Oblast; implementation of priority investment projects; increase of oil, gas, coal consumption in the domestic market, promotion of deep processing of raw materials,

[13] Meeting on the development of the Arctic zone. President of Russia. URL: http://www.kremlin.ru/events/president/news/68188 (accessed 18 April 2022).

increase of energy supplies to other regions that need them; activation and completion of the construction of the Northern Latitudinal Railway; development of the NSR; construction and maintenance of an emergency rescue fleet and integrated emergency rescue centers of the EMERCOM of Russia; active involvement in cooperation in the Arctic of non-regional states and associations, primarily Asian countries [14].

These areas have become priorities for ministries, departments and the Arctic regions throughout 2022.

The central issue was the growth of Arctic shipping, increasing freight transit and improving the efficiency of export logistics routes. The Chairman of the Government of the Russian Federation M.V. Mishustin approved a plan for the development of the NSR up to 2035 (Decree No. 2115-r dated August 1, 2022). It is planned to allocate 1.8 trillion rubles from various sources for its implementation. The document includes about 150 measures. In particular, this is the development of transport hubs in Murmansk and Arkhangelsk, the construction of bunkering and maintenance bases in the ports of Tiksi and Dikson, the Utrenny liquefied natural gas and gas condensate terminal, the Sever Bay oil loading terminal, and a marine terminal designed to service infrastructure for the development of the Pavlovskoe lead-zinc deposit on the Novaya Zemlya archipelago, the creation of a marine transshipment complex for liquefied natural gas in the Kamchatka Krai and on the Kola Peninsula. It is planned to build an emergency rescue fleet of 46 vessels, to equip the Arctic integrated emergency rescue centers of the Ministry of Emergency Situations with helicopters. An Arctic satellite constellation will also be created, on which the hydrometeorological and navigational support of shipping, as well as the assessment of climate change in high latitudes, depend. More than 150 billion rubles are expected to be spent on the development of spacecraft for safe navigation on the NSR. By 2030, six radar satellites for remote sensing of the Earth should be launched into orbit: two Obzor-R and four Kondor-FKA [15].

The issue of building ice-class transport vessels is being addressed separately. Russia plans to build 153 vessels for the Arctic fleet, including 12 icebreakers. In general, 32 ice-class transport vessels are being built today to implement Arctic investment projects. Of these, 25 are at Russian shipyards and 7 are at Korean ones. Nuclear-powered icebreakers are manufactured by Baltiyskiy Zavod. Two icebreakers of the “22220” project, “Arktika” and “Sibir”, with a capacity of 60 MW, are already working on the Northern Sea Route, 3 more ships of this project (Ural, Yakutia and Chukotka) are under construction. The planned dates for their commissioning and delivery: the first vessel – the end of 2022, others – this year, 2024, 2026 and 2027. The Zvezda shipyard in the Far East is also building a unique 120 MW icebreaker “Lider”. So far, this is the so-called first-in-

[14] Ibid.
[15] V razvitie Severnogo morskogo puti vlozhat 1,8 trilliona rubley [1.8 trillion rubles will be invested in the development of the Northern Sea Route]. URL: https://rg.ru/2022/08/16/reg-szfo/v-razvitie-severnogo-morskogo-puti-vlozhat-18-trilliona-rublej.html (accessed 18 September 2022).

class ship, but an order for 2 more is expected. In other words, this unique project will also be put into mass production [16].

As for the construction of nuclear-powered icebreakers, 90% technological supremacy has been achieved. Taking into account the disposal of three icebreakers in the short term due to the depletion of the resource, it is planned to build six more icebreakers by 2030. Four of them will be financed from extrabudgetary funds, and two nuclear-powered icebreakers and a recharging ship — from the budget [17].

This contributed to the growth of cargo traffic along the Northern Sea Route. In 2016, the volume of traffic was 7.5 million tons [5, Lukin Yu.F.], in 2017, 10.7 million tons were transported [18], in 2018, 19.689 million tons [19], in 2019, the volume of traffic cargo amounted to 30 million tons against the target of 26 million tons [20], in 2020 – 32.9 million tons. According to the Deputy Prime Minister of the Russian Federation A.V. Novak, "in 2021, cargo traffic amounted to 35 million tons, which is 2 million tons higher than the plan, plus 6%. This year, as of July, we are still growing by 5%" [21].

As part of execution of the Presidential instruction and decision of the government, the Federal State Budgetary Institution "Main Directorate of the Northern Sea Route" was created within the control loop of the State Corporation Rosatom, which is responsible for managing navigation along the NSR [22]. This will ensure the safety of navigation along the routes of the Northern Sea Route, the stable delivery of goods within the framework of the northern delivery, and will additionally attract new cargo carriers to the Northern Sea Route as part of transit. These activities include issuing and withdrawing permits for these operations. It includes the Maritime Operations Headquarters.

Transit cargo transportation has tripled over the past two years; the number of voyages along the NSR doubled and reached 1627 ones [23]. However, Deputy Director of the Directorate of

[16] Do 2030 plan postroit' 1,5 tysyach sudov. Viktor Evtukhov o sudostroenii v RF [The plan up to 2030 is to build 1.5 thousand ships. Victor Evtukhov about shipbuilding in Russia]. URL: https://aif.ru/money/economy/do_2030_plan_postroit_1_5_tysyach_sudov_viktor_evtuhov_o_sudostroenii_v_rf (accessed 15 October 2022).

[17] Operational meeting with vice-premiers. URL: http://government.ru/news/46150/#pp1348 (accessed 10 October 2022).

[18] Summing up the activities of the NSR Administration for 2017. NSR administration website. URL: http://www.nsra.ru/ru/glavnaya/novosti/n19.html (accessed 15 October 2018).

[19] Savosin D. Ob"em perevozok po SMP v 2018 g. uvelichilsya v 2 raza [Savosin D. The volume of traffic along the NSR in 2018 increased by 2 times]. URL: https://neftegaz.ru/news/view/179802-Obem-perevozok-po-SMP-v-2018-g.-uvelichilsya-v-2-raza (accessed 04 March 2019).

[20] Ob"em perevozok gruzov po Sevmorputi dostig 30 mln tonn [The volume of cargo transportation along the Northern Sea Route reached 30 million tons]. URL: https://sudostroenie.info/novosti/29125.html (accessed 15 January 2020).

[21] Operational meeting with vice-premiers. URL: http://government.ru/news/46150/#pp1348 (accessed 10 October 2022).

[22] Rasporyazhenie Pravitel'stva RF ot 23 iyulya 2022 goda №2019-r [Decree of the Government of the Russian Federation of July 23, 2022 No. 2019-r].

[23] Operational meeting with vice-premiers. URL: http://government.ru/news/46150/#pp1348 (accessed 10 October 2022).

the Northern Sea Route of the State Corporation Rosatom M.V. Kulinko said at the round table "Transport and transit potential of the Arctic" that international transit traffic along the Northern Sea Route in 2022 is not expected. In 2021, the volume of transportation within the framework of international transit amounted to 2 million tons, while the planned figure was up to 1.5 million tons [24]. Experts do not exclude that by 2030 its volumes passing through the Northern Sea Route may grow to 20–30 million tons. It is assumed that most of the transit will be container traffic. This means that it is necessary to build transport and logistics hubs along the NSR route, which will allow carrier companies to change ships and reload containers. Under these conditions, ice-class containerships Arc6 and Arc7 will be needed, which have yet to be created [25]. China, the Netherlands, Cyprus, Liberia and Portugal are the biggest carriers on the NSR.

The leading officials of the government of the Russian Federation, the Ministry for the development of the Far East, Rosatom, probably, should stop reporting to the President of the Russian Federation that 80 million tons will be transported along the Northern Sea Route in 2024, since currently Russia does not have an appropriate cargo base. The reason for this was the pandemic, sanctions against the Russian Federation, the weakening of the capacities of a number of domestic companies.

It is hardly worth expecting a significant increase in transit traffic along the NSR in the near future, although such a potential certainly exists. In the short and medium term, the Northern Sea Route will solve Russia's domestic economic problems. It is primarily about exporting extracted natural resources and transferring them to the markets. A number of oil and gas production projects, which are key to the formation of the NSR cargo base, may be shifted due to the termination of imported equipment deliveries.

Russia has taken significant steps in Arctic exploration in 2022. The scientific and educational expedition "Arctic Floating University - 2022: The Changing Arctic" on the research vessel "Professor Molchanov" was successfully completed for the 10th time. The Center for Arctic Studies of the Institute of Europe Russian Academy of Sciences (IE RAS), on the basis of the Agreement between the IE RAS and the Northern Arctic Federal University, constantly takes the results of these expeditions into account in its scientific work and publishes analytical articles on the most topical issues of Arctic development in the journal "Arctic and North". The construction of the ice self-propelled platform "North Pole" was completed on time, and from October 2022, a wide range of research in the Arctic was carried out on its basis. No other country in the world has such a scientific base, which once again confirms the importance of Russia as the leading Arctic nation in the world.

[24] V direktsii Sevmorputi ob"yasnili otsutstvie zayavok na mezhdunarodnyy transit [The Directorate of the Northern Sea Route explained the lack of applications for international transit]. URL: https://rossaprimavera.ru/news/505418f0 (accessed 18 October 2022).
[25] Dlya razvitiya Sevmorputi budet sozdan moshchnyy transportnyy flot [A powerful transport fleet will be created for the development of the Northern Sea Route]. URL: https://rg.ru/2022/09/13/gaz-vozmut-na-bort.html (accessed 18 September 2022).

Russia's situation will require very hard work to develop high latitudes, to protect the sovereignty of the state both at the national and regional levels. One of the steps to protect national interests in the ecological direction was the decision of the Government of Chukotka to refuse further cooperation with the Russian branch of the international public organization World Wildlife Fund (WWF Russia). The regional authorities terminated the agreement unilaterally, citing the fact that projects to create a 12-mile buffer zone to protect whales, as well as "bear patrols" (measures to monitor the movement of polar bears) are not in the national interest of Russia, and will prevent indigenous minorities from traditional fishing activities and jeopardize the security of the Russian Arctic.

Defense and security issues. Russia's response

The actions of states to build up their economic and military presence in the Arctic required Russia to take adequate measures aimed at maintaining parity and creating favorable conditions for protecting national interests.

Measures are being taken to improve the composition and structure of the Armed Forces of the Russian Federation, other troops, military formations and bodies in the Arctic zone, to equip them with modern weapons, military and special equipment adapted to Arctic conditions [26]. In this direction, the modernization of new submarine bases, the construction of airfields, military camps for newly formed military units and weapons storage depots continues. Submarines of the Borey-A project, modern S-400 Triumph air defense systems, crews of radio engineering units and aviation guidance points are successfully fulfilling their tasks. Measures are constantly being taken to coordinate the actions of the troops, to create a new, more advanced infrastructure in the regions of the Far North.

Only in September 2022, the ships of the Arctic grouping of the Northern Fleet "Admiral Levchenko" and "Alexander Otrakovskiy", together with the tactical group stationed on Kotelniy Island of the New Siberian Islands archipelago in the Laptev Sea, worked out the defense of the borders of the Arctic [27]. Nuclear submarines and the Bastion coastal missile system of the Pacific Fleet during the Umka-2022 integrated Arctic expedition conducted launches of Granit and Onyx cruise missiles at a sea target at high latitudes. The missiles at the set time hit a complex sea target, imitating a squad of enemy warships at a distance of over four hundred kilometers [28].

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[26] Ukaz Prezidenta RF ot 26 oktyabrya 2020 g. N 645 «O Strategii razvitiya Arkticheskoy zony Rossiyskoy Fede-ratsii i obespecheniya natsional'noy bezopasnosti na period do 2035 goda» [Decree of the President of the Russian Federation of October 26, 2020 N 645 " Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035"].

[27] Korabli SF otrabotali oboronu rubezhey Arktiki v ramkakh ucheniy v more Laptevykh [The ships of the Northern Fleet worked out the defense of the borders of the Arctic as part of exercises in the Laptev Sea]. URL: https://www.osnmedia.ru/obshhestvo/korabli-sf-otrabotali-oboronu-rubezhej-arktiki-v-ramkah-uchenij-v-more-laptevyh/ (accessed 19 September 2022).

[28] APL «Omsk» i «Novosibirsk» v Chukotskom more vypustili rakety po korablyam «protivnika» [Nuclear submarines "Omsk" and "Novosibirsk" in the Chukchi Sea fired missiles at the ships of the "enemy"]. URL: https://tass.ru/armiya-i-opk/15771197 (accessed 20 September 2022).

Important tasks to counter terrorism and illegal migration in the Arctic are solved by the Border Guard Service of the Federal Security Service, the Ministry of Internal Affairs, the Ministry of Emergency Situations and the Russian Guard [6, Kholikov I.V., Kupriyanovich M.S.].

The activities of the Russian Coast Guard to protect and guard the state border of the Russian Federation, the length of which is about 20 thousand km, have been successfully implemented. Under the sanctions pressure, the tasks of monitoring the surface of the waters of the Arctic seas, especially in the areas of Russian industrial activity and the fishing zone of the Spitsbergen archipelago, have become topical. Attention has increased to ensuring the safety of maritime transport along the NSR [7, Kudinov N.N.].

Taking into account changes in the leadership of the Russian Ministry of Emergency Situations, attention has increased to accelerating the construction of the missing Arctic Integrated Rescue Centers. According to the Head of the ministry Alexander Kurenkov, in the coming years, it is planned to equip such centers in Sabetta, Dixon, Tiksi and Pevek [29] in addition to the existing ones in order to increase the level of protection of the population and territories of the AZRF by improving the monitoring system, increasing the efficiency of actions during search-and-rescue, emergency-rescue and other urgent works.

During SPIEF-2022, it was noted that about 35.000 specialists work in the Russian Arctic regions as part of EMERCOM units. To increase the efficiency of work, the department regularly conducts exercises of the forces of the Ministry of Emergency Situations in the Arctic. In April 2023, the Safe Arctic 2023 interdepartmental experimental research exercises will be held in nine northern regions of the country. The main site for testing the practical actions of the exercises will be the village of Sabetta, including the liquefied natural gas plant and the seaport [30].

In the next few years, the aviation of the Ministry of Emergency Situations will include 14 helicopters, nine of which are designed specifically for operation in high latitudes (Mi-8AMTSh-VA (Arctic). More than 100 pilots will be trained for polar flights [31].

The bodies of the Ministry of Internal Affairs in the Arctic zone have intensified their activities to protect the life, health, rights and freedoms of citizens of the Russian Federation, foreign citizens, stateless persons, directing their main efforts to combat crime, protect public order, property and ensure public safety [8, Gavrilov O.Yu.; 9, Shakhmaev M.M., Dombrovskiy A.A., Rustamov R.A.]. Particular attention is paid to the issues of migration, drug trafficking, weapons, road safety. They focus on countering the illegal extraction of bioresources, ensuring public order in regional cities, ports, airports, fuel and energy facilities, fishing artels, oil and gas production

[29] MChS otkroet v Arktike eshche chetyre spasatel'nykh tsentra [The Ministry of Emergency Situations will open four more rescue centers in the Arctic]. URL: https://tass.ru/obschestvo/16109103 (accessed 25 October 2022).
[30] MChS v 2023 godu provedet issledovatel'skie ucheniya v Arktike [The Ministry of Emergency Situations will conduct research exercises in the Arctic in 2023]. URL: https://tass.ru/obschestvo/16096129 (accessed 29 October 2022).
[31] MChS poluchit vertolety Mi-8AMTSh-VA dlya poletov v Arktike [The Ministry of Emergency Situations will receive Mi-8AMTSh-VA helicopters for flights in the Arctic]. URL: https://ria.ru/20211209/vertolety-1762859888.html (accessed 19 October 2022).

sites, the development of solid minerals, and the compact living of communities of indigenous peoples of the North.

At the same time, it should be recognized that the bodies of the Ministry of Internal Affairs in the Arctic zone, in comparison with other regions of the Russian Federation, are understaffed, their infrastructure is sometimes outdated and needs to be updated and improved. Given the difficult climatic conditions and long distances, a new model of traffic management, cooperation and interaction with local public organizations based on information technology is required.

Big tasks in the Arctic are being solved by the recently created Federal Service of the National Guard Troops of the Russian Federation (Rosgvardiya) [32]. At present, the department's private security units are guarding 9 seaports of the NSR, 3 nuclear power facilities classified as important state facilities, 7 ships with nuclear power plants (including the nuclear icebreakers Yamal, 50 Years of Victory, Taimyr, Vaigach, the universal nuclear icebreaker of project 22220 Arktika, Sevmorput, as well as the floating nuclear thermal power plant Akademik Lomonosov, located in the port of Pevek in the Chukotka Autonomous Okrug) [10, Kornilenko A.V.]. It should be noted that due to the planned commissioning of new nuclear-powered icebreakers, the development of seaport infrastructure and maritime shipping lanes in the NSR, as well as the growth of conflict potential in the Arctic, the organizational and staff structure of the units (parts) will need to be strengthened by 2024.

Recently, a number of major exercises have taken place in the Rosgvardia. Thus, in March and April 2021, they were held under the title "Actions of special forces units of the National Guard of the Russian Federation in the Arctic zone in the event of a complication of the situation in peacetime at high-risk facilities" in the international port of Dudinka, located at the 69th latitude in mouth of the Yenisei. They practiced the release of hostages and a container ship with a load of explosives on board, which were captured by an organized criminal group. The successful actions of the military and police special forces were observed by the Commander-in-Chief of the Russian Guard, General of the Army V.V. Zolotov. In total, the special forces group covered 1500 km in the most severe conditions of the Far North [33].

In our opinion, the activities of the Ministry of Internal Affairs and the Russian Guard in the Arctic require deep analytical support and the necessary financial support.

The strengthening of the Russian presence in the Arctic region is due to the efforts of the United States and its allies to challenge the legal rights of Russia in the Arctic. Over the past two

[32] Ukaz Prezidenta RF ot 05.04.2016 № 157 «Voprosy Federal'noy sluzhby voysk natsional'noy gvardii Rossiyskoy Federatsii» // Sobranie zakonodatel'stva RF, 11.04.2016, № 15, st. 2072; Federal'nyy zakon ot 03.07.2016 g. № 226-FZ «O voyskakh natsional'noy gvardii Rossiyskoy Federatsii» [Decree of the President of the Russian Federation of 04/05/2016 No. 157 "Issues of the Federal Service of the National Guard Troops of the Russian Federation" // Collection of Legislation of the Russian Federation, 04/11/2016, No. 15, art. 2072; Federal Law No. 226-FZ of July 3, 2016 "On the National Guard Troops of the Russian Federation"].

[33] V Arktike startovali masshtabnye ucheniya spetsnaza Rosgvardii [Large-scale exercises of the special forces of the Russian Guard started in the Arctic]. URL: https://www.1tv.ru/news/2021-04-02/404210-v_arktike_startovali_masshtabnye_ucheniya_spetsnaza_rosgvardii (accessed 18 October 2021).

years, the Arctic strategies of the Department of Defense, the Army, the Air Force and the Navy have been adopted in the United States. According to the Deputy Secretary of the Security Council of the Russian Federation M.M. Popov, "The United States in the Arctic is expanding its military presence by deploying US GM destroyers in the Barents Sea, building three new heavy icebreakers by 2027 and establishing new naval facilities and naval bases" [34]. This course is confirmed by the three-week exercises COLD RESPONSE 2022 held in Norway in March 2022 with the participation of more than 30 thousand military personnel from 27 countries, 50 ships and 220 aircraft.

The military infrastructure in the region is being improved, stockpiles of weapons, military equipment and materiel are being created, and measures for the transfer of military personnel are being worked out. Commander of the Northern Fleet Alexander Moiseev on December 2, 2021 gave a generalized description of the infrastructure and aggressiveness of NATO in the region. He noted: "At the moment, there are up to 50 military infrastructure facilities of foreign states in the Arctic, such as the United States, Canada, Denmark, Norway, Iceland... These countries have 22 airfields, 23 naval bases, and 4 nuclear warning radar stations. Up to 19 thousand military personnel are permanently stationed at these facilities... The US and NATO navies continue the practice of carrying out regular single and group cruises of combat surface ships in the Barents Sea. The duration of the presence of US submarines and surface ships in the Barents Sea and Norwegian Sea is increasing. In 2021 alone, despite the ongoing difficult epidemiological situation, 20 operational and combat training events were held in the region for the national and joint armed forces of the NATO member countries. Moreover, over the past three years, there has been a steady increase in the intensity of combat training activities in the Arctic by the US Air Force strategic bomber aviation. While in 2016–2018, US strategic bomber flights over the waters of the Barents and Norwegian Seas were isolated events, in 2019–2021, flights were carried out systematically with increasing intensity — from 7 (17 aircraft) in 2019 to 10 (28 aircraft) sorties in 2021" [35]. However, it was emphasized that Russia is inferior to NATO in terms of the number of military facilities in the Arctic.

In 2022, the authorities of the United States of America formed a new 11th airborne division in the state of Alaska called the Arctic Angels. Reinforced by helicopter and artillery brigades, as well as parts of logistics, its total number reached about 12 thousand people [36].

[34] O tom, kto razzhigaet pozhar voyny i udastsya li sokhranit' khrupkiy mir, v interv'yu «Rossiyskoy gazete» rasskazal zamestitel' Sekretarya Soveta bezopasnosti Rossii Mikhail Popov [Mikhail Popov, Deputy Secretary of the Security Council of Russia, spoke in an interview with Rossiyskaya Gazeta about who is kindling the fire of war and whether it will be possible to maintain a fragile peace]. URL: http://www.scrf.gov.ru/news/allnews/3188/ (accessed 09 April 2022).

[35] Admiral rasskazal o provokatsionnoy deyatel'nosti SShA v Arktike [The admiral spoke about the provocative activities of the United States in the Arctic]. URL: https://www.mk.ru/politics/2021/12/03/admiral-rasskazal-o-provokacionnoy-deyatelnosti-ssha-v-arktike.html/ (accessed 28 December 2021).

[36] Army Forms 11th Airborne Division Amid Focus on Arctic Warfare. Military Daily News. 06. 06.2022. URL: https://www.military.com/daily-news/2022/06/06/army-forms-11th-airborne-division-amid-focus-arctic-warfare.html (accessed 17 June 2022).

According to the Chairman of the Committee of Senior Officials of the Arctic Council N.V. Korchunov, Russia cannot but be concerned about a significant increase in NATO activity in the Arctic, including non-regional member countries of the alliance, such as the UK. NATO, as a pretext for increasing the presence of the Alliance in high latitudes, even uses Russia's economic cooperation with non-Arctic countries in the region (China), which is positioned by members of the bloc as a threat to its security. Such a trend, in the absence of a dialogue involving all the Arctic states, naturally increases the degree of conflict and can provoke military incidents in the region [37].

At the opening of the X Moscow Conference on International Security (August 16, 2022), Russian Defense Minister General of the Army S.K. Shoigu, analyzing the situation on the European continent, noted: "Of course, the official participation of Helsinki and Stockholm in the strategic planning of NATO, the possible provision of the territory of these states for the deployment of strike weapons will change the security conditions in the Baltic region and the Arctic, will require a revision of approaches to defense Russian territory. Separate conclusions have already been made and enshrined in the updated Naval Doctrine, approved by the President of the Russian Federation on July 31. Work in this direction will be continued" [38]. Thus, the United States sets the task of gaining a leading position in the region in the new strategy. It notes that Russia has greatly increased its presence in the Arctic over the past ten years, having also modernized its military equipment. The United States accuses China of building up its potential in the Arctic zone through investments in scientific projects related to the Arctic [11, Slobodchikova S.N., Abramovich M.M.]. At the same time, US Secretary of State Anthony Blinken, speaking about the new US national strategy for development in the Arctic, noted that the United States will carry out the presence of the government in the Arctic region as necessary to protect the American people and protect its sovereign territory [12, Raikov Yu.A.].

Conclusion

Russia, under sanctions from the United States and the European Union, should take all possible measures to protect its people and territory, strengthen the Arctic borders, science, economy and education, as well as intensify its work in the information space.

Establishment and development of new international platforms in the Arctic without the participation of Russia (for example, the Nordic Plus) will only lead to the stagnation of regional integration processes. Based on such steps by the West, it is possible to predict a change in the role of the Arctic Council in the short term in the following areas: reducing the role of the institution of chairmanship, retaining its nominal role; politicization of the Council's activities, exposure

[37] MID RF: NATO mozhet sprovotsirovat' voennye intsidenty v Arktike [Russian Foreign Ministry: NATO can provoke military incidents in the Arctic]. URL: https://tass.ru/interviews/15932579 (accessed 12 October 2022).
[38] Na otkrytii X Moskovskoy konferentsii po mezhdunarodnoy bezopasnosti s privetstvennym slovom vystupil Ministr oborony Rossii [At the opening of the 10th Moscow Conference on International Security, the Minister of Defense of Russia made a welcoming speech]. URL: https://function.mil.ru/news_page/country/more.htm?id=12433677 (accessed 18 August 2022).

to geopolitical tensions; a decrease in the activity of non-governmental cooperation on most tracks. However, scientific regional cooperation can be maintained regardless of the political agenda.

Russia views the Arctic not as a field of geopolitical intrigues, but as a territory of dialogue, stability and constructive cooperation. This is evidenced by the results obtained by the Center for Arctic Studies of the Institute of Europe of the Russian Academy of Sciences in the course of scientific research. Colleagues from the Diplomatic Academy of the Russian Foreign Ministry, Moscow State University, NArFU, RANEPA are in solidarity with us [13, Zhiltsov S.S., Zonn I.S.; 14, Burov A.S.; 15, Kretinin V.A., Kuznetsov V.V., Safronova L.E.].

Given the withdrawal of Western companies from many projects, an increase in unemployment and a possible increase in the outflow of citizens are predicted. The implementation of large projects is likely to be carried out mainly on a rotational basis. Under these conditions, the regional authorities and municipalities need to strengthen cooperation with large Russian companies that operate in these territories in order to resolve social issues in the interests of its residents.

In the context of sanctions against Russia, it is important to carry out consistent work to ensure the country's technological sovereignty in the Arctic. We are talking about eliminating the technological gap in the construction of Arc4 and Arc7 ice-class LNG tankers, creating equipment for drilling wells in the Arctic, and technologies for liquefying natural gas.

The leadership of the country and the heads of the subjects of the Russian Arctic understand that this region is an important and promising territory of Russia. This was confirmed during the work of the SPIEF-2022 [16, Zhuravel V.P.] and the Eastern Economic Forum. The need for systematic work to form awareness among Russian citizens of involvement in important Arctic affairs is emphasized. According to the experts, economic projects will be the most important ones. Our closest allies in the EAEU and BRICS need to be more actively involved in them. Taking into account the current situation in the AC, its deepest crisis, it is advisable to consider the issue of deeper integration on the Arctic track with China, up to the creation of its own Arctic Council.

The above and other Arctic problems should be the subject of research by scientists and specialists in 2023. In the current context, it is necessary to re-establish and reinvigorate international scientific cooperation in the Arctic.

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The article was submitted 10.11.2022; approved after reviewing 22.11.2022; accepted for publication 22.11.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 107–130.
Original article
UDC: 327(470+481)(045)
doi: 10.37482/issn2221-2698.2022.49.125

The International Dimension of Norwegian Arctic Policy and the Accumulated Capital of Russian-Norwegian Cooperation

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Abstract. This article presents an analysis of Norway's cooperation with Arctic and non-Arctic states in the Arctic over the past decade. The paper focuses on the priorities of the country's new Arctic strategy adopted in 2020 in the areas of environmental protection, social and economic development, and improving the quality of life of indigenous peoples and residents of the northern regions. The paper aims at systematization of Norway's experience of participation in various projects both under the aegis of international organizations in the region (the Arctic Council, the Barents-Euro-Arctic Council, the Nordic Council of Ministers, etc.) and in bilateral format with the Arctic countries. A special emphasis is placed on the analysis of Norwegian-Russian cooperation in the Arctic in the fields of environmental protection, fisheries, energy, joint operations to prevent and eliminate the consequences of oil spills and other environmental disasters, and social and cultural interaction. In addition, cooperation of Norway and Russia in multilateral formats in various sectors is examined. The current crisis in Russia-Western relations and its impact on the implementation of joint Russian-Norwegian projects and initiatives and the development of cooperation in the Arctic are analyzed.
Keywords: *Norway, Arctic, international cooperation in the Arctic, Arctic Council, Russian-Norwegian cooperation, Barents region*

Acknowledgments and funding

The study was carried out within the framework of the Basic Research Program of the National Research University Higher School of Economics, as well as with grant support from the Faculty of World Economy and World Politics of the National Research University Higher School of Economics.

Introduction

The strategic importance of the Arctic region in the development of Norway is due to a combination of historical, economic and geographical factors [1, Dzyuban V.V., p. 6]. About half of the country's territory is located to the north of the Polar Circle, and, therefore, since the 12th–13th centuries, the inhabitants of these territories were primarily engaged in fishing and

For citation: Stepanov I.A., Smolovik E.V., Kazakovtseva A.A. The International Dimension of Norwegian Arctic Policy and the Accumulated Capital of Russian-Norwegian Cooperation. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 125–151. DOI: 10.37482/issn2221-2698.2022.49.125

hunting in the Arctic [2, Perdikaris S., p. 395]. Currently, in addition to fisheries, mineral resources are of great importance for the Norwegian economy [3, Noreng Ø., p. 396], such as oil and gas reserves in the Arctic, mainly on the continental shelf. In 2020, Norway adopted a new Arctic strategy, updating its policy priorities in the region.

The Arctic region is playing an increasingly important role in the international arena due to the preserved energy potential and the growing importance of the problem of global climate change, which entails the melting of ice and the subsequent increase in climate risks for Norway with its large Arctic area [4, Martinson D.G., Pitman W.C., p. 254; 5, Makarov I.A., Sokolova A., Stepanov I.A., p. 451]. Due to the emergence of common problems and challenges for the Arctic states in the region, the countries have intensified cooperation both in bilateral and multilateral formats [6, Ellingsen I.H. et al., p. 160]. Norway is interested in exchanging experience and knowledge, as well as conducting joint research with other countries in the Arctic region for a better understanding of the climatic and environmental situation there.

The importance of the Arctic region for Norway is reflected in the works of foreign researchers who consider not only historical and economic aspects [2, Perdikaris S.; 3, Noreng Ø.], but also ecological and climatic ones, paying particular attention to the multilateral cooperation of countries in the Arctic [4; 6; 5]. The main trends and directions of cooperation between Russia and Norway, such as environmental protection, fisheries, energy, etc., have received wide attention in the works of Russian and foreign authors [1, Dzyuban V.V.; 7, Alexandrov O.B., Kirgizov-Barskiy A.V.; 8, Jensen L.C.; 9, Krivorotov A.K.].

By now, the capital of the Russian-Norwegian cooperation in the Arctic is considerable: the long-term experience of cooperation between countries in the region made it possible to establish various institutions, such as bilateral working commissions, as well as to implement projects in a wide range of fields and sectors. The countries are stimulated by their common land and long maritime border, which opens up many areas for bilateral cooperation: fisheries, environmental protection, energy, etc. Over the past decades, Russia and Norway have launched a large number of bilateral projects in different directions; a solidcreation of an international Secretariat of the Council regulatory and legal framework for cooperation was built, contributing to the implementation of the mutual interests of the two countries [7, Alexandrov O.B., Kirgizov-Barskiy A.V., p. 86]. The current political crisis has had a sharply negative impact on the development of Russian-Norwegian cooperation in the Arctic, and all the accumulated capital of cooperation between the two countries in the coming years risks remaining unclaimed.

The purpose of this article is to systematize the experience of Norway's participation in various projects, both under the auspices of international organizations in the region (the Arctic Council, the Barents Euro-Arctic Council, the Nordic Council of Ministers, etc.), and in a bilateral format. The article is divided into three parts. The first part looks at Norway's new Arctic strategy and its main priorities. The second part presents an analysis of Norway's multilateral and bilateral

cooperation with other Arctic states in the region. The third part describes the main areas of Russian-Norwegian cooperation in the region, as well as an assessment of the prospects for their development.

Arctic policy of Norway

For a long time, the Arctic has been an area of major strategic national interest for Norway [8, Jensen L.C., p. 2]. Norway's special area of national interest is the Barents Sea, which is one of the largest maritime zones on the Norwegian continental shelf with huge potential for oil and gas production, as well as bioresources.

Norway's Arctic policy focuses on the development of the Northern Norway region, and its priority is international cooperation in the Arctic, which includes relations with neighboring countries in the Barents Sea region and Northern Norway, including Russia. The main objectives of Norway's state policy in the Arctic are [1]:

- peace, stability and predictability;
- international cooperation and international legal order;
- integrated ecosystem management;
- increasing the number of jobs and creating added value;
- closer cooperation between the business sector and think tanks;
- effective social assistance programs and initiatives to make Northern Norway an attractive place to live.

In 2020, Norway adopted a new Arctic strategy that emphasizes the importance of bilateral, regional and multilateral cooperation with neighboring countries and its partners in the Arctic. Many of the provisions of the Strategy can be correlated with the UN Sustainable Development Goals (UN SDGs). The main priorities identified in Strategy 2020 are: 1) an integrated approach to climate and environmental change in the Arctic, 2) social development in the Arctic region, 3) value added and competency development, 4) development of infrastructure, transport and communications. Norway's previous Arctic Strategy of 2017 [2] focused on similar areas, but while environmental protection and climate change were previously an integral part of other areas, the current strategy emphasizes them as a separate priority.

The new strategy focuses on the first area, environmental protection, as the rapid warming of the Arctic threatens both some Arctic flora and fauna and entire ecosystems that depend on ice and snow, as well as posing serious risks to local communities and the way of life of indigenous peoples. As before, combating climate change remains one of Norway's top priorities. The country is a member of the UN Framework Convention on Climate Change, has ratified the Paris Agree-

[1] The Norwegian Government's Arctic Policy // Government.no. URL: https://www.regjeringen.no/en/dokumenter/arctic_policy/id2830120/ (accessed 22 February 2022).
[2] Arctic Strategy // Government.no. URL: https://www.regjeringen.no/en/dokumenter/arctic-strategy/id2550081/ (accessed 17 August 2022).

ment, and therefore continues to reduce greenhouse gas emissions in accordance with national goals and international obligations. In the current strategy, Norway emphasizes its contribution to the achievement of the Arctic Council's goal of reducing black carbon emissions [3] (a target of 25% black carbon reduction by 2025 compared to 2013 levels), and its actions to monitor climate change processes, including ocean acidification. In addition, with regard to environmental protection, the 2020 Strategy also indicates the goal set back in 2017 to deepen research on the Arctic ecosystem.

As before, in line with the 2020 Strategy, Norway continues to strive to develop the knowledge base needed for ecosystem-based management of the natural environment in Northern Norway and for climate change adaptation in the maritime industries and dependent on ocean sectors of society. In addition, Norway wants to create decent living conditions that would be attractive to the population of the country, especially young people. It is also planned to develop a strategy for small towns and urban centers and support regional cooperation between the business sector, districts and municipalities, as well as universities and colleges to promote the development of flexible learning programs — a goal set by the Norwegian government in 2017.

For the first time, reindeer husbandry was given a special place in the 2020 Strategy. This is an important livelihood within the region, and it is necessary for Norway to provide favorable conditions for this type of economic activity. Thus, Norway takes into account the need to develop all sectors of the country's economy and provides them with support. At the same time, the state has been striving for years to establish communications and connections between various economic agents, which include state, municipal, and even private actors.

Saami, their way of life, etc. — an integral part of the Norwegian identity and culture, and it is therefore planned that the Norwegian government will participate in consultations with the Saami Parliament of Norway to compare existing experience in the field of the Saami language and culture and to develop knowledge in this area. Norway recognizes the need for regulatory and legal changes in the framework of the policy aimed at supporting the Saami, including adjustments to the legislative framework governing this area. The 2017 Strategy also reflected these goals in one form or another, indicating the historical continuity of Norwegian policy to support the indigenous people of the North.

In the 2020 Strategy, Norway pays special attention to the sustainable development of the region, including the promotion of environmental innovation, entrepreneurship and start-ups in Northern Norway. Norway is also committed to:

[3] Black carbon is one of the greenhouse gases that contribute to global climate change. Its formation occurs as a result of the incomplete combustion of fossil fuels, biomass and biofuels. When black carbon is deposited on snow and ice, it absorbs sunlight, releasing heat, which leads to heating of air and snow with ice. Thus, black carbon emissions are especially critical for the Arctic, as they lead to acceleration in the melting of Arctic ice. In turn, this could lead to faster global warming and climate change. What is Black Carbon? // Center for Climate and Energy Solutions. URL: https://www.c2es.org/document/what-is-black-carbon/ (accessed 01 March 2022).

- sustainable development of the maritime industry and ensuring its “blue growth” (Norway aims to improve resource control in the context of sustainable management of fish stocks);
- sustainable development of the energy industry (Norway, as an energy-abundant country, intends to increase oil and gas production, as well as develop offshore wind power, for example, off the coast of Helgeland in Nordland province);
- strengthening economic cooperation in national and international policies (Norway plans to encourage cooperation between individual institutions and even sectors in the field of recruitment and development of talents in Northern Norway, to promote closer cooperation between employers, the business sector and institutions of higher education to meet society's needs for skills and knowledge, and to take steps to involve Norwegian economic operators in the Copernicus programme [4] to improve the modeling of climate processes in the Arctic);
- sustainable and profitable mining (one of the objectives, for example, is to promote exploration and deep sea mining).

The 2017 Strategy set goals only to strengthen cooperation between the business sector and other actors, while the maritime industry, energy and mineral resource development were not considered as priority areas at that time [5]. However, they were still mentioned in the 2017 Arctic Strategy, which indicates their increased importance for the country by 2020.

For the development of infrastructure, transport and communications in 2020, the task was to conceptually assess the future transport solutions of the region (for example, the proposed new railway section from Feuske to Tromsø). Norway intends to continue to allocate significant financial resources to the development of the road network in its northern part: in 2017, the Norwegian government allocated NOK 40 billion to invest in transport projects in the northern parts of Norway [6]. In addition, the Norwegian strategy for 2020 includes a number of measures in the field of infrastructure, transport and communications, which are also aimed at combating climate change. It is planned to continue testing and phased introduction of aircraft with low and zero greenhouse gas emissions, as well as the development of projects to improve navigation conditions, including the development of port infrastructure.

Separately, in both strategies, Norway emphasizes the importance of responding to environmental disasters, in particular through the implementation of agreements on preparedness and response to acute pollution in the Arctic, as well as the development of the Norwegian Marine

[4] The Copernicus Program is an Earth observation program of the European Union that aims to study the planet and its environment. The data obtained contribute to improving the quality of life of European citizens and the rest of the world's population. About Copernicus // Copernicus. URL: https://www.copernicus.eu/en/about-copernicus (accessed 16.02.2022).
[5] Arctic Strategy // Government.no. URL: https://www.regjeringen.no/en/dokumenter/arctic-strategy/id2550081/ (accessed 17 August 2022).
[6] Ibid.

Litter Center (Senter mot marin forsøpling, formerly the Norwegian Centre for Oil Spill Prevention and Marine Environment Protection). Since 2017, the goal of strengthening cooperation with Russia for joint oil spill response operations has been maintained in the Arctic strategy[7].

Despite the continuity of most of the provisions of the new Arctic strategy, some of the goals and directions were prioritised in 2020 for the first time, such as environmental protection, sustainable energy, marine industry, reindeer herding and others. This indicates that for 3 years, the value of these areas for Norway has increased greatly. Also, according to the text of the new strategy, there was an increase in the importance of China as a partner for Norway in the Arctic region, cooperation with which was emphasized in a separate block in 2020. Norway began to consider new opportunities for interaction in the region, more clearly formulating goals for sustainable development and focusing primarily on it.

Mechanisms and formats of international cooperation in Norway in the field of sustainable development of the Arctic region. Multilateral formats

The leading platforms for advancing the Arctic agenda for Norway are the Arctic Council (AC) and the Arctic Economic Council (AEC), the Barents Euro-Arctic Council (BEAC), as well as the Nordic Council of Ministers.

Norway is a member of the Arctic Council, has chaired it only once, from 2007 to 2009, and will replace Russia in this capacity in 2023 [8]. During Norway's AC chairmanship, resource management in fisheries, maritime transport, oil production and mining were a priority. Other issues on the agenda were pollution and climate change, climate change monitoring and assessment, biodiversity conservation and socio-economic development [9].

Currently, most of the projects in which Norway is involved in the Arctic Council now take place within the Working Group on the Protection of the Arctic Marine Environment (PAME). Examples include a project on recovery and recycling of marine litter and microplastics [10, 11], a project to assess the damage of low sulfur fuels to Arctic ecosystems [12], a project to protect biodiversity in Arctic waters [13], and projects in the field of shipping [14].

[7] Ibid.
[8] Norway // Arctic Council. URL: https://arctic-council.org/about/states/norway/ (accessed 16 February 2022).
[9] Ibid.
[10] Regional action plan on marine litter // Arctic Council. URL: https://arctic-council.org/projects/regional-action-plan-on-marine-litter/ (accessed 01 March 2022).
[11] Arctic coastal cleanup // Arctic Council. URL: https://arctic-council.org/projects/arctic-coastal-cleanup/ (accessed 01 March 2022).
[12] New low sulphur fuels, fate, and behavior in cold water conditions // Arctic Council. URL: https://arctic-council.org/projects/new-low-sulphur-fuels-fate-and-behavior-in-cold-water-conditions/ (accessed 01 March 2022).
[13] Marine invasive alien species in Arctic Waters // Arctic Council. URL: https://arctic-council.org/projects/marine-invasive-alien-species-in-arctic-waters/ (accessed 01 March 2022).
[14] Arctic ship traffic data // Arctic Council. URL: https://arctic-council.org/projects/arctic-ship-traffic-data-astd/ (accessed 01 March 2022).

In addition, Norway is involved in projects to develop a sustainable blue economy [15], waste management [16, 17] and assess the impact of climate change on Arctic ecosystems [18].

Norway hosts the Arctic Council Secretariat in Tromsø, which since 2016 includes the Secretariat of Indigenous Peoples. In the Arctic Council, Norway pays special attention to combating climate change, developing sustainable transport and energy, as well as supporting the indigenous peoples of the North [19].

Norway attaches great importance to the Barents Euro-Arctic Council, where the country chaired from 2019 to 2021. Norway is the initiator of its creation and further institutionalization, including the establishing of an international Secretariat of the Council in Kirkenes and the Barents Institute — the think tank of the Council. Climate change has become a key focus of Norway's agenda during its chairmanship, which led to an updated Climate Change Action Plan for cooperation in the region in 2021 as part of the Nordic Council of Ministers [20]. Furthermore, maintaining stability and peace in the Arctic region is a key task for Norway in its foreign policy. In this regard, the Minister of Foreign Affairs of Norway, Anniken Huitfeldt, notes that in the conditions of international tension, dialogue and synergy of the agendas of the Arctic Council, the Council of the Barents Euro-Arctic Region, the Nordic Council and the Council of the Baltic Sea States are required [21].

Although Norway is not a member of the European Union, it is active in international projects that are supervised and funded by the EU. The most successful track is cross-border cooperation programs (CBC). Since 2014, Norway, along with Sweden, Finland, Iceland, Ireland and Denmark (Greenland and the Faroe Islands), has been implementing the "Interreg Northern Periphery and Arctic" project [22], in which the regions of Tren-delag, Nur-Norge and Svalbard are involved from Norway. Russia does not take part in the project, but is its observer [23]. The purpose of this

[15] Blue bioeconomy in the Arctic region // Arctic Council. URL: https://arctic-council.org/projects/blue-bioeconomy-in-the-arctic-region/ (accessed 01 March 2022).
[16] Kola waste project // Arctic Council. URL: https://arctic-council.org/projects/kola-waste-project/ (accessed 01 March 2022).
[17] Arctic marine microplastics and litter // Arctic Council. URL: https://arctic-council.org/projects/arctic-marine-microplastics-and-litter (accessed 01 March 2022).
[18] Understanding climate change impacts on Arctic ecosystems and associated climate feedbacks // Arctic Council. URL: https://arctic-council.org/projects/understanding-climate-change-impacts-on-arctic-ecosystems-and-associated-climate-feedbacks/ (accessed 01 March 2022).
[19] Interview with Morten Høglund, Norway's senior Arctic official // Arctic Council. 20.10.2021. URL: https://arctic-council.org/ru/news/interview-with-morten-hoglund-norways-senior-arctic-official/ (accessed 16.02.2022).
[20] Obnovlenie Plana deystviy po voprosam izmeneniya klimata dlya Barentseva sotrudnichestva [Update of the Action Plan on Climate Change for the Barents Cooperation] // The Barents Euro-Arctic Council. 2021. URL: https://www.barentsinfo.fi/beac/docs/2021_11_01_Barents_Action_Plan_on_Climate_Change_RU.pdf (accessed 16 February 2022).
[21] Interview with the Norwegian Minister of Foreign Affairs on the outgoing BEAC Chairmanship // The Barents Euro-Arctic Council. 25.10.2021. URL: https://www.barents-council.org/news/interview-with-the-norwegian-minister-of-foreign-affairs-on-the-outgoing-beac-chairmanship (accessed 16 February 2022).
[22] Interreg northern periphery and Arctic // Northern Periphery and Arctic Programme 2014 — 2020. URL: https://www.interreg-npa.eu/interreg-npa-2021-2027/ (accessed 16 February 2022).
[23] RF i ES gotovyat sem' programm prigranichnogo sotrudnichestva na 2021–2027 gody [Russia and the EU are preparing seven cross-border cooperation programs for 2021-2027] // TASS. 27.01.2020. URL: https://tass.ru/ekonomika/7618139 (accessed 16 February 2022).

project is to strengthen cooperation between the regions of the Euro-Arctic zone in the socio-economic sphere, as well as in the field of environmental protection.

Norway is also a member of the Nordic Council of Ministers, where the portfolio of projects in the field of achieving the UN SDGs is expanding every year. Within the framework of the Council of Ministers of the Nordic countries, with the support of Nordforsk [24] and Nordregio [25], projects are being implemented to develop human capital, healthcare, environmental protection and adaptation to climate change (including projects to maintain biodiversity, waste management), develop the bioeconomy, as well as building infrastructure in the Arctic [26].

Norway also actively participates in the work of the Arctic Coast Guard Forum, which brings together the states of the Arctic Council for search and rescue in the Arctic and joint local emergency response [27]. Norway also pays great attention to the fight against crime in the fishing industry, for which satellite monitoring technologies is being developed in order to carefully monitor the situation in the regions of Northern Norway, which is difficult without modern technologies [28].

Bilateral formats

Norway implements deep bilateral cooperation in the Arctic with Sweden and Finland. Norway's projects with Finland focus on the oil and gas industry, and a wind farm in Finland, which will supply Norwegian oil and gas production [29], has also been completed by 2022 [30]. The cooperation of these countries is also aimed at building links between business and educational institutions [31], for example, through international business forums in the Arctic (Arctic Business Corridor [32]). Norway and Sweden cooperate in the area of renewable energy [33], i.e. the countries have developed a joint electronic certificate system for renewable energy [34]. The priority areas of cooper-

[24] NordForsk Funding Opportunities // NordForsk. URL: https://www.nordforsk.org (accessed 16 February 2022).
[25] Arctic issues // Nordregio. URL: https://nordregio.org/research-topics/arctic-issues/# (accessed 16 February 2022).
[26] Sustainable Development Action — The Nordic Way // Nordic Council of Ministers. URL: https://norden.diva-portal.org/smash/get/diva2:1092868/FULLTEXT01.pdf (accessed 16 February 2022).
[27] Beregovye okhrany stran Arktiki prinyali Rukovodstvo po provedeniyu sovmestnykh operatsiy [Arctic coast guards adopt joint operations guidelines] // TASS. 25.03.2017. URL: https://tass.ru/obschestvo/4125460 (accessed 16 February 2022).
[28] Norway's integrated ocean management plans // Norwegian Ministry of Climate and Environment. 2021. URL: https://www.regjeringen.no/contentassets/5570db2543234b8a9834606c33caa900/en-gb/pdfs/stm201920200020000engpdfs.pdf (accessed 16 February 2022).
[29] Telegina E., Morgunova M. Finland's strategy in the Arctic Region // Finland's strategy in the Arctic Region. 3.09.2012. URL: https://russiancouncil.ru/en/analytics-and-comments/analytics/finland-s-strategy-in-the-arctic-region/ (accessed 16 February 2022).
[30] Metsälamminkangas wind farm // Sval. URL: https://sval-energi.no/assets/metsalamminkangas-wind-farm/ (accessed 1616 February 2022).
[31] Finnish-Norwegian Arctic Partnership strengthened by a state visit // Ministry for Foreign Affairs of Finland. 6.09.2016. URL: https://um.fi/current-affairs/-/asset_publisher/gc654PySnjTX/content/valtiovierailu-vahvistaa-norjan-ja-suomen-arktista-kumppanuutta (accessed 16 February 2022).
[32] Growth through Arctic resources. A rising cross-border economic area // Arctic Corridor. URL: https://arcticcorridor.fi (accessed 16 February 2022).
[33] Buil N. Nordic region // Agora Energiewende. URL: https://www.agora-energiewende.de/en/global/nordic-region/ (accessed 16 February 2022).
[34] Sweden, Norway seal end of joint green subsidy scheme in 2035 // Reuters. 18.09.2020. URL: https://www.reuters.com/article/us-norway-sweden-electricity-idUSKBN26922B (accessed 16 February 2022).

ation between Norway, Finland and Sweden are transport and logistics, digital services and labor market integration [35]. Indigenous issues and their representation in international forums such as the Arctic Council and the Barents Euro-Arctic Council are also of great importance in Norwegian, Swedish and Finnish relations. Furthermore, in 2018, the three countries signed a Trilateral Statement of Intent to deepen and improve defense cooperation [36]. Norway's cooperation with the United States in the Arctic touches on maritime issues, including oil spill response [37], and scientific dialogue between American and Norwegian research centers. Norway and Iceland are also developing a scientific dialogue between universities and research centers [38, 39].

Norway also promotes Arctic cooperation with China, especially in research. For example, the first Chinese polar station Huanghe was opened on Svalbard in 2004 [40]. Norway conducts joint scientific research in the Arctic with India: in 2007, the first Indian scientific expedition was launched in Norway, and in 2008, the Himadri research station was opened in Svalbard [41].

Russian-Norwegian cooperation in the field of sustainable development of the Arctic region. Bilateral Russian-Norwegian cooperation in the Arctic

The legal framework for cooperation between Russia and Norway is enshrined in numerous bilateral treaties and documents, which were previously constantly updated and amended. One of the main documents that resolved most of the existing territorial claims between countries was the Treaty on the delimitation of maritime spaces and cooperation in the Barents Sea, signed in 2010 [42]. The established areas of cooperation were security in maritime and air space, environmental protection, fishing, energy, environmental protection, joint operations to prevent and eliminate the consequences of oil spills and other environmental disasters and socio-cultural interaction [9, Krivorotov A.K., p. 268]. However, due to the aggravation of relations between Russia and Western countries in February 2022, cooperation within the framework of the vast majority of projects and initiatives was suspended.

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[35] The Norwegian Government's Arctic Policy // Government of Norway. 26.01.2021. URL: https://www.regjeringen.no/en/dokumenter/arctic_policy/id2830120/ (accessed 16 February 2022).

[36] SShA, Finlyandiya i Shvetsiya: Trekhstoronnee zayavlenie o namereniyakh v sfere oboronnykh interesov [USA, Finland and Sweden: tripartite declaration of intent on defense interests] // RKK ICDS. 25.05.2018. URL: https://icds.ee/ru/ssha-finljandija-i-shvecija-trehstoronnee/ (accessed 16 February 2022).

[37] Neptune // Arctic Council. URL: https://eppr.org/projects/neptune/ (accessed 16 February 2022).

[38] Cooperation in the Field of Arctic Studies between Iceland and Norway: Two Announcements // UArctic. 25.11.2019. URL: https://www.uarctic.org/news/2019/11/cooperation-in-the-field-of-arctic-studies-between-iceland-and-norway-two-announcements/ (accessed 16 February 2022).

[39] Review of the cooperation between Iceland and Norway in the field of Arctic scientific research // Nordregio. 1.06.2018. URL: https://nordregio.org/research/review-of-the-cooperation-between-iceland-and-norway-in-the-field-of-arctic-scientific-research/ (accessed 01 March 2022).

[40] Konyshev V.N., Sergunin A.A. Strategii inostrannykh gosudarstv v Arktike: obshchee i osobennoe [Strategies of Foreign States in the Arctic: General and Special] // RIAC. 2013. URL: https://russiancouncil.ru/common/upload/Arctic%20Anthology%20Vol%201-2.pdf (accessed 01 March 2022).

[41] Himadri station // National Center for Polar and Ocean Research. URL: https://ncpor.res.in/app/webroot/pages/view/340-himadri-station (accessed 01 March 2022).

[42] Rossiya i Norvegiya podelili spornyy uchastok dna v Arktike [Russia and Norway share a disputed seabed in the Arctic] // BBC. URL: https://www.bbc.com/russian/international/2010/09/100915_russia_norway_arctic_sea_border (accessed 25 February 2022).

Environmental protection

An important area of cooperation between Russia and Norway was environmental protection. The basis for Russian-Norwegian cooperation was the Agreement between the Government of the Russian Federation and the Government of the Kingdom of Norway on cooperation in the field of environmental protection of September 3, 1992 [43]. Under this Agreement, a Joint Norwegian-Russian Commission on Environmental Protection was established. Both at the level of the Joint Commission and at the level of working groups, meetings of officials were held regularly, which reflected the aspirations of both states to deepen cooperation in the field of environmental protection and sustainable development.

In 2019, at the 20th meeting of the Joint Commission, the Working Program of Russian-Norwegian cooperation in the field of environmental protection for 2019–2021 was approved. This was the result of a positive experience of cooperation and successful implementation of projects in the Barents Sea region in the field of environmental protection in 2016–2018 [44].

The Joint Commission included several working groups that aim to cooperate in the following areas: protection of the marine environment, biodiversity, reduction and control of environmental pollution, radioactive contamination, as well as in specific areas, such as cross-border cooperation and protection of natural and cultural heritage. In 2022, there was no cooperation between states within the framework of the Joint Commission and working groups.

Environmental pollution control

An active dialogue on cooperation between Norway and Russia on reducing environmental pollution began in 2018. The problem is relevant for both countries, because due to the common maritime border, garbage is transported with currents and winds between states, negatively affecting the marine and coastal environment in both Russia and Norway, as well as certain sectors of the economy and human health. At a bilateral meeting of the Minister of Natural Resources and Ecology of the Russian Federation Dmitriy Kobylkin and the Minister of Climate and Environmental Protection of Norway Ola Elvestuen on February 26, 2018, the parties identified the main issues [45]

[43] O podpisanii Soglasheniya mezhdu Pravitel'stvom Rossiyskoy Federatsii i Pravitel'stvom Korolevstva Norvegiya o sotrudnichestve v oblasti okhrany okruzhayushchey sredy ot 03 avgusta 1992 g. [On the signing of the Agreement between the Government of the Russian Federation and the Government of the Kingdom of Norway on cooperation in the field of environmental protection dated August 03, 1992] // Kodeks. URL: https://docs.cntd.ru/document/901603203 (accessed 25 February 2022).

[44] Glava Minprirody Rossii i Ministr klimata i okruzhayushchey sredy Korolevstva Norvegii utverdili rabochuyu programmu sotrudnichestva do 2021 g. [The head of the Ministry of Natural Resources of Russia and the Minister of Climate and Environment of the Kingdom of Norway approved a working program of cooperation up to 2021] // Ministry of Natural Resources. URL: http://www.mnr.gov.ru/press/news/glava_minprirody_rossii_i_ministr_klimata_i_okruzhayushchey_sredy_korolevstva_norvegii_utverdili_rab/?sphrase_id=426961 (accessed 25 February 2022).

[45] Voprosy bor'by s zagryazneniem morskoy sredy obsudili Glava Minprirody Rossii i Ministr zashchity klimata i okhrany okruzhayushchey sredy Norvegii [The issues of combating marine pollution were discussed by the Head of the Ministry of Natural Resources of Russia and the Minister of Climate Protection and Environmental Protection of Norway] // Ministry of Natural Resources. URL:

that require mutual attention. These included combating marine debris pollution, reducing pollution in border regions and the problem of offshore disposal of waste from coastal industries.

The basis for cooperation in this area was the exchange of experience on this problem and the measures already taken to solve it. One of the first steps was the Russian-Norwegian seminar on combating pollution of the Barents Sea with marine debris and microplastics, which took place in November 2018 [46]. Thanks to this initiative, experts from both countries were able to share their knowledge and identify prospects for cooperation on this issue for sustainable development.

Several projects between Russia and Norway in the framework of the fight against pollution have been enshrined in the Work Program for cooperation between countries: waste management in Murmansk; introduction of the best available technologies (BAT) at the enterprises of the northern regions, taking into account the Norwegian experience; reduction of pollution in the Barents Sea [47]. In order to work on these projects, the parties have carried out joint activities. For example, a regular meeting of experts from both countries on marine litter and microplastics in the Barents Sea took place in 2020. The event marked the beginning of the preparation of a joint report on the pollution of the Barents Sea with marine debris and microplastics, which will provide a systematic basis of knowledge and recommendations on this issue [48]. There have also been local activities that aim to exchange data in this area, such as on methodologies for assessing the impact of pollution on the environment [49].

In addition, specific campaigns and projects aimed at cleaning up the coastline were carried out. In May 2021, the results of the Norwegian-Russian projects MALINOR (Mapping marine litter in the Norwegian and Russian Arctic Seas), DIMARC (Detecting, identifying and mapping plastic in the Arctic using robotics and digital solutions) and ArcToMal (Arctic tourism in the Barents Sea — awareness and participation for marine litter prevention) [50]. All three projects were spon-

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http://www.mnr.gov.ru/press/news/voprosy_borby_s_zagryazneniem_morskoy_sredy_obsudili_glava_minprirody_rossii_i_ministr_zashchity_kli/?sphrase_id=426961 (accessed 25 February 2022).

[46] V Minprirody Rossii sostoyalsya rossiysko-norvezhskiy seminar po bor'be s zagryazneniem Barentseva morya morskim musorom i mikroplastikom [The Ministry of Natural Resources of Russia hosted a Russian-Norwegian seminar on combating pollution of the Barents Sea with marine debris and microplastics] // Ministry of Natural Resources. URL: http://www.mnr.gov.ru/press/news/v_minprirody_rossii_sostoyalsya_rossiysko_norvezhskiy_seminar_po_borbe_s_zagryazneniem_barentseva_mo/?sphrase_id=426961 (accessed 25 February 2022).

[47] Rabochaya programma rossiysko-norvezhskogo sotrudnichestva v oblasti okhrany okruzhayushchey sredy na 2019-2021 gg. [Working program of Russian-Norwegian cooperation in the field of environmental protection for 2019-2021] // Joint Russian-Norwegian Commission for Environmental Protection. URL: http://www.kolgimet.ru/fileadmin/user_upload/Files/prog_ru_nor.pdf (accessed 25 February 2022).

[48] V Minprirody Rossii obsudili voprosy rossiysko-norvezhskogo sotrudnichestva v oblasti bor'by s zagryazneniem Barentseva moray [Issues of Russian-Norwegian cooperation in the field of combating pollution in the Barents Sea were discussed at the Russian Ministry of Natural Resources] // Ministry of Natural Resources. URL: http://www.mnr.gov.ru/press/news/v_minprirody_rossii_obsudili_voprosy_rossiysko_norvezhskogo_sotrudnichestva_v_oblasti_borby_s_zagrya/?sphrase_id=426961 (accessed 25 February 2022).

[49] Ibid.

[50] Rossiysko-norvezhskiy vebinar «Problema morskogo musora v Barentsevom more: sostoyanie i istochniki» [Russian-Norwegian webinar "The problem of marine debris in the Barents Sea: state and sources"] // Arctic Fund. URL: https://arctic.narfu.ru/index.php?option=com_content&view=article&id=1734:rossijsko-norvezhskij-vebinar-problema-morskogo-musora-v-barentsevom-more-sostoyanie-i-istochniki&catid=8&lang=ru&Itemid=548 (accessed 25 February 2022).

sored by Norway under the leadership of Akvaplan-niva [51] and aimed at reducing the pollution of the Barents Sea coastlines from garbage: the first two projects were devoted to mapping marine debris using innovative solutions, and the last one was to attract tourists and tour operators in the Arctic to scientific research marine debris [52].

Marine environmental management

As Russia and Norway share a border in the Barents Sea, both countries have equal and mutual responsibility to protect the marine ecosystem and to preserve all plant and animal species found in the region. This cooperation started in 1994 with the signing of the Agreement between the Government of the Russian Federation and the Government of the Kingdom of Norway on co-operation in combating oil pollution in the Barents Sea [53].

Until 2022, the main cooperation between the countries took place within the framework of the Russian-Norwegian Working Group on the Marine Environment. In 2019, at the 16th meeting, the main vectors of cooperation in this direction established by the Work Program were fixed. In particular, cooperation in the field of the marine environment was aimed at developing an integrated ecosystem approach to management (ecosystem-based management) of the Barents Sea [54]. On the Norwegian side, a plan for such management in the region of the Barents Sea and the Lofoten Islands has already been developed. It is based on ensuring a balance between environmental protection and commercial activities in the region (fishing, shipping, oil production) [55]. Russia has set the key task of developing a similar integrated management plan for the Russian part of the Barents Sea based on the Norwegian experience, as well as developing a pilot project for integrated environmental management in the Arctic seas and its implementation in the Russian part of the Barents Sea.

In addition, one of the projects of the Work Program within the framework of marine environment management is the operation of the Barentsportal [56], which contains environmental data on the Barents Sea. This website is a joint project between Norway and Russia and aims to ex-

[51] Akvaplan-niva is a subsidiary of the Norwegian Research Institute for Water Resources (Norsk institutt for vannforskning (NIVA)), which cooperated with Russia in the field of marine and freshwater ecosystem research, environmental monitoring, navigation analysis, and training of young scientists.
[52] Ibid.
[53] Rossiysko-Norvezhskoe sotrudnichestvo po bor'be s zagryazneniem neft'yu [Russian-Norwegian cooperation to combat oil pollution] // Sistemy promyshlennoy bezopasnosti [Systems of industrial safety]. URL: https://www.spbecolog.com/sotrudnichestvo/mezhdunarodnye-ucheniya/rossiysko-norvezhskoe-sotrudnichestvo-po-borbe-s-zagryazneniem-neftyu/ (accessed 25 February 2022).
[54] Rabochaya programma rossiysko-norvezhskogo sotrudnichestva v oblasti okhrany okruzhayushchey sredy na 2019-2021 gg. [Working program of Russian-Norwegian cooperation in the field of environmental protection for 2019-2021] // Joint Russian-Norwegian Commission for Environmental Protection. URL: http://www.kolgimet.ru/fileadmin/user_upload/Files/prog_ru_nor.pdf (accessed 25 February 2022).
[55] Norwegian-Russian cooperation on the marine environment // Norwegian Polar Institute. URL: https://www.npolar.no/en/themes/international-cooperation-in-the-arctic/norwegian-russian-cooperation-on-the-marine-environment/ (accessed 25 February 2022).
[56] Barentsportal // Joint Norwegian-Russian Environmental Status Reporting for Barents Sea. URL: https://www.barentsportal.com/barentsportal/index.php/ru/ (accessed 25 February 2022).

change information related to the integrated environmental management of the Barents Sea and sustainable development in the region. As part of this, Norway and Russia are prioritizing exchange of information, experience and expertise on various sustainable development issues [57]. However, at the moment, further updating of the web portal is suspended.

Biodiversity conservation

Another focus of cooperation between Norway and the Russian Federation in the field of nature conservation is biodiversity conservation. Cooperation took place within the framework of the Russian-Norwegian working group on cooperation in the field of biodiversity; its meetings were held annually.

As a result of interaction within the framework of the Work Program of Russian-Norwegian cooperation in the field of environmental protection for 2016-2018, Norway and Russia have made significant progress in implementing several projects focused on the joint collection of data on the state of populations, their study and the preparation of recommendations for eliminating possible risks for them. These include the projects “Seabird population in the Barents Sea region”, “Vulnerable and endangered bird species in the Barents Sea region”, “Populations of marine mammals in the Barents Sea region”. At the meeting of the Working Group in 2019, the parties noted the success in cooperation within the framework of all three projects [58], and these projects were extended as part of the work program of Russian-Norwegian cooperation in the field of environmental protection 2019–2021 [59].

In addition, the scientific centers of both states not only jointly studied ecosystems and biodiversity, but also carried out specific activities to protect and study the environment. One example of such interaction was the joint work of the Norwegian Institute of Bioeconomy Research (Nibio) and the Karelian Research Center of the Russian Academy of Sciences [60]. These research centers have been cooperating for many years, the main area of common interest was the study

[57] Zaversheno 16-e zasedanie Rossiysko-norvezhskoy Rabochey gruppy po morskoy srede: rabota po sovmestnomu eko-monitoringu Barentseva morya budet prodolzhena [The 16th meeting of the Russian-Norwegian Working Group on the Marine Environment is completed: work on joint eco-monitoring of the Barents Sea will be continued] // Ministry of Natural Resources. URL: http://www.mnr.gov.ru/press/news/zaversheno_16_e_zasedanie_rossiysko_norvezhskoy_rabochey_gruppy_po_morskoy_srede_rabota_po_sovmestno/?special_version=Y (accessed 25 February 2022).

[58] V Norvegii sostoyalos' tret'e zasedanie rossiysko-norvezhskoy Rabochey gruppy po sotrudnichestvu v oblasti bioraznoobraziya [The third meeting of the Russian-Norwegian Working Group on cooperation in the field of biodiversity was held in Norway] // Ministry of Natural Resources. URL: http://www.mnr.gov.ru/press/news/v_norvegii_sostoyalos_trete_zasedanie_rossiysko_norvezhskoy_rabochey_gruppy_po_sotrudnichestvu_v_obl/?sphrase_id=426961 (accessed 25 February 2022).

[59] Rabochaya programma rossiysko-norvezhskogo sotrudnichestva v oblasti okhrany okruzhayushchey sredy na 2019-2021 gg. [Working program of Russian-Norwegian cooperation in the field of environmental protection for 2019-2021] // Joint Russian-Norwegian Commission for Environmental Protection. URL: http://www.kolgimet.ru/fileadmin/user_upload/Files/prog_ru_nor.pdf (accessed 25 February 2022).

[60] Bye H.G. Strengthening Northern Research Cooperation between Norway and Russia // High North news. URL: https://www.highnorthnews.com/en/strengthening-northern-research-cooperation-between-norway-and-russia (accessed 25 February 2022).

of brown bears in the Svanhovd region. The interaction regarding research in the border areas was especially intensive.

Thus, Norway sought to strengthen cooperation with Russia and expand the joint initiative on transboundary research in the field of biodiversity conservation.

Joint operations to prevent and eliminate the consequences of oil spills and other environmental disasters

The legal framework for cooperation between countries on oil spill response and the elimination of the consequences of other environmental disasters is based on three documents: Memorandum on strengthening Norwegian-Russian cooperation in the field of maritime safety in the Barents Sea 2006, the Agreement between the Government of the Russian Federation and the Government of the Kingdom of Norway on cooperation in combating oil pollution in the Barents Sea, 1994, as well as the Joint Contingency Plan in the event of oil pollution in the Barents Sea, which was signed simultaneously with the Agreement [61].

For 20 years, with some exceptions (as in 2020 due to COVID-19), Norway and Russia have been conducting joint maritime search and rescue and oil spill response exercises in the Barents Sea [62]. It is important to note that the countries have repeatedly cooperated in carrying out operations to prevent and eliminate the consequences of oil spills. For the Norwegian side, cooperation in this area was seen as the basis for sustainable development in the Arctic, which ensures security in the Barents Sea [63].

Fisheries

In the framework of cooperation in the field of sustainable development, the fisheries sector deserves special attention. Norway and Russia have a long maritime border, which was demarcated in 2010. The states signed an agreement “On the delimitation of maritime spaces and cooperation in the Barents Sea and the Arctic Ocean”, which was ratified by the Russian side in 2011. According to this document, the disputed territory with an area of 175 thousand km^2 was equally divided between the countries as a result of a compromise reached. The treaty strengthened bilateral relations between the countries, which moved to a new level, since almost all territorial claims between Norway and Russia were resolved and there were no longer any barriers to cooperation. The Norwegian side proposed the idea of creating in the future the so-called “Pomor zone”, which would become the Norwegian-Russian industrial and economic cooperation zone in the border area of both countries.

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[61] Agreements regarding maritime transport // BarentsPortal. URL: https://www.barentsportal.com/barentsportal/index.php/ru/status-2016/284-affiliated-topics-data-from-2013/adopting-and-adapting-an-ecosystem-approach-to-management/993-agreements-regarding-maritime-transport (accessed 01 March 2022).

[62] Bye T-G. Norway and Russia Exercising Together in the Barents Sea // High North news. URL: https://www.highnorthnews.com/en/norway-and-russia-exercising-together-barents-sea (accessed 01 March 2022).

[63] Ibid.

In the last quarter of the 20th century, the Joint Norwegian-Russian Fisheries Commission was created, within the framework of which the countries successfully interacted. Their cooperation ensured a sustainable fishery in the region as the countries made joint decisions on: the level of total allowable catch (TAC), TAC distribution between Russia and Norway, technical measures regarding fishing gear; they also introduced systems to ensure that the fishing industry complied with all regulations [64].

Every year, the countries agreed on the TAC, paying attention to the state of stocks of each of the species [65]. Since 2018, the commercial capelin fishery has stopped due to the low level of spawning stock [66], which was resumed in 2022 [67]. This became possible as a result of the exchange of knowledge and research between Norwegian and Russian scientists, on the basis of which they concluded that there is a sufficient stock of capelin for continuation of its commercial trade.

Energy. Oil and gas

Cooperation in the field of oil and gas production was of particular interest to Russia and Norway. To intensify cooperation in this area, a Working Group on Oil and Gas, a Working Group on Energy Efficiency and Renewable Energy Sources and an Expert Group were established as part of a bilateral dialogue on the use of oil and gas resources and the environment [68].

As part of the energy dialogue between the countries, an Agreement on the exchange of seismic data in the Barents Sea was signed in 2016, and in 2018 — an Intergovernmental Agreement on the procedure for collecting seismic data up to and along the demarcation line on the continental shelf in the Barents Sea and the Arctic Ocean [69].

One of the longest examples of cooperation between Norway and Russia in the field of oil and gas is the cooperation of the Norwegian oil and gas state concern Equinor (Statoil until 2018) with PJSC Rosneft. Initially, Equinor State Concern has been involved in the development of the Kharyaginskoye oil field since 1996. In 2012, strategic cooperation with PJSC Rosneft Oil Company began. The cooperation of the two companies included many projects that were implemented not

[64] Joint Norwegian-Russian Fisheries Commission // BarentsPortal. URL: https://www.barentsportal.com/barentsportal/index.php/ru/status-2016/284-affiliated-topics-data-from-2013/adopting-and-adapting-an-ecosystem-approach-to-management/994-joint-norwegian-russian-fisheries-commission (accessed 01 March 2022).

[65] Rossiya i Norvegiya soglasovali usloviya promysla obshchikh zapasov na 2020 god [Russia and Norway agreed on the terms of fishing for common stocks for 2020] // Federal Agency for Fishery. URL: https://fish.gov.ru/news/2019/10/17/rossiya-i-norvegiya-soglasovali-usloviya-promysla-obshchikh-zapasov-na-2020-god/ (accessed 01 March 2022).

[66] RF i Norvegiya mogut vozobnovit' promysel moyvy ne ran'she 2022 g. [The Russian Federation and Norway may resume capelin fishing earlier than 2022] // Federal Agency for Fishery. URL: https://fish.gov.ru/obzor-smi/2020/10/20/rf-i-norvegiya-mogut-vozobnovit-promysel-mojvy-ne-ranshe-2022-g-rosrybolovstvo/ (accessed 01 March 2022).

[67] Bates Q. Russia and Norway strike 2022 fisheries agreement // FiskerForum. URL: https://fiskerforum.com/russia-and-norway-strike-2022-fisheries-agreement/ (accessed 15 July 2022).

[68] Energetics // Embassy of the Russian Federation in Norway. URL: https://norway.mid.ru/ru/countries/energetika/ (accessed 25 February 2022).

[69] Ibid.

only in the Arctic region [70]. Equinor, under the Production Sharing Agreement, owned 30% of the Kharyaginskoye oil field, which made the company the second largest investor in the project [71]. In addition, the Russian company Novatek planned to supply LNG to the Norwegian Equinor [72]. However, due to the current crisis, cooperation between the two companies ceased due to the departure of Equinor from Russia [73].

Russian companies have participated in tenders for licenses to develop the Norwegian shelf, which are organized by the Norwegian government for both national and international companies. In 2015, for example, Lukoil Overseas North Shelf AS applied for participation in the 23rd round of license distribution, which resulted in the approval to develop a certain block [74].

In addition, the cooperation of the Norwegian oil and gas state concern Equinor with PJSC OC Rosneft was also aimed at combating climate change and reducing greenhouse gas emissions, which led to the signing of an Agreement between them on cooperation in the field of greenhouse gas emissions management in 2021 [75]. The partners agreed not only to reduce methane and CO2 emissions as part of their joint oil and gas projects in Russia, but also to consider alternative energy sources, such as wind turbines, and to try to introduce carbon capture and storage technologies [76].

Nuclear power

For decades, cooperation in the field of nuclear energy and nuclear safety was carried out within the framework of the bilateral commission on nuclear and radiation safety, which operated for 25 years. In June 2021, the 24th meeting of the commission was held, which was focused on cooperation in preparedness, environmental monitoring and safety in Russian nuclear power plants [77]. In addition, it is important to note that cooperation between the Norwegian Radiation and Nuclear Safety Authority and the state nuclear energy corporation Rosatom has deepened over the past two years. In 2019, Norway provided financial support for the extraction and trans-

[70] Russia // Equinor. URL: https://www.equinor.com/en/where-we-are/russia.html (accessed 25 February 2022).
[71] Ibid.
[72] Postavki SPG «Novateka» v Norvegiyu usilili pozitsiyu RF na mirovom rynke gaza [Novatek's LNG supplies to Norway have strengthened Russia's position on the global gas market] // Ekonomika segodnya [Economics Today]. 10.08.2021. URL: https://rueconomics.ru/510940-postavki-spg-novateka-v-norvegiyu-usilili-poziciyu-rf-na-mirovom-rynke-gaza (accessed 25 February 2022).
[73] Norvezhskaya Equinor vyshla iz chetyrekh sovmestnykh predpriyatiy s «Rosneft'yu» [Norwegian Equinor withdraws from four joint ventures with Rosneft] // Forbes. URL: https://www.forbes.ru/biznes/466675-norvezskaa-equinor-vysla-iz-cetyreh-sovmestnyh-predpriatij-s-rosneft-u (accessed 16 July 2022).
[74] Norvegiya ob"yavila o nachale 24-go raunda raspredeleniya litsenziy na pravo razrabotki shel'fa [Norway announced the start of the 24th round of distribution of licenses for the right to develop the shelf] // PRO-ARCTIC. URL: https://pro-arctic.ru/29/08/2016/news/22950 (accessed 25 February 2022).
[75] Adomaitis N. Equinor, Rosneft to cooperate in cutting emissions in Russia // Reuters. 2021. URL: https://www.reuters.com/business/sustainable-business/equinor-rosneft-cooperate-cutting-emissions-russia-2021-09-29/ (accessed 25 February 2022).
[76] Ibid.
[77] Russia and Norway meet on issues of nuclear safety // Bellona. URL: https://bellona.org/news/nuclear-issues/2021-06-russia-and-norway-meet-on-issue-of-nuclear-safety (accessed 25 February 2022).

portation of spent nuclear fuel from Andreev Bay [78]. Norway has invested in safety upgrading programs at Kola NPP in Murmansk Region [79], in particular, supporting the Russian Federation in decommissioning old reactors at Kola NPP [80], an important step towards sustainable development. However, since Norway joined the anti-Russian sanctions, Russia has suspended its cooperation in the field of nuclear energy and nuclear safety [81].

Sociocultural cooperation

The sociocultural interaction between Norway and Russia was based on the Agreement on cooperation in the field of culture, education and scientific research of 1994, the Action Plan for cooperation in the field of culture in the Far North of 2009 and the Program of cooperation in the field of culture for the period 2019– 2021 The last document was adopted in 2019 and included nine projects with a total funding of NOK 2.9 million (about 20.5 million rubles). Five of these projects were dedicated to the performing arts, including the Samovar Theater in Kirkenes and the Norwegian-Russian Theater RuNo in Tromsø, while the other four were aimed at promoting and preserving the culture of indigenous peoples, mainly the Saami. There is no current information about upcoming performances and other events within these projects.

In addition, within the framework of the Work Program of Russian-Norwegian cooperation in the field of environmental protection for 2019–2021, two projects were implemented between the countries: Conservation, preparation of cultural monuments on the Kola Peninsula and the Nordland Railway project: Conditions in captivity and forced labor performed by Soviet prisoners of war during the Second World War. As part of the second project, the Norwegian side erected a new monument to Russian prisoners near the former POW camp, and Russian scientists developed the map “Blood Road: a map of facilities built by Soviet prisoners of war along the Nordland railway in 1943–1945” [82].

Cooperation in the cultural sphere also took the form of various events that were held on a reciprocal basis. In 2019, for example, there was an exhibition of works from the State Tretyakov

[78] Danilov F.P. Nuclear Safety is Still a High Priority in Norway’s Cooperation with Russia // High North news. URL: https://www.highnorthnews.com/en/nuclear-safety-still-high-priority-norways-cooperation-russia (accessed 25 February 2022).
[79] Norvegiya vlozhila 644 tysyachi evro v povyshenie bezopasnosti Kol'skoy AES [Norway has invested 644 thousand euros in improving the safety of the Kola NPP] // RIA Novosti. URL: https://ria.ru/20151110/1318071304.html (accessed 25 February 2022).
[80] Kireeva A. Russia and Norway meet on issues of nuclear safety // Bellona. URL: https://bellona.org/news/nuclear-issues/2021-06-russia-and-norway-meet-on-issue-of-nuclear-safety (accessed 25 February 2022).
[81] Rossiya zamorozila sotrudnichestvo s Norvegiey v sfere yadernoy bezopasnosti [Russia freezes cooperation with Norway in the field of nuclear safety] // RIA Novosti. URL: https://ria.ru/20220603/norvegiya-1792855782.html (accessed 16 July 2022).
[82] Sostoyalsya norvezhsko-rossiyskiy veb-seminar, posvyashchennyy sokhraneniyu pamyati o sovetskikh voennoplennykh [A Norwegian-Russian webinar dedicated to preserving the memory of Soviet prisoners of war took place] // Likhachev Russian Research Institute for Cultural and Natural Heritage. URL: https://heritage-institute.ru/?tribe_events=cotrudniki-instituta-naslediya-prinyali-uchastie-v-norvezhsko-rossijskom-veb-seminare-posvyashhyonnom-sohraneniyu-pamyati-sovetskih-voennoplennyh (accessed 16 July 2022).

Gallery's collection at the Munch Museum in Oslo, followed by an exhibition of works by E. Munch at the Tretyakov Gallery in the same year.

Many of these events were held as part of cross-border cooperation. In 2018, for the first time in the city of Kirkenes, the Murmansk Arctic State University (MASU) organized the Day of the Russian Language and Culture, the purpose of which was to promote the Russian language and literature [83]. Another event that has been held for several years is the Russian-Norwegian Forum. In 2021, the program of the forum was dedicated to the dialogue of cultures: "Russia and Norway at the crossroads of eras and cultures", and a scientific and practical conference, open lectures, film screenings, creative meetings were held in Murmansk with video broadcast in social media [84].

Another initiative in the framework of cross-border cooperation between Norway and Russia is the development of the Pasvik-Inari program. The Pasvik-Inari Park is located on the territories of Norway, Russia and Finland. As part of bilateral cooperation, Norway and Russia not only assessed the state and jointly monitored water and terrestrial ecosystems in the park, but also developed tourist routes. In 2021, a new tour route was opened near the waterfall on the Shuonijoki River, available to the citizens of Norway and Russia [85].

Citizens of the Russian Federation could also cross the Norwegian border without a visa or stamps in their passport. This opportunity was available to Russians who lived in the municipalities of Nikel, Pechenga, Zapolyarniy or Korzunovo for three years: if this condition is met, you can get a border resident certificate that allows you to travel to Norway an unlimited number of times, but for a limited term (no more than 15 days per trip) [86]. In the summer of 2022, the Norwegian Consulate General in Murmansk was temporarily closed, which led to the suspension of the issuance of residence permits in the border area [87].

In addition, Russia and Norway sought to develop inter-university cooperation. This interaction took place, in particular, within the framework of the Russian-Norwegian working group on cooperation in the field of education. At the beginning of 2022, about 140 cooperation agreements were in force between Russian and Norwegian universities and more than 40 joint scientific

[83] MAGU provel v Kirkenese Dni russkogo yazyka i kul'tury [MASU held Days of Russian Language and Culture in Kirkenes] // Khibiny. URL: https://www.hibiny.com/news/archive/160816/ (accessed 01 March 2022).
[84] V Murmanske otkrylsya rossiysko-norvezhskiy kul'turnyy forum [Russian-Norwegian cultural forum was opened in Murmansk] // Government of the Murmansk Oblast. URL: https://gov-murman.ru/info/news/401581/ (accessed 01 March 2022).
[85] Otkryt novyy turmarshrut na granitse Rossii i Norvegii [A new tourist route was opened on the border between Russia and Norway] // Ministry of Natural Resources of Russia. URL: http://www.mnr.gov.ru/press/news/otkryt_novyy_turmarshrut_na_granitse_rossii_i_norvegii_/index.php?sphrase_id=426961 (accessed 01 March 2022).
[86] Border resident certificate // Embassy of the Kingdom of Norway in Moscow. URL: https://www.norway.no/ru/russia/service-info/visitors-visa-res-permit/1/ (accessed 01 March 2022).
[87] Vremennoe zakrytie General'nogo konsul'stva v Murmanske [Temporary closure of the Consulate General in Murmansk] // Embassy of Norway in Russia. URL: https://www.norway.no/ru/russia/norway-russia/news-events2/-----/ (accessed 16 July 2022).

projects were carried out [88]. One example of cooperation in the field of higher education is the Russian-Norwegian master's program "International oil and gas business" in management field in MGIMO [89]. As of July 2022, there was no statement about the termination of inter-university cooperation between the countries.

Cooperation between Russia and Norway in multilateral formats

Until now, the Arctic Council has been the main platform for cooperation between Russia and Norway in the field of sustainable development of the Arctic region, since it unites all the Arctic and subarctic states and creates a basis for fruitful joint work. The work in the Arctic Council was carried out within the framework of several working groups, most of the projects involving Russia and Norway were implemented within the framework of the Sustainable Development Working Group (SDWG). For example, Russia and Norway, together with Canada, the Athabaskan Arctic Council, the Aleut International Association and the Saami Union, worked on the project "Indigenous youth, food knowledge and Arctic change (EALLU) [90] in 2019–2023, the purpose of which is to develop sustainable reindeer husbandry in the Arctic region, as well as to share knowledge about the food culture among indigenous peoples and reindeer herders.

In addition, in 2021, the SDWG launched the Arctic community representatives on COVID-19 and public health: a multi-site case study [91], which was devoted to assessing the impact of the COVID-19 pandemic on the population of the Arctic, on the level of healthcare in the region [92].

The SDWG has been implementing the Arctic demography index project [93], which was launched in 2020. Russia, Norway and Canada acted as project coordinators. The main goal of the project was to develop a methodology for calculating the demographic index based on three parameters: natural increase and decrease in the population and migration flows. Within the framework of the project, it was planned to calculate the demographic index in 19 Arctic regions, including 9 regions in Russia, 2 in Norway, 3 in Finland, 2 in Sweden and 3 in Canada.

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[88] Rossiya i Norvegiya prodolzhayut razvivat' mezhvuzovskoe sotrudnichestvo [Russia and Norway continue to develop interuniversity cooperation] // Ministry of Education and Science of Russia. URL: https://minobrnauki.gov.ru/press-center/news/?ELEMENT_ID=32412 (accessed 09 March 2022).

[89] Rossiysko-norvezhskaya magisterskaya programma «Mezhdunarodnyy neftegazovyy biznes» po napravleniyu «Menedzhment» [Russian-Norwegian master's program "International oil and gas business" on the discipline of "Management"] // MGIMO. URL: http://www.miep.mgimo.ru/page/view/id/49 (accessed 01 March 2022).

[90] Indigenous youth, food knowledge and Arctic change // Sustainable Development Working Group. URL: https://sdwg.org/what-we-do/projects/indigenous-youth-food-knowledge-arctic-change-eallu-i/ (accessed 20 February 2022).

[91] Arctic community representatives on COVID-19 and public health: a multi-site case study // Sustainable Development Working Group. URL: https://arctic-council.org/projects/arctic-community-perspectives-on-covid-19-and-public-health-a-multi-site-case-study/ (accessed 20 February 2022).

[92] Arctic Community Perspectives on Covid-19 and Public Health: A Multi-Site Case Study Project Proposal // Arctic Council. URL: https://oaarchive.arctic-council.org/handle/11374/2731 (accessed 20 February 2022).

[93] Arctic demography index // Sustainable Development Working Group. URL: https://sdwg.org/what-we-do/projects/arctic-demography-index/ (accessed 20 February 2022).

From 2021 to 2023, under the leadership of Russia and Norway and within the framework of the SDWG, it was planned to implement the Preserving Arctic Architectural Heritage project [94], the purpose of which is to create a digital database of cultural heritage objects in the Arctic, using 3D-modelling technology for online tours.

Since 2020, Russia, with support of the SDWG, has begun to create an international autonomous Arctic station "Snezhinka" [95]. It is a research center for experimentation, monitoring, technology development and implementation, primarily in the field of climate change [96]. Norway, as a member of the Arctic Council, expressed interest in this project.

Since 2015, Russia and Norway, within the framework of the working group on the implementation of the Arctic Monitoring and Assessment Program (AMAP), have been coordinating a project to assess radiation activity in the Arctic [97] in the context of global climate change and accelerated economic development of the Arctic. Within the framework of the project, the tasks were set to identify the sources of radiation activity and what effect climate change has on the level of radioactivity. However, at present, the Arctic Council and all its working groups have temporarily suspended work, and the Arctic states have refused to cooperate with Russia on common projects [98].

Norway takes part in cross-border cooperation programs (CBC) with the European Union. Norway participated in the Kolarctic CBC together with Russia. The phase from 2014 to 2020 was successfully completed, and the project was extended to a new phase from 2021 to 2027. On the part of Russia, the Murmansk and Arkhangelsk oblasts, as well as the Nenets Autonomous Okrug, were involved in the project, on the part of Norway — the county of Nurlan and Troms-og-Finnmark.

Among the sustainable development projects in the Arctic involving Russia and Norway within the framework of the Kolarctic CBC, the project Cross-border innovations in Arctic aquaculture can be singled out [99], which was launched in 2019 and was supposed to be completed by the end of 2022. The main objective of the project was to promote sustainable aquaculture development in the Arctic region by identifying and studying the factors that limit the introduction of fish species such as Arctic charr (Salvelinus alpinus), catfish (Anarhichas minor), whitefish (Coregonus lavaretus) and nelma

[94] SDWG Project Proposal — Preserving Arctic Architectural Heritage // Arctic Council. URL: https://oaarchive.arctic-council.org/handle/11374/2745 (accessed 25 February 2022).
[95] Arctic Hydrogen Energy Applications and Demonstrations (AHEAD) // Arctic Council. URL: https://arctic-council.org/ru/projects/arctic-hydrogen-energy-applications-and-demonstrations-ahead/ (accessed 25 February 2022).
[96] The Snowflake International Arctic Station — A hub for energy innovation and cultural exchange // Arctic Council. URL: https://arctic-council.org/news/the-snowflake-international-arctic-station-a-hub-for-energy-innovation-and-cultural-exchange/ (accessed 25 February 2022).
[97] Radioactivity in the Arctic // AMAP. URL: https://radioactivity.amap.no (accessed 20 February 2022).
[98] ARCTIC COUNCIL // The Arctic Council URL: https://www.arctic-council.org/ (accessed 17 July 2022).
[99] Cross-Border Innovations in Arctic Aquaculture // Kolarctic. URL: https://blogg.nord.no/arctaqua/ (accessed 23 February 2022).

(Stenodus leucichthys nelma), the breeding of which is more profitable and suitable for Arctic conditions [100].

In addition, the Arctic Railway Infrastructure in Kolarctic (ARINKA) project (2014-2021) was implemented under the Kolarctic program [101], the main objectives of which included sharing of advanced solutions and knowledge in railway construction to increase railway network capacity in the Kolarctic program region, as well as developing recommendations for monitoring the railway network. In the field of transport, a trilateral project (Russia, Norway and Finland) "Barents on schedule" was implemented, which resulted in the development of a platform [102] with information on cross-border public transport and on the main tourist routes. It is important that within the framework of the Kolarctic CBC, the border checkpoint Borisoglebsk, located on the Russian-Norwegian border, was reconstructed [103]. However, Russia's participation in the CBC is currently suspended [104].

Russia and Norway cooperated through the Barents Euro-Arctic Council, which Norway chaired from 2019 to 2021. At the 18th ministerial session of the Barents Euro-Arctic Council, Russian Foreign Minister Sergey Lavrov stressed the importance of maintaining a political dialogue with the Nordic countries on developing the Arctic region, including through summit meetings [105]. However, cooperation with Russia within the framework of this platform was also put on hold [106].

In addition, Russia, together with Norway, Iceland and the EU, created the Northern Dimension partnership [107], which facilitated Nordic cooperation in areas such as the environment, health, transport, logistics and culture.

Russia was a member of the Nordic Council of Ministers, of which Norway is also a member. The Nordic Council of Ministers has seven working areas, including higher education and research, health and climate protection. Within the framework of the Council, the interaction between Russia and Norway took place mainly on climate issues, for example, from 2019 to 2020, the countries participated in a project called Strengthening Nordic-Russian network in promotion of climate change mitigation for local development, the main goal of which was to develop NCO on climate change issues [108].

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[100] Ibid.
[101] ARINKA Project // Kolarctic CBC. URL: https://arinka.eu/ (accessed 22 February 2022).
[102] Barents on time // Kolarctic CBC. URL: https://barentsontime.com/ru/ (accessed 22 February 2022).
[103] Programma prigranichnogo sotrudnichestva Kolarktik 2014–2020 gg. [Cross-border cooperation program Kolarctic 2014–2020] // Kolarctic. URL: https://narfu.ru/upload/medialibrary/10e/sovmestnyy-programmnyy-dokument-pps-kolarktik.pdf (accessed 22 February 2022).
[104] CBC Kolarctic 2014–2020 // Kolarctic. URL: https://kolarctic.info/ru/kolarctic-2014-2020-ru-2/ (accessed 27 May 2022).
[105] Sergey Lavrov's interview before the 18th BEAC Ministerial Session // BEAC. 22.10.2021. URL: https://www.barents-council.org/news/sergey-lavrovs-interview-before-the-18th-ministerial-session-of-the-barents-euro-arctic-council (accessed 22 February 2022).
[106] Sovet Barentseva / Evroarkticheskogo regiona priostanovil sotrudnichestvo s Rossiey [Barents Euro-Arctic Council suspends cooperation with Russia] // Interfax. URL: https://www.interfax.ru/russia/827077 (accessed 19 July 2022).
[107] The Northern Dimension Partnerships // The Northern Dimension. URL: https://northerndimension.info/about-northern-dimension/ (accessed 23 February 2022).
[108] Strengthening Nordic-Russian network in promotion of climate change mitigation for local development // Nordic Co-operation. 22.11.2019. URL: https://www.norden.org/en/project/ukreplenie-seti-vzaimodeystviya-severnykh-stran-i-rossii-po-sodeystviyu-smyagcheniyu (accessed 23 February 2022).

In March 2022, cooperation with Russia within the framework of the Nordic Council of Ministers and within the framework of the Northern Dimension partnership was suspended [109].

Conclusion

The Arctic strategy of Norway in 2020 and the country's participation in a large number of projects in the Arctic demonstrate the geopolitical and geo-economic importance of the region for the state. First of all, Norway pays special attention to the values and goals of the international community, which it includes in its Arctic agenda. At the same time, the state forms the Arctic policy, based on the characteristics of the social, economic, environmental and climatic conditions of its northern region, striving to ensure national interests through international cooperation.

The multilateral cooperation projects, in which Norway has participated, especially since 2020, are consistent with the goals and objectives specified in the new Arctic strategy of the state. This conclusion was made on the basis of Norway's participation in the projects of the Arctic Council, the Nordic Council of Ministers and the Kolarctic CBC, as well as the state's chairmanship of the Barents/Euro-Arctic Council, under which, for example, measures were taken in line with the objectives of the Norwegian Strategy for the Protection environment, namely addressing climate change.

In general, the priority of environmental protection over other areas of Arctic policy in Norway has been noted. This is confirmed by the active participation of the state in the projects of the working group on the protection of the Arctic marine environment of the Arctic Council, as well as the abundance of multilateral and bilateral measures already implemented in this area. In particular, this can be seen in cooperation with Russia, where Norway has not only carried out joint projects on pollution control, biodiversity conservation and marine environmental management, but has also strengthened the institutional framework accompanying this cooperation. The existence of an extended Working Program for Russian-Norwegian environmental cooperation in 2019–2021 and working groups in this area demonstrates the integrated and responsible approach of both Norway and Russia to protecting the region's environment.

The experience of cooperation with Russia in recent years demonstrates its qualitative and quantitative results in the form of projects already fully or partially implemented, as well as new agreements and the creation of additional institutions of interaction. One noteworthy example of this is Norway's willingness to support Russia in its own Arctic projects, which are not directly linked to a common land and sea border or multilateral cooperation formats, such as Norwegian support for nuclear power in Russia, namely the safety of the Kola nuclear power plant. Over the past three years, Norway has demonstrated its willingness to share its own experience and knowledge with Russia, as well as to contribute to the development and introduction of new measures and policies that are already being implemented in Norway, including ecosystem management of the environment.

[109] Nordic Council of Ministers suspends all co-operation with Russia // Nordic Co-operation URL: https://www.norden.org/en/news/nordic-council-ministers-suspends-all-co-operation-russia (accessed 17 July 2022).

Thus, Norway and Russia accumulated a huge potential for cooperation in various fields: from the economy to culture. At the same time, the implementation of many projects, due to their peculiarities, depends on the continuity of the process of cooperation between the two countries. Despite the difficult geopolitical situation after 2014, as well as Norway's membership in NATO, the Norwegian side has repeatedly stressed the importance and necessity of dialogue and cooperation with Russia in the Arctic to ensure the integrated development of this unique region. This was confirmed by the persistence of cooperation projects even in the energy sector, which is closely linked to the national interests of states and which is strongly influenced by political tensions in the international arena.

However, due to the events of February 2022, Norway suspended cooperation with Russia in multilateral and bilateral formats. At the beginning of the summer of 2022, the Norwegian government did not announce the possibility of resuming existing projects and organizing new ones. The aggravation of relations between Russia and Western countries has a critical impact on the state of cooperation between the Arctic states in the region. Most joint projects between Norway and Russia have been suspended, new meetings within the framework of bilateral working groups are not held, and part of the interaction has been completely stopped, as, for example, in the energy sector due to the departure of the Norwegian Equinor from Russia. There is no information in the public domain about the current status of cooperation in some projects, but it can be assumed that the lack of data indicates a suspension of bilateral cooperation. In the multilateral formats of cooperation between Norway and Russia, a similar trend can be traced, as Norway has put on pause all joint projects with Russia and, in general, interaction with it within the framework of the Arctic Council, the Council of the Barents Euro-Arctic Region, the Nordic Council of Ministers, the Northern Dimension partnership and all CBC, in particular, Kolarctic CBC.

The implementation of the accumulated capital of the Norwegian-Russian cooperation in the Arctic largely depends on the possibility of overcoming the foreign policy crisis in the coming years. Otherwise, the rich experience of interaction in the region in various fields will be lost, as well as opportunities for future cooperation. In addition, a break in relations can have a critical impact on the state of the Arctic ecosystems, which are extremely vulnerable to global climate change and local pollution, requiring collective action by all countries in the region [10, Makarov I.A., Stepanov I.A., p. 136].

However, the experience of scientific cooperation between Norway and the USSR during the acute geopolitical crisis during the years of the Cold War testifies to the reality of overcoming difficulties and tensions in bilateral relations in order to continue cooperation in the Arctic. In 1958, meetings of Soviet and Norwegian oceanologists were held, and in 1965, three years after the Caribbean crisis, the first joint expedition of the countries was carried out in the Barents Sea to study fish stocks, which testifies to the understanding by states of the importance of developing cooperation to protect the environment and implementation of sustainable economic activity in the Arctic [110]. The signing by the

[110] 60 let rossiysko-norvezhskogo nauchnogo sotrudnichestva: pripodnyali zheleznyy zanaves radi obshchego morya [60 years of Russian-Norwegian scientific cooperation: the iron curtain was lifted for the sake of a common sea] // Fishnews.ru. URL: https://fishnews.ru/rubric/krupnyim-planom/11069 (accessed 18 August 2022).

USSR, Norway, Denmark, Canada and the USA of the Agreement on the Conservation of Polar Bears (1973) also indicates the priority of international cooperation in the field of environmental protection in the Arctic. The past experience of overcoming crisis situations and the rich history of relations between the two countries should form the basis for the resumption of dialogue, the preservation and enhancement of the accumulated capital of Russian-Norwegian cooperation in the Arctic.

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The article was submitted 26.07.2022; approved after reviewing 27.07.2022; accepted for publication 25.08.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

NORTHERN AND ARCTIC SOCIETIES

Arctic and North. 2022. No. 49. Pp. 131–149.
Original article
UDC 316.34(98)(045)
doi: 10.37482/issn2221-2698.2022.49.152

Readiness of Social Environment for Inclusion of "Atypical" Children in Regional Society of the Euro-Arctic Territories of Russia

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Abstract. The relevance of studying the state of the social environment of a regional society is determined by the development of inclusive processes that involve the integration of people with disabilities into public life as full members of society. In this regard, it is important to understand the level of readiness of society to include disabled children due to the large-scale disability of the child population and the existing need to create special conditions for the positive socialization of children in this category. The issues of creating inclusive environmental conditions are particularly relevant in Euro-Arctic territories, which are characterized by significant risks to health and quality of life of the population. In order to identify the level of readiness of the social environment of regional society, the article undertakes theoretical and empirical research, including an analysis of the characteristics of the social environment and approaches to determining its accessibility in domestic and foreign studies, the author's typology of private social environments, as well as an assessment of the state of infrastructural and socio-psychological barriers for children with disabilities based on the results of the author's online questionnaire survey of the population of the Arctic territories of the Northwestern Federal District conducted in 2022 (n=861, the sample is proportional to the number of residents of the Arctic territories). The survey revealed the existing barriers to inclusion in the studied territories, which is important in the implementation of social policy measures to create a barrier-free environment for the younger generation with persistent health disorders.
Keywords: *disabled children, atypicality, "atypical" child, social inclusion, social environment, accessible environment, barrier-free environment, Euro-Arctic region*

Acknowledgments and funding

The study was supported by the Russian Science Foundation grant No. 22-28-00795, https://rscf.ru/project/22-28-00795/.

Introduction

In modern society, the development of inclusive processes aimed at the involvement of people with disabilities in all spheres of life on an equal basis with other citizens has identified a number of social tasks that need to be solved as a matter of priority. We single out the creation of an accessible environment among them, which is insufficiently formed in the regional society today [1, Zhigunova G.V., Afonkina Yu.A., p. 012035].

For citation: Afonkina Yu.A., Zhigunova G.V. Readiness of Social Environment for Inclusion of "Atypical" Children in Regional Society of the Euro-Arctic Territories of Russia. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 152–173. DOI: 10.37482/issn2221-2698.2022.49.152

It should be emphasized that genuine, and not formal, social inclusion of people with disabilities requires not only infrastructural accessibility, but also the possibility of social environment resources use on the basis of maximum possible subjective activity to meet their needs, their involvement in cultural and other benefits of society, social practices [2, Afonkina Yu.A., p. 8–9].

The study of the accessibility of the environment in terms of regional specificity is the focus of many modern studies, the results of which reflect the state of accessibility of both different spheres of life for people with disabilities, and territories in general, taking into account the characteristics of the regions [3, Usova L.V., p. 29–30, etc.]. The significance of regional studies is determined by the fact that the role of sociological knowledge increases in the study of global, regional (national) social space due to the change of civilizational values [4, Dregalo A.A., Ulyanovsky V.I., p. 56].

It can be argued that the inclusion of people with disabilities today sets a new meaning and new tools for the social development of regions. The study of the regional environment in terms of its accessibility for the inclusion of people with disabilities is important for understanding the specifics of the processes taking place in modern society from heuristic, prognostic and applied points of view. In the first case, it is about obtaining new sociological knowledge about the interaction and relationship between the individual and the environment in the development of inclusive processes; in the second case, it is about identifying directions and trends of social inclusion in modern Russian society, and in the third one, it is about developing mechanisms and ways of social management of community processes to ensure independent living of people with disabilities.

Children with disabilities should be singled out as a special social group, whose socialization takes place in significantly difficult conditions. Its methods and forms are recognized by society as “abnormal”, and a child is endowed with “atypicality” [5, Skvortsova V.O., p. 168].

The specificity of inclusion of an “atypical” child in the society is determined, on the one hand, by its dependence on the social environment, which does not always take into account the needs of a growing person for inclusion and creates the necessary conditions for it, and, on the other hand, by maximum sensitivity to social influences.

We believe that children with disabilities (taking into account their irregular/non-standard/unusual ways of inclusion in social processes) need to transform the social environment, which can be reasonably provided only on the basis of a modern scientific base. At the same time, it should be emphasized that today there is no systematic understanding of the accessibility of the modern social environment for the “atypical” child, which makes it difficult to design conditions and use resources for inclusion in various social environments of regional societies.

It should be noted that from the standpoint of the analysis of regional specifics in the context of accessibility of the social environment, the Euro-Arctic territories are of particular interest as they are characterized by significant environmental and climatic risks that have a negative impact on public health, including the child population [6, Revich B.A., p. 395–396, etc.].

Thus, the study of the state of the social environment of the regional society for an “atypical” child in the Euro-Arctic territories is an urgent scientific task, the solution of which is of theoretical significance for the development of the sociology of the social environment and of practical importance in terms of managing the development of inclusive processes in modern society.

Materials and methods

At the theoretical level, the study used general scientific and particular scientific methods, such as analytical-synthetic and system methods, methods of induction, deduction and comparative analysis, structural-functional method; at the empirical level — online questionnaires and the method of statistical data processing using the IBM SPSS Statistics software.

The materials of the research are sociological theories, concepts and approaches that made it possible to compile a methodological platform for studying the readiness of the social environment for an “atypical” child in a regional society in the Euro-Arctic territories, namely:

1. Theory of atypicality of E.R. Yarskaya-Smirnova, which considers the atypicality of the individual as a result of social construction. From the perspective of socio-cultural analysis of atypicality, overcoming the isolation of people with disabilities in society requires the elimination of not only physical, but also symbolic barriers, which imply social assessment of disability as a restriction, anomaly and unsuitability, as well as attributing the marginal nature of the social life of a child with a disability and his family [7, p. 26].

2. The concepts of accessible and barrier-free environment that have emerged in Russian sociology. First of all, we note the concept of E.K. Naberushkina, who analyzes these concepts through the prism of universal design as an idea of social equality and, consequently, strict requirements for the organization of Russian social environment [8, p. 206]. The elimination of barriers in the social environment is considered by scientists as the most important condition for the independent life of people with disabilities [9, Romanov P.V., Yarskaya-Smirnova E.R., p. 67]. At the same time, the formation of a barrier-free environment, according to Nikonova A.A., is impossible without the transformation of public relations, values, norms and practices [10, p. 176].

3. The theory of institutional organization of juvenile disability of G.V. Zhigunova, according to which the social construction of the phenomenon of disability as a collective fact of public consciousness is carried out by institutional means and in institutional forms of social reality. The specificity of the problems of juvenile disability is determined by the fact that any deviation in the physical and/or mental sphere of a child, disrupting the formation of his psychosocial functions, negatively affects his social identity. In turn, the identification and self-identification of a person with a disability as an inferior subject hinders his social adaptation and self-realization, leading to social exclusion [11, Zhigunova G.V., p. 68–70].

4. The author’s interpretation of the environmental approach to the analysis of inclusive processes, which reveals the trends in the development of an accessible environment based on the analysis of complex and non-linear relationships between a person with a disability and envi-

ronmental resources in the course of his interactions and relationships with the environment as a metasystem that implies the unity of legal, sociocultural, material-technical, socio-psychological and other systems.

5. The concept revealing sociological potential of studying the social space of the northern regions of A.A. Dregalo and V.I. Ulyanovsky [4, p. 60]. Based on the multidimensional understanding of the object of sociological analysis of local social community by the mentioned scientists, we consider regional society as an integral subsystem of society, and therefore reflecting global social trends. In addition, we consider regional society both as a system of social actions through specific cases of consciousness and behavior in relation to people with disabilities, and also as a sphere of communication and solidarity of the population, manifested in relation to representatives of regional societies to this category of people. When defining the subject of research within the framework of this concept, we proceeded from the consideration of social factors of accessibility in the regional society as a result of the activity of agents of social institutions and social actions/interactions, structures of the regional society; system elements of the local social environment, the analysis of which reveals the provision of accessibility at the microsocial level, makes it possible to identify the changing social reality of the local environment and determine the state of the processes taking place in the regional society.

6. The results of the author's empirical study of 2022 among residents of the Arctic territories of the Republics of Karelia and Komi, the Nenets Autonomous Okrug (hereinafter referred to as NAO), Murmansk and Arkhangelsk oblasts (excluding NAO) using an online questionnaire on the problems of social functioning of children with disabilities in the context of the development of an inclusive social environment in the regions of the Euro-Arctic territories with a proportional representative sample of 861 people.

Discussion

The theoretical and empirical analysis of inclusive processes inevitably draws attention to the category of the social environment, which is widely reflected in classical and modern sociological approaches. Thus, even E. Durkheim associated social progress with changes in the environment [12, p. 18]. T. Parsons explained the environment as an integral attribute of the action system [13, p. 6–7], when interaction with the environment, regulation of access to material resources characterizes the self-sufficiency of society.

The social environment in a number of foreign sociological studies is considered not as a space, but as a system of places. For example, in the work of R. Barker, the category of "place of behavior" is discussed, which combines the physical properties of a place and the pattern of people's behavior inherent in it [14, Barker R.G.].

Interpretation of the social environment within the sociology of the city from the point of view of its physical structure as a factor in the distribution of social roles of citizens and their discrimination [15, R. Park; 16, Wirth L., p. 1–24] is of particular interest.

Among modern foreign researchers, we note works that consider the specifics of the influence of barriers on the promotion of the independence of people with different needs [17, Mooney F., Rafique N., Tilly L., p. 241–246; 18, Sandjojo J., Gebhardt W.A., Zedlitz A., Hoekman J., p. 37–52; 19, Sandjojo J., Gebhardt W.A., Zedlitz A., Hoekman J., p. 111–122]. The importance of the needs of persons with disabilities in the organization of the social environment is reflected in the study by E.P. Tudzi, J.T., Bugri, A.K. Danso, who used the example of students with disabilities to show the lack of proper society's understanding of the inclusive needs of people with disabilities, which is reflected in the problems of communication, accessibility of transport and the physical environment [20, p. 275–294].

In domestic sociological approaches, the social environment is considered as the focus of the relationship between a person and society, mediated by a combination of certain conditions, individual and social ones [21, Khannanov Sh.K., p. 74–77]. J.T. Toshchenko includes the category of environment in the concept of the sociology of life, which considers the consciousness, behavior and attitude of a person to a change in the social status of individuals, as well as the social environment of a person's social life at different levels of social reality [22, p. 7].

The social environment is revealed as a set of social relations, prevailing ideas and values, products and results of human labor, creativity, scientific research. For an individual, it acts as the closest living space, the space of everyday life. However, it is important to emphasize that in both cases, a person is an element of the environment as well as a social actor creating it, establishing a dynamic balance with the social environment based on interactions and relationships.

Studies, reflecting the essence of influence of environment on a person, deserve special attention. The dependence of man on the artificial and natural environment, the importance of the commonality of personality and environment is emphasized in the works of A.A. Dregalo and V.I. Ulyanovskiy [4, p. 57], Sh.Kh. Khannanov, indicating that it is in relation to the environment that a person manifests himself, adapts to it or changes it [21, p. 72].

In modern foreign studies, along with the fact that the influence of the environment on the development of mental health disorders has been proven [23, Mandy W., Lai M., p. 271–229], the dependence of the quality of life of people with disabilities and the success of their rehabilitation on providing access to basic urban and social resources in the environment is shown [24, Sze N.N., Christensen K.M., p. 66–73], as well as their inclusion in labor activity [25, Laditka J.N., Laditka S.B., p. 126–134].

Thus, inclusion in the social environment can both aggravate a person's health disorders and make up for his limited health opportunities and return him to society.

In general, our theoretical analysis of approaches to the category of the social environment allows us to define it as a set of social conditions that facilitate or hinder a certain type of activity of a person, in which his needs are satisfied. Accordingly, we define an inclusive environment as a set of social conditions that contribute to the unhindered implementation of social interactions of individuals in the process of meeting their social needs. In terms of accessibility, the social envi-

ronment is revealed through resources and barriers that form the conditions for the inclusion or exclusion of people with disabilities.

Taking into account the understanding of a barrier-free environment that has developed in Russian sociology, it should be considered not only in terms of equipping infrastructure facilities with elements of accessibility, but primarily in the context of creating conditions for social interaction between different categories of citizens and communities, which is achieved by overcoming various kinds of barriers, material and non-material ones. Moreover, as E.K. Naberushkina notes, in the process of creating elements of accessibility for people with disabilities today, on the contrary, we fix discrimination against them, focusing on their specific status. This appears in the creation of special urban spaces for the disabled, the equipment of separate entrances to buildings and verified logistics routes, beyond which many social barriers remain [8, p. 207–208].

As noted in the Report of the UN Secretary-General (2012), accessibility is not an act or a state, but a freedom of choice that makes it possible to enter some other environment and participate in its processes [1]. Therefore, accessibility must be considered not only as presence, but also as participation. However, the problem of accessibility in Russia has not been solved yet. A person with disabilities still faces numerous barriers to social inclusion that prevent him from actualizing and developing human potential, exercising freedom of choice and developing his own life strategy. These barriers cannot be fully eliminated only by improving the activities of social services. Broad public efforts are needed to improve the accessibility of social environments, which will allow people with disabilities to lead an independent life.

The notion of universal or inclusive design is related to the category of accessibility, which means that the design of objects, settings, programs and services is usable for all people to the greatest extent possible without the need for adaptation or special design [2], which, of course, does not exclude the use of special devices for specific individuals if necessary. Inclusive design expands human capabilities, focusing not on a specific hypothetical user, but on the widest possible range of consumers. The main criterion for inclusive design, in our opinion, is the ability for people with different needs, including special ones, to use the same objects, and therefore to interact. In this way, inclusive design differs from assistive technologies that are used only by people with disabilities, which excludes them from interacting with or makes them dependent on other people.

[1] Problemy i novye tendentsii v oblasti uluchsheniya polozheniya invalidov: doklad General'nogo sekretarya OON/Spetsial'nyy komitet po vseob"emlyushchey edinoy Mezhdunarodnoy konventsii o zashchite i pooshchrenii prav i dostoinstv invalidov [Challenges and New Trends in the Advancement of Persons with Disabilities: Report of the UN Secretary-General/Ad Hoc Committee on a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities]. New York, June 16–27, 2003, p. 5. URL: https://www.un.org/esa/socdev/enable/documents/ahcdocs03/issueadv-ru.pdf (accessed 03 July 2022).

[2] Konventsiya o pravakh invalidov [Convention on the Rights of Persons with Disabilities]. URL: https://www.un.org/ru/documents/decl_conv/conventions/disability.shtml (accessed 03 July 2022).

Let us also note the promising approach of A.A. Nikonova, who considers the creation of an inclusive environment through the organization of an inclusive city as a new type of urban environment accessible to every person [10, p. 177].

Thus, the readiness of the social environment to include people with disabilities is revealed only when people can not only be in it, but also fully use its resources, which requires the removal of barriers and the adaptation of social standards to meet the needs of people in universal comfortable ways. Such environmental transformations in the narrow sense expand the spheres and forms of activity of people with disabilities in different social environments, providing them with access to employment, leisure, education, recreation, etc., and, in a broader sense, help to establish the equal value for society of the needs of all individuals without exception.

The creation of a barrier-free environment is especially important for the younger generation, when values, directions of life self-determination and personal identity are formed. Analysis of the problem of readiness of the regional social environment for an “atypical” child is of particular scientific interest and has significant practical relevance due to the fact that, on the one hand, in modern society, the scale of child disability increases every year, and on the other hand, the conditions and mechanisms of inclusion of children with disabilities in society remain understudied.

Let us also dwell on the phenomenon of “atypical” in relation to children with disabilities. Due to the perception of atypicality as a deviation of something or someone from social norms and rules fixed in the public consciousness and the institutional structure of society, stereotypes of perception are formed in society, which are reproduced in the practices of distancing from the “other”. As Skvortsova O.V. notes, everything beyond the normativity is perceived by society as an abnormality, being reflected in public perception through social symbols and social practices [5, p. 168]. Considering the above, the attitude of society towards a child as an atypical individual depends on how much his appearance, actions and behavior correspond to social standards and expectations existing in society.

The perception of children with disabilities as being atypical distorts their interaction with the social environment, which, in turn, narrows their opportunities and pushes them to the periphery of the micro-social space. This situation can be overcome by using the available resources of the social environment and enriching them to meet the needs of a developing personality, which requires the activity of both the child and other actors of social inclusion.

It should be emphasized that a significant characteristic of “atypical” children is their extreme vulnerability as a social group: both because of their socio-age characteristics (lack of independence and dependence on adults in organizing their life, combined with limited expression of will), and due to the fact that a significant part of them is extremely insufficiently included in social environments, the reasons for which require a detailed study.

Results

The results of the author's empirical sociological research conducted in 2022 by online questionnaires among the population of the Euro-Arctic region of the Russian Federation revealed the state of readiness of the social environment of the regional society to include “atypical” children into it. The sample is representative (n=861 persons aged 18 to 78), proportional to the number of inhabitants of the subjects of the European part of the Russian Arctic, including: representatives of the Arctic territories of the Republic of Karelia — 6% (52 people), Komi Republic — 4.5% (39 people), Nenets Autonomous Okrug — 3.9% (34 people), Arkhangelsk Oblast — 37.9% (326 people), Murmansk Oblast — 47.6% (410 people). Most of the respondents (61.8%) had a higher education, 15.4% had a specialized secondary education, 13.2% had a secondary vocational education, 2.9% had a general complete education, and 1.3% had an incomplete higher education.

It should be noted that the survey, when identifying attitudes towards children with disabilities, used differentiation by types of persistent disorders based on the classification adopted in the Russian legislation [3], from which the disorders that cause the need to create a barrier-free environment at the material and technical or socio-psychological levels — musculoskeletal (hereinafter referred to as MSD) disorders, mental disorders, visual and hearing disorders and disorders caused by physical deformity were highlighted.

The vast majority of the surveyed residents of the Euro-Arctic territories (99.4%) meet children and adolescents with disabilities in public places of their regions with different frequency, that is, they have direct experience of perceiving an “atypical” child.

Most of the respondents believe that children with disabilities, with the exception of those with mental disabilities, should be in public places. Specifically, the presence of children with MSD disorders is generally supported by 83.5%, children with hearing impairments — by 79.8%, with visual ones — by 76.2%, with physical disabilities — by 72.4%. About half of the respondents (48.2%) expressed support for the presence of children with mental disabilities in public places, while 36.9% said that this category should only be present under certain conditions (Fig. 1).

[3] Prikaz Ministerstva truda i sotsial'noy zashchity Rossiyskoy Federatsii ot 27 avgusta 2019 goda N 585n «O klassifikatsiyakh i kriteriyakh, ispol'zuemykh pri osushchestvlenii mediko-sotsial'noy ekspertizy grazhdan federal'nymi gosudarstvennymi uchrezhdeniyami mediko-sotsial'noy ekspertizy» [Order of the Ministry of Labor and Social Protection of the Russian Federation of August 27, 2019 N 585n "On the classifications and criteria used in the implementation of medical and social examination of citizens by federal state institutions of medical and social examination"]. URL: https://docs.cntd.ru/document/561183607 (accessed 05 July 2022).

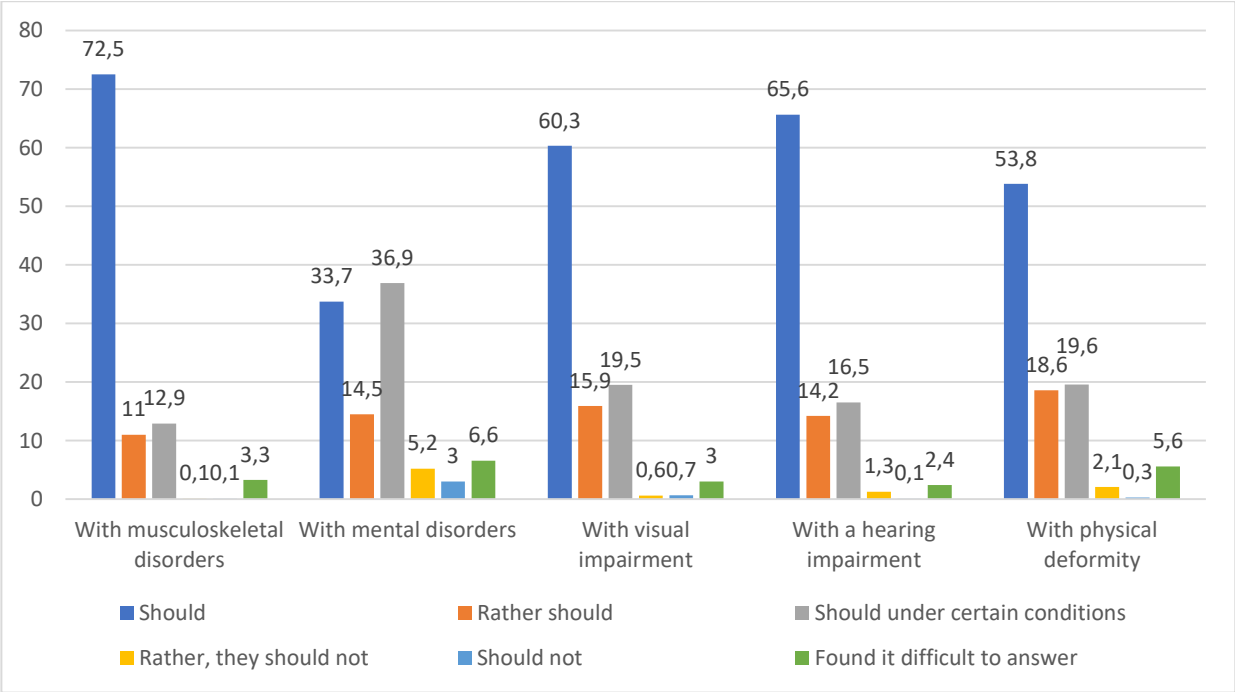

Fig. 1. Opinions of respondents on the necessity for children with disabilities to be in public places, %.

Depending on the region, opinions that children with disabilities rather should not and definitely should not be in public places prevail among the representatives of the Republic of Karelia. Moreover, this opinion is widespread in relation to children with all the identified types of disorders, except for MSD. Respondents from NAO have the least such opinions (2.9%).

Respondents from the Republic of Karelia (16.7%) are most negatively inclined towards children with physical disabilities, followed by the Republic of Komi (5.2%), the Arkhangelsk Oblast (1.8%) and the Murmansk Oblast (1.2%).

Regarding children with mental disorders, the answers “rather should not” and “definitely should not” were given in all the regions surveyed: 15.4% of the respondent from the Komi Republic, 10.4% from the Arkhangelsk Oblast, 7.0% from the Republic of Karelia, 6.6% from the Murmansk Oblast, 2.9% from the NAO.

12.5% of respondents from the Republic of Karelia, 1.2% from the Murmansk Oblast, 0.3% from the Arkhangelsk Oblast believe that children with hearing impairments rather should not and definitely should not be in public places. Negative answers regarding children with visual impairments were given by 2.3% of the respondent from the Republic of Karelia, 2.2% from the Murmansk Oblast, 0.3% from the Arkhangelsk Oblast. 2.5% of the representatives of the Republic of Komi and 0.2% of the Murmansk Oblast, respectively, believe that children with disabilities rather should not and definitely should not be in public places (Fig. 2).

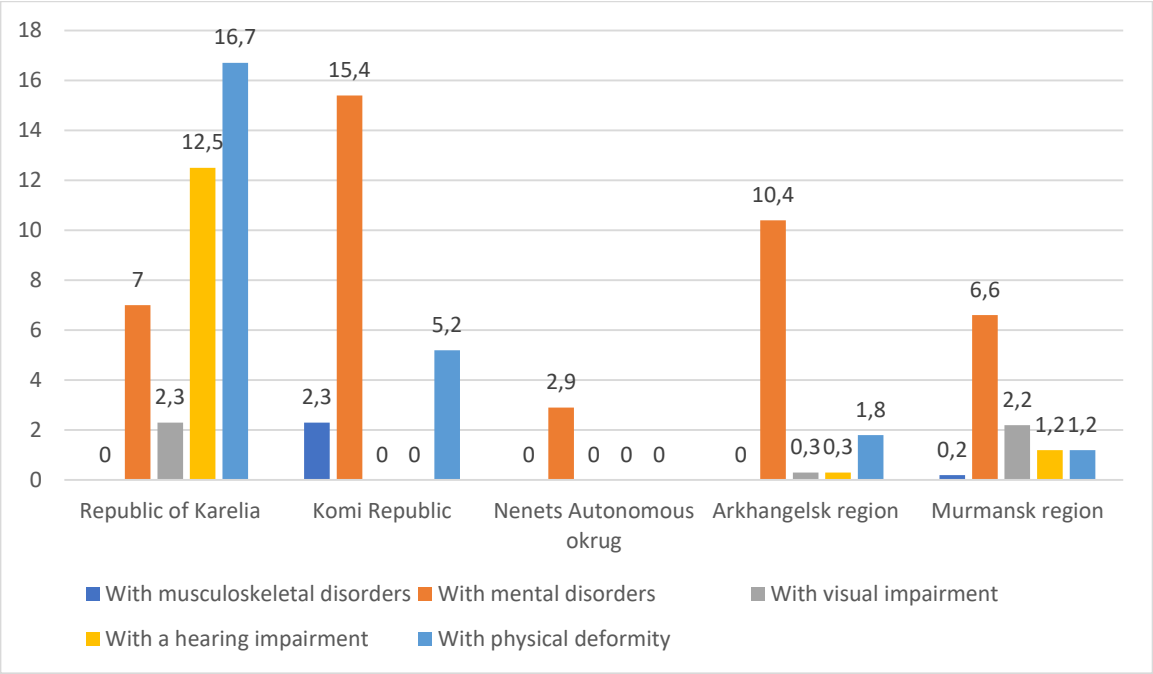

Fig. 2. Distribution of respondents' negative answers about the presence of children with disabilities in public places depending on the region of residence, %.

Revealing the respondents' ideas about the level of accessibility of social infrastructure of their "home" regions, it was found that more than a third of the respondents (37.5%) believe that the social infrastructure of their regions is less accessible to people with disabilities, almost the same number (34.3%) note that the infrastructure is only half available (Fig. 3).

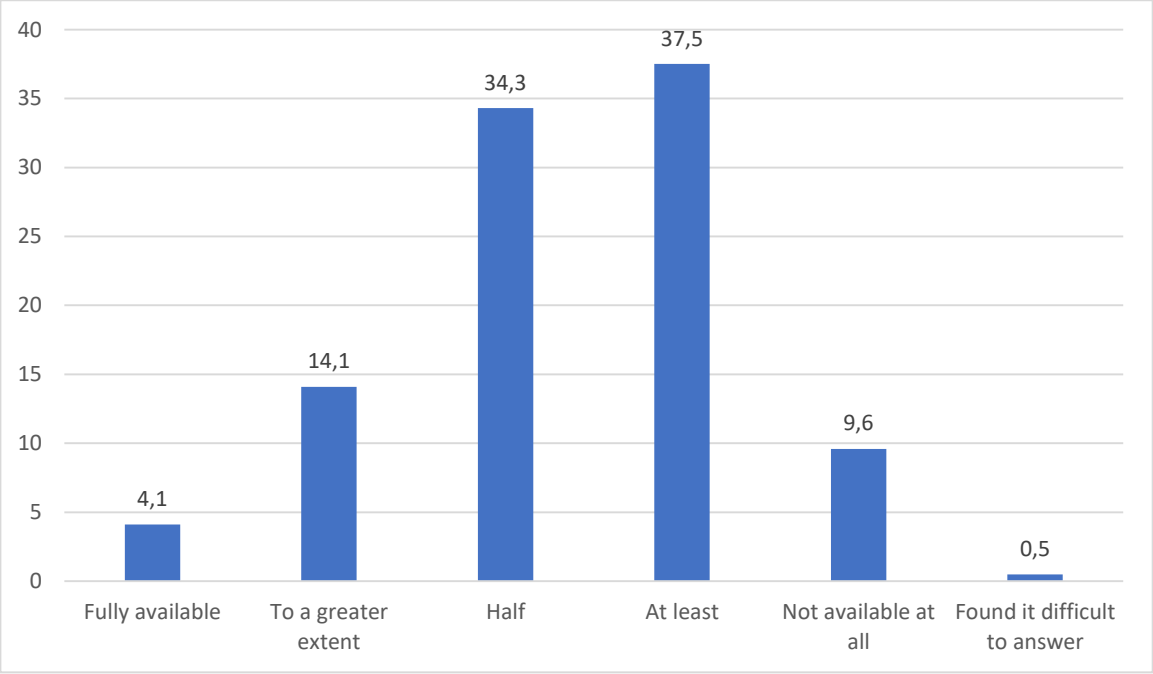

Fig. 3. Respondents' opinions on the level of accessibility of the social infrastructure of their regions for people with disabilities, %.

About a half of the surveyed respondents from the Komi Republic (48.7%) and NAO (44.1%) indicated that the infrastructure of their region is less accessible. In other regions, this assessment,

although somewhat dominant, is close to the “half ready” response. At the same time, the indicator “not ready at all” is higher in the Republic of Karelia (16.7%) and the Murmansk Oblast (11.5%) compared to other regions (Fig. 4).

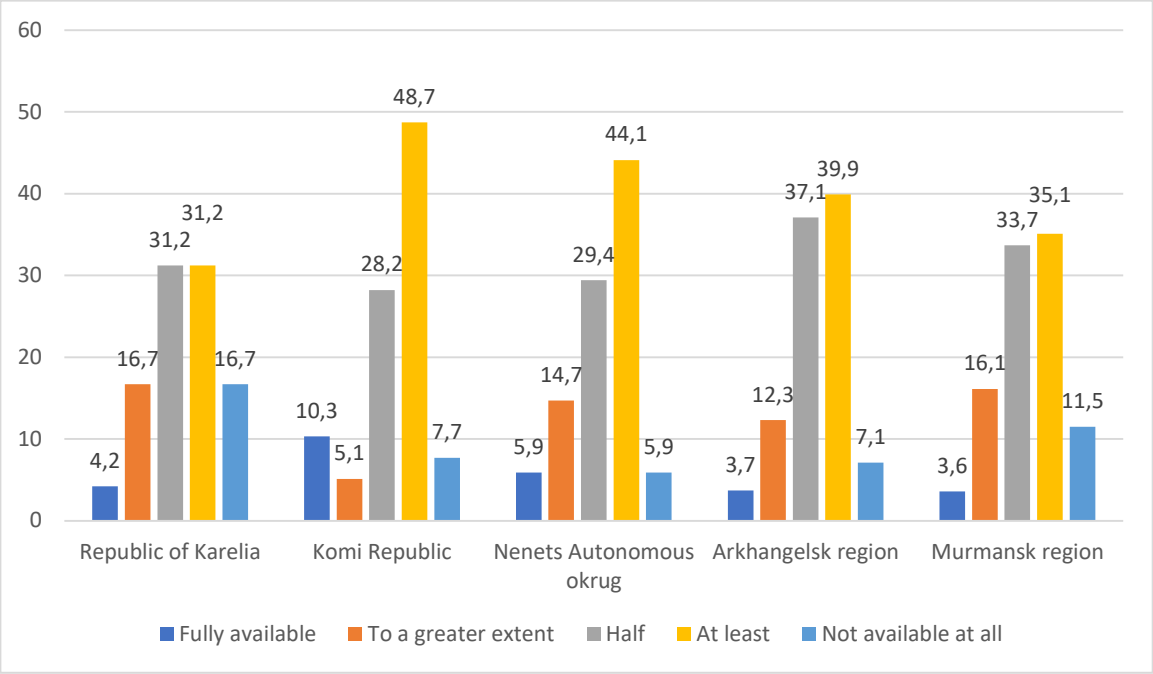

Fig. 4. Perceptions of accessibility of social infrastructure for people with disabilities depending on the regions of the respondents, %.

The index of accessibility of social infrastructure by region is as follows (1 is fully accessible, -1 is completely inaccessible): -0.52 in the Komi Republic, -0.31 in the Arkhangelsk Oblast, -0.29 in the NAO, -0.27 in the Republic of Karelia, -0.26 in the Murmansk Oblast. The cumulative index of accessibility of infrastructure facilities in the Euro-Arctic territories is -0.3.

Since education plays a crucial role in the inclusion of children with disabilities in the course of their socialization, the respondents were asked about the type of educational institution for teaching children with certain disabilities. The opinions of the respondents were slightly outweighed towards a regular institution only for children with MSD disorders, but at the same time they amounted to less than half (47.9%). The remaining categories, according to respondents, should be educated predominantly in specialized institutions — from 42.2% for those with physical deformity to 74.4% for children with mental disorders. In relation to children with these two types of disorders, a higher percentage of responses are “at home schooling”, which indicates that the public is not ready for joint education of children (Fig. 5).

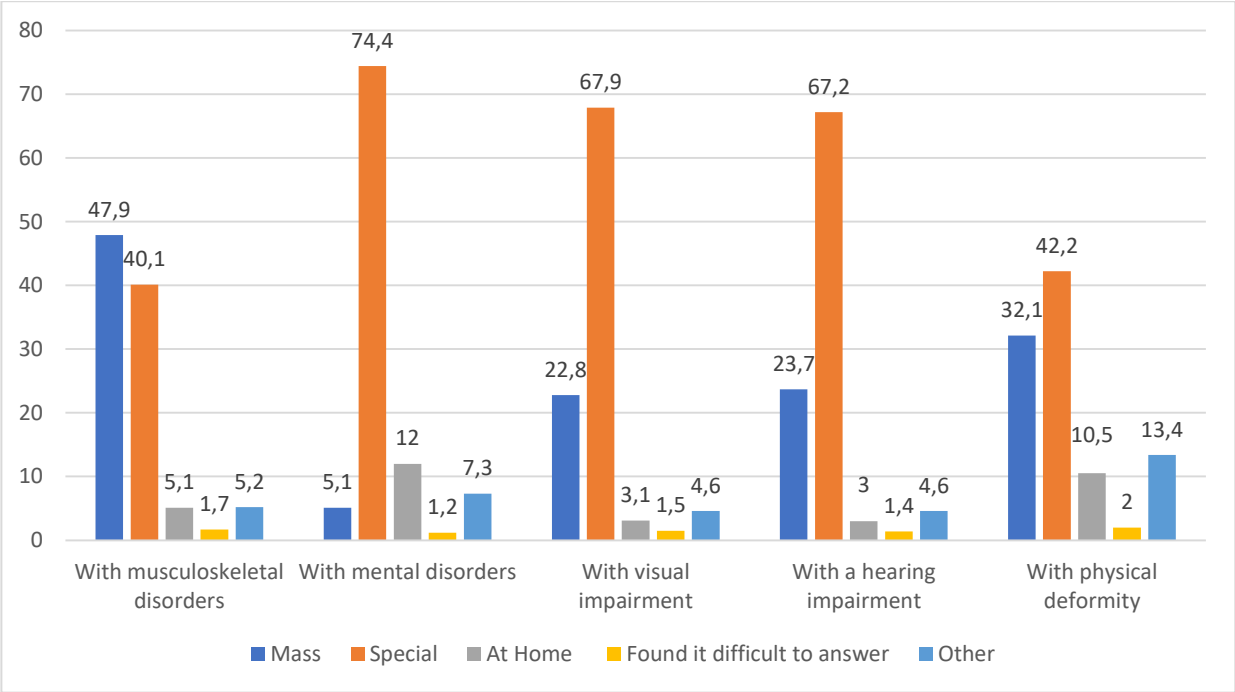

Fig. 5. Respondents' perceptions of places where children with various types of impairments should study, %.

Depending on the region of the respondents' residence, opinions about the education of children differ only in relation to children with MSD disorders and children with physical deformities; for children with other types of impairments, the distribution of answers corresponds to the given data as a whole.

With regard to children with disabilities, opinions were divided as follows: representatives of the Republic of Komi, the Nenets Autonomous Okrug and the Murmansk Oblast are mostly for joint education of children, regardless of the state of health (56.4%, 67.6% and 52.7%, respectively); respondents from the Arkhangelsk Oblast give priority to specialized institutions (53.4%); 42.3% of respondents from the Republic of Karelia are also in favor of specialized institutions, and 15.4% supported home schooling. Representatives of the Republic of Karelia have the highest share of opinions about teaching children with disabilities at home; this indicator is insignificant among representatives of other regions (Table 1).

Table 1

Respondents' opinions about the types of institutions for the education of children with disabilities, depending on the region of residence and types of health disorders, %

Place of study	Types of health disorders	Region of residence				
		Republic of Karelia	Komi Republic	Nenets Autonomous Okrug	Arkhangelsk Oblast	Murmansk Oblast
In a regular educational institution	MSD	40.4	***56.4***	***67.6***	39.9	***52.7***
	Mental	5.8	0	8.8	0.9	8.5
	Vision	21.1	17.9	44.1	14.4	28.3
	Hearing	19.2	20.5	47.1	16.0	28.8
	Deformity	28.8	35.9	***50.0***	27.3	34.4
In a specialized educational institution	MSD	42.3	38.5	20.6	***53.4***	31.0
	Mental	***63.5***	***87.2***	***73.5***	***80.4***	***70.0***
	Vision	***65.4***	***82.1***	***52.9***	***78.5***	***59.7***
	Hearing	***67.3***	***79.5***	***50.0***	***77.3***	***59.5***
	Deformity	46.1	***51.3***	35.3	47.5	37.1

Place of study	Types of health disorders	Region of residence				
		Republic of Karelia	Komi Republic	Nenets Autonomous Okrug	Arkhangelsk Oblast	Murmansk Oblast
Homeschooling	MSD	15.4	2.6	2.9	2.4	6.3
	Mental	25.0	10.3	2.9	14.1	9.5
	Vision	11.5	0	0	2.8	2.9
	Hearing	11.5	0	0	2.8	2.7
	Deformity	9.6	5.1	0	11.7	11.0
Difficult to answer	MSD	1.9	2.6	8.8	4.3	10
	Mental	5.8	2.6	14.7	4.6	12.0
	Vision	0	0	2.9	1.8	1.5
	Hearing	1.9	0	2.9	4.0	9.0
	Deformity	15.4	7.7	14.7	13.5	17.6

In the context of identifying the level of readiness of the social environment for the inclusion of children with disabilities, we considered it important to ask the respondents about the areas of activity in which a child with a disability can be successful in order to consider an indirect indicator of the public assessment of the social potential of children and awareness of the need to create a barrier-free environment in each named area.

Residents of the Euro-Arctic region believe that children with physical deformity can achieve success in leisure and recreational activities to a greater extent — the average score is 3.32 points out of 5, where 5 is the maximum value; children with hearing impairments — 3.30 points, children with visual impairments — 3.24 points and children with MSD disorders — 3.15 points. Opinions about the possible success of children with mental disorders at the average level — 2.54 points.

In sports activities, according to the respondents, children with hearing impairments (3.80 points) and children with physical deformity (3.54 points) can achieve success to a greater extent. This is followed by children with mental disorders — 2.81 points, children with visual impairments — 2.87 points, children with MSD disorders — 2.80 points.

In creative and developmental activities, children with MSD disorders (4.09 points) and children with physical deformity (4.05 points) can succeed first, followed by children with hearing disorders (3.93 points); children with visual impairments (3.66 points) and children with mental disabilities (3.38 points).

In educational activities, children with MSD disorders (4.25 points) and children with physical deformity (4.05 points) received a higher score; followed by children with hearing impairment (3.94 points), children with visual impairment (3.81 points), children with mental disorders (2.66 points).

In everyday life activities, according to the respondents, children with hearing impairments (4.13 points) and children with physical deformity (4.07 points) can achieve success; followed by children with visual impairment (3.55 points), children with MSD disorders (3.49 points) and children with mental disorders (3.30 points).

The average score for all the areas considered is 3.82 points for children with hearing impairments, 3.81 points for those with physical deformity, 3.43 points for visual impairments, 3.56 points for MSD disorders, and 2.94 points for mental disorders (Fig. 6).

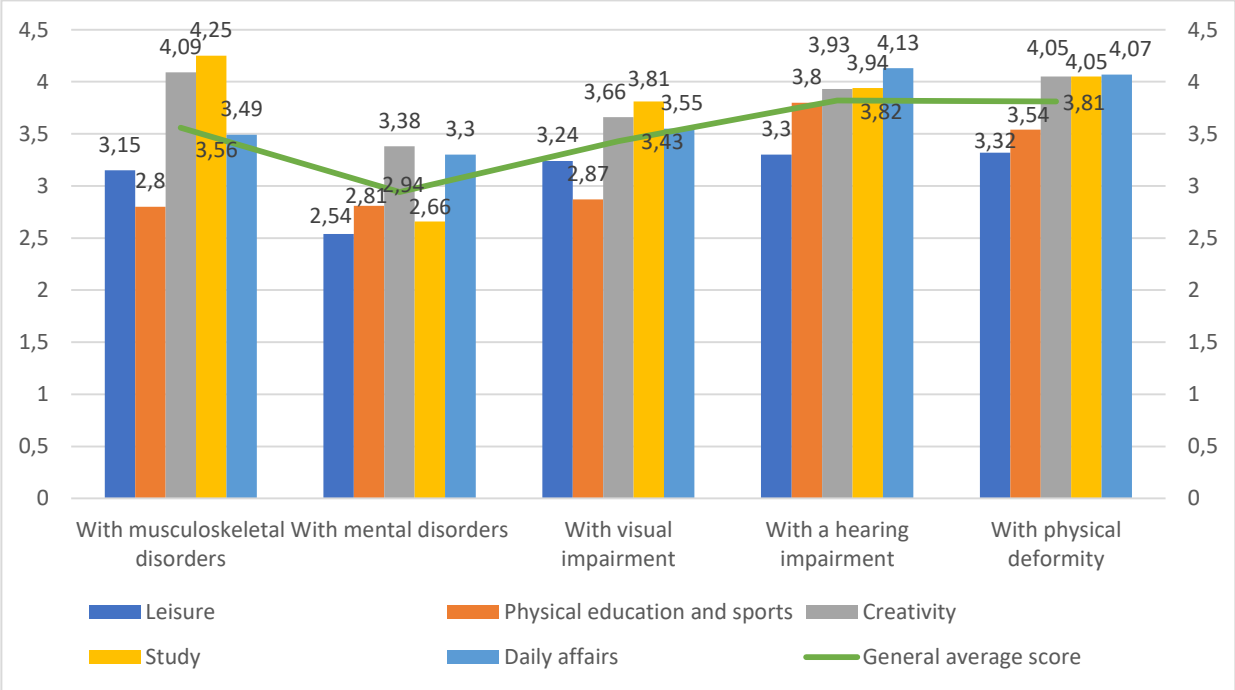

Fig. 6. Respondents' opinion about the success of children with disabilities in various activities, in points from 1 to 5, where 1 is the minimum, 5 is the maximum value.

Respondents see great success for children with MSD in educational and creative activities, for children with hearing impairment — in everyday household activities, for children with physical deformity — in daily affairs, educational and creative activities. For these categories of children, scores above the average were obtained for the above spheres. As for children with visual impairments and mental disorders, respondents estimate their chances of success to be closer to average. Nevertheless, the respondents allocate slightly higher scores for the first category of children to learning activities and for the second one — to creative activities.

So, the correlation between the type of impairment of a child and his or her social success in the citizens' perceptions was revealed. Respondents assign the least chances for success to children with mental disorders, as compared to children with other diseases. In general, citizens of the studied regions believe that children with disabilities are more likely to succeed in creative, educational and everyday life activities.

When assessing the respondents' readiness to provide assistance to a child with a disability, which is an important activity aspect of inclusion, a high level of readiness was revealed. However, the respondents are willing to help children with not all types of disabilities: while respondents were willing to help children with MSD, vision, hearing and physical disabilities (from 72.4% to 80.3%), only just over half (53.8%) expressed willingness to help children with mental disabilities. With regard to children with mental disorders, the level of those who are not ready to help in

any cases is higher (28.9%). For the remaining categories, the level of unreadiness to help ranges from 15.8% to 18.6% (Fig. 7).

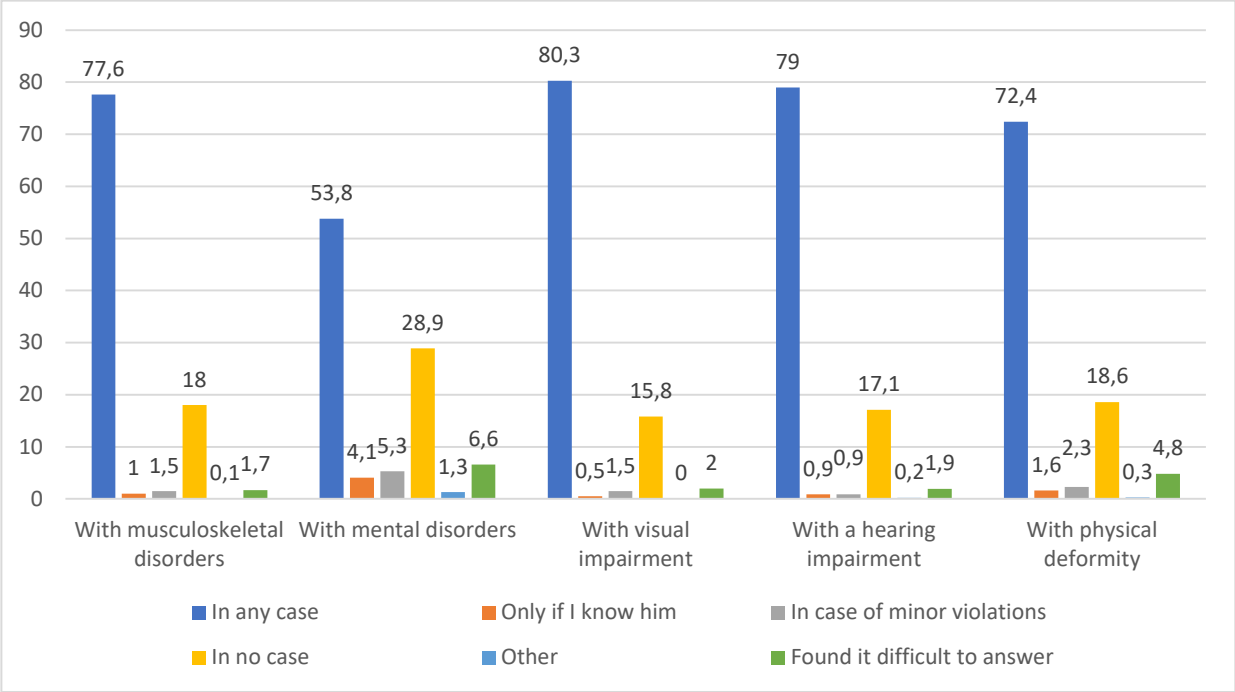

Fig. 7. Distribution of answers to the question “In what cases would you be able to help a disabled child, if necessary?”, %.

Moreover, if the respondents show less loyalty to children with mental disabilities in coming to their help, then they are somewhat more loyal to children with visual impairments compared to other categories disabilities, which is evident from the highest percentage of those who are ready to help (80 .3%) and the smallest percentage of those who are not ready.

Depending on the region of residence, the unwillingness to help a child with MSD was expressed to a greater extent by representatives of the Republic of Komi (20.5%) and the Murmansk Oblast (20.0%); representatives of the NAO — 17.6%, the Arkhangelsk Oblast — 17.2%, the Republic of Karelia — 5.8%.

Among those who are not ready to help children with mental disorders in any cases, several more than a quarter of the representatives of the Republic of Komi (25.6%) and the NAO (26.4%), about a third of the respondents of the Arkhangelsk region (30.9%) and the Murmansk region (29.7%). In the Republic of Karelia, 13.5% of respondents are not ready to help.

18.5% of respondents from the Murmansk Oblast, 17.6% from the NAO, 14.4% from the Arkhangelsk Oblast, 12.8% from the Republic of Komi, 1.9% from the Republic of Karelia are not ready to help children with visual impairment. Approximately the same distribution of answers about the unwillingness to help children with hearing impairment: 20.7% of respondents from the Murmansk Oblast, 17.6% from the NAO, 15.3% from the Arkhangelsk Oblast, 12.8% from the Komi Republic, 1.9% from the Republic of Karelia.

26.5% of respondents are not ready to help children with physical deformity in the NAO, 20.2% in the Murmansk Oblast, 18.7% in the Arkhangelsk Oblast, 15.3% in the Republic of Komi, and 1.9% in the Republic of Karelia.

The given data indicate a greater willingness to provide assistance to children with disabilities among respondents from the Republic of Karelia.

When identifying perceptions of children with disabilities and their social position in society, the results of the survey show that the population of the Euro-Arctic territories is not ready to assess the situation of this category, resulting in a large number of those who found it difficult to answer. Nevertheless, we will present the received tendencies.

In general, a quarter of the respondents (26.9%) consider disabled children to be different from children with normal health in their human qualities, while 11.1% do not feel this way, 62% found it difficult to answer. At the same time, a third of the respondents living in the Arkhangelsk Oblast (35.3%), a quarter of the respondents from Murmansk (25.6%), a fifth of the respondents from the NAO (10.3%) and 10.3% of the inhabitants of the Komi Republic declared a difference.

Children with disabilities should not necessarily have access to all the same benefits as children with a normotypical health condition — almost a quarter of the respondents (24.8%) answered this way, while only 8.8% said that the same benefits should be available, and 66.4% found it difficult to answer. Among those who admit that benefits for children with disabilities are not available to the same extent as for normotypical children, representatives of the regions were distributed as follows: 38.5% — residents of the Republic of Karelia, 27.6% — the Arkhangelsk Oblast, 21.7% — the Murmansk Oblast, 20.5% — Republic of Komi, 17.6% — NAO.

Almost a quarter of respondents (22.6%) underestimated the role of creating an accessible environment in the self-realization of children with disabilities. Only 4.2% believe that an accessible environment will contribute to the self-realization of children, 63.2% found it difficult to answer. Among those regions that underestimate the importance of an accessible environment in the self-realization of children with disabilities, the regions are as follows: 51.9% — respondents of the Republic of Karelia, 39.3% — the Arkhangelsk Oblast, 38.2% — the NAO, 26.1% — the Murmansk Oblast, 15.4 % — Republic of Komi.

However, in terms of social adaptation, opinions are much more optimistic — more than half of the respondents (57.0%) believe that these children can easily adapt in a community of normotypical peers, and only 13.9% indicated the opposite, 29% found it difficult to answer.

Answering the question about the importance for a child with a disability to have a “normal” childhood, negative answers were received from about a fifth of the respondents (18.3%); only 3.6% gave a positive answer to this question, 78% found it difficult to answer. Of those who gave a negative answer, the regions were as follows: 36.5% of respondents in the Republic of Karelia, 19.6% in the Arkhangelsk Oblast, 16.8% in the Murmansk Oblast, 8.8% in the NAO, and 7.7% in the Komi Republic.

In general, the results of the empirical study showed that the majority of respondents are ready to see children with various types of disabilities in public places, but to a lesser extent — with mental disorders (only 48.2% are ready for this). However, in terms of educating children with disabilities, society is ready to educate only children with MSD impairments in mass institutions. The maximum rejection of being included in institutions is found for children with mental disorders, visual and hearing impairments. These categories of children should study, according to the majority of respondents, in specialized institutions (opinions from 74.4% to 67.2% of respondents). Moreover, this attitude is characteristic of respondents in all regions.

According to the respondents, the social infrastructure of the Euro-Arctic region is rather inaccessible for the inclusion of children with disabilities in the society. At the same time, the Komi Republic has the lowest accessibility index (-0.52), in other regions it also has negative values.

Respondents believe that children with disabilities are generally able to succeed in creative, educational and everyday activities. However, when assessing success, children with mental disorders are endowed with less potential, and only children with MSD disorders are given high potential.

The results of the study show the correlation between the level of readiness of the Euro-Arctic society to include children with disabilities in the regional society and the type of impairment, where children with mental health problems are at risk.

Conclusion

In general, the results of the study show insufficient logistical and socio-psychological readiness of the regional environment of the Euro-Arctic territories for the inclusion of children with disabilities. Thus, opinions were revealed about the unpreparedness of the regional infrastructure for the integration of people with disabilities, including children, into society. At the same time, an underestimation of the role of creating an accessible environment for the successful self-realization of “atypical” children was revealed. There is a lack of confidence in the ability of children with disabilities outside special educational institutions to succeed in regular schools. The study showed an underestimation of the potential of children with mental disorders compared to other categories of disabilities. In addition, the respondents would be less willing to see this category in public places, in mass educational institutions, and less willing to come to their aid. We can also say about the lack of formation among almost a fifth of the respondents (18.3%) of understanding the importance for an “atypical” child to have an “ordinary” childhood, with all its attributes and practices, typical for children in the process of growing up and socialization. The data obtained are typical to some extent for all territorial subjects of the Euro-Arctic region, which indicates their current unpreparedness to include children with disabilities and the existing barriers to the further development of inclusive processes.

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The article was submitted 12.07.2022; approved after reviewing 18.07.2022; accepted for publication 19.07.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 150–166.
Original article
UDC 338.48(470.22)(045)
doi: 10.37482/issn2221-2698.2022.49.174

The Tourism Vector for the Karelian Arctic Development

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Abstract. The article presents an integrated approach to considering the tourism vector of Karelian Arctic development. Six municipalities of the Republic of Karelia, included into the Arctic zone of the Russian Federation, have become a model site for the study. Severe natural and climatic North conditions, along with challenges of socio-economic development, actualize the perspective of tourism and recreation, including for the local population. For the first time in the study, the territory of the Karelian Arctic was comprehensively examined from the standpoint of tourist and recreational development. The study analyzes tourist and recreational potential, tourist infrastructure, including infrastructure of accommodation, catering, leisure and recreation, tourist flow and types of tourism; projects of tourist orientation, strategic directions of tourism development in the municipal context. The opinion of the residents of the Karelian Arctic about the tourist and recreational development of the territory is also taken into account, and limitations and current challenges are highlighted. The study reveals the diversity of municipal districts in the Karelian Arctic in terms of tourism and recreational potential, the degree of tourist development of the territory, tourism development opportunities, the constraints. Despite the existing limitations, on the basis of the identified opportunities, the significance of the tourism development vector of the Karelian Arctic is shown as a promising direction of domestic tourism in the Russian North, as well as a tool to restore physical and emotional strength of the local population.
Keywords: *Karelian Arctic, tourism development, local population, municipality, Republic of Karelia, White Sea*

Acknowledgments and funding

The author expresses gratitude to Ekaterina Andreevna Shlapeko, Candidate of Political Sciences, researcher at the Karelian Research Center of the Russian Academy of Sciences, for her help in compiling and conducting a sociological study. The work was carried out as part of the implementation of the state task of the Karelian Research Center of the Russian Academy of Sciences.

Introduction

The unique tourist and recreational potential of the Karelian Arctic, the preserved traditions of original culture and hospitality open up opportunities for the development of various types of tourism: from ice diving and ecotourism in specially protected natural areas to ethnocultural tours to rune- populated villages. Belonging to the Arctic, determining the severity of the natural and climatic conditions of life, actualizes the problems of tourism and recreation of the

For citation: Kondrateva S.V. The Tourism Vector for the Karelian Arctic Development. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 174–192. DOI: 10.37482/issn2221-2698.2022.49.174

local population as a tool for restoring the physical and emotional strength of a person. The aim of the work is to substantiate the tourism development vector of the Karelian Arctic on the basis of identifying opportunities, limitations and modern challenges for the functioning of the tourism sector.

Development of tourism in the Arctic: theoretical aspects

The Arctic tourism development in recent years has become one of the key areas of tourism research in the northern and Arctic regions [1, Lukin Yu.F.; 2, Kharlampieva N.K.; 3, Kuklina V., Kuklina M., Ruposov V., Rogov V.; 4, Bertosh A.A.]. The greatest attention is paid to cruises in polar latitudes [5, Kunnikov A.V.; 6, Pashkevich A., Lamers M.] and ecotourism [7, Sevastyanov D.V.; 8, Korbut V.V., Tsekina M.V.; 9, Zhagina S.N., Svetlosanov V.A., Nizovtsev V.A.], which is largely due to the specifics of the territory.

Attention is paid to socio-economic aspects [2, Kharlampieva N.K.; 10, Lukin Yu.F.; 11, Yakovchuk A.A.; 12, Zhelnina Z.Yu.], development and implementation of tourism potential in the conditions of Arctic exploration [13, Orlova V.S.]. Proceeding from the fact that "the population of the Arctic is facing many social, economic and environmental problems, which, in turn, increase the difficulties of everyday life in harsh climatic conditions" [14, Druzhinin P.V., Kurilo A.E., Moroshkina M.V.], works devoted to the problems of tourism and recreation of the local population of the Arctic regions of the Russian Federation deserve special attention [15, Kondrateva S.V., Moroshkina S.V.; 16, Tsvetkov A.Yu.], as well as the study of preferences of residents of the northern territories [17, Sidorovskaya T.V., Volovik O.A., Sidoruk A.Yu.] and recreational mobility [18, Morozova T.V., Murina S. G., Belaya R.V.].

The problem of studying tourism in the Karelian Arctic as a single space is just beginning to be considered as a fairly new area of Arctic and northern research, which is due to the gradual separation of the municipalities of the Republic of Karelia from 2017 into the Arctic zone of the Russian Federation and the formation of the region. At the same time, it should be noted that there are scientific achievements in the study of tourism in some areas of the Karelian Arctic [14, Druzhinin P.V., Kurilo A.E., Moroshkina M.V.; 19, Gromov V.V.; 20, Klyuchnikova E.M., Titov A.F., Masloboev V.N.].

The strategic works on the socio-economic development of the Karelian Arctic, revealing the opportunities and limitations of the studied territory on the basis of SWOT-analysis [21, Volkov A.D., Tishkov S.V.], sociological studies of the territory deserve attention [22, Suvorova I.M.; 23, Suvorova I.M.].

However, the available scientific works on the investigated problems are rather fragmented in the content and spatial aspect, which does not allow forming a comprehensive idea of tourism development in the Karelian Arctic as a whole. This article attempts to fill this gap. On the basis of an integrated approach, the article investigates the tourism vector of development in the

Karelian Arctic by identifying the opportunities, limitations and current challenges of tourism functioning in the territory under study.

Materials and methods

Six municipalities of the Republic of Karelia (RK) belonging to the Arctic zone of the Russian Federation were the model site of the study: Kostomuksha urban district and Belomorskiy, Kalevalskiy, Kemskiy, Louhskiy, and Segezhskiy districts.

The justification for the tourism development vector of the Karelian Arctic is based on the application of an integrated approach that takes into account the possibilities, limitations and modern challenges of the functioning of the tourism sector.

The study was based on the analysis of state statistics data from the websites of the administrations of the municipalities of the Karelian Arctic, the Internet portal of the RK, the Investment Passport of the Arctic Territories of the RK, the Republican Center for the state protection of cultural heritage objects, unified tourist passports and strategic documents for the socio-economic development of the study areas.

The median values were calculated in the work.

The study of the tourist infrastructure of the Karelian Arctic was carried out on the basis of the calculation of indicators of its structural elements (the method is more detailed: [24, Stepanova S.V.; 25, Shulepov V.I., Stepanova S.V.].

The section revealing the attitude of the local population of the Karelian Arctic is based on the data of a sociological survey conducted by the author together with her colleague E. A. Shlapeko in 2021 (103 residents of the Karelian Arctic were interviewed), where the ratio of the Karelian Arctic respondents to the total population of the region (17.9%) correlates with the population ratio in the region (18.3%); shares are also reconciled by municipalities.

The problems of the tourist and recreational development of the Karelian Arctic is multidimensional and diverse, it is impossible to analyze in detail the entire set of interrelated blocks and directions in the framework of one article. The work seems to be the beginning of a comprehensive understanding of the development of tourism in the Karelian Arctic as a whole, revealing some of the most significant aspects of the issues under study.

Karelian Arctic: general characteristics of the territory

The Karelian Arctic unites six of the 18 municipalities of the Republic of Karelia, their allocation to the Arctic zone of the Russian Federation occurred gradually: in 2017 — Belomorskiy, Kemskiy and Loukhskiy municipal districts (Fig. 1., blue color), in 2020 — Kostomuksha urban district, Segezhskiy and Kalevalskiy municipal districts (dashed lines). In the west, the state Russian-Finnish border passes through the territory of three municipalities, and the Karelian Arctic also borders on the Murmansk and Arkhangelsk oblasts, washed in the northeast by the waters of the White Sea.

Fig. 1. Municipalities of the Karelian Arctic [1].

The Karelian Arctic, with an area of 71.4 thousand km^2 or 40% of the RK territory (Table 1), is characterized by low and extremely low population density (the exceptions are the Kostomuksha urban district and the Segezhskiy district). Less than a fifth of the inhabitants of the region (18.3%) live here, the urbanization of most municipalities is also below the average Karelian values (81.2%).

Table 1

General socio-economic characteristics of the Arctic municipalities of the Republic of Karelia (as of 01.01.2021) [2]

	Municipality	Area, km^2	Share of the area of the region, %	Population, thousand people	Share of the region's population, %	Number of inhabitants per 1 km^2	Urban population, %
1	Kostomuksha urban district	4046	2.2	30273	5.0	7.5	98.4
2	Belomorskiy district	12797	7.1	15151	2.5	1.2	59.6
3	Kalevalskiy district	13260	7.3	6489	1.1	0.5	58.3
4	Kemskiy district	8029	4.4	13961	2.3	1.7	74.9
5	Louhskiy district	22552	12.5	10619	1.7	0.5	70.3
6	Segezhskiy district	10723	5.9	34761	5.7	3.2	94.1

A negative trend in the Karelian Arctic, as well as in the RK as a whole, is the population decline (Table 2) along with an increase in the share of people over the working age (except for the urban district). In 2016–2021, the number decreased by 8.5 thousand people (more intensive rate than the RK average). The problem is most acute in the Loukhskiy and Kemskiy municipal districts.

[1] Source [21, Volkov A.D., Tishkov S.V.].
[2] Source [26, Republic of Karelia].

Table 2

Population dynamics of the Karelian Arctic for the period 2016–2021, thousand people [3]

No.	Municipality	2016	2017	2018	2019	2020	2021	2016-2021, %
1	Kostomuksha urban district	30.1	30.0	29.9	29.9	30.1	30.3	+ 0.7
2	Belomorskiy district	17.0	16.7	16.3	15.9	15.4	15.2	-10.6
3	Kalevalskiy district	7.1	6.9	6.7	6.6	6.6	6.5	-8.5
4	Kemskiy district	15.8	15.5	15.0	14.6	14.3	14.0	-11.4
5	Louhskiy district	12.0	11.8	11.5	11.1	10.8	10.6	-11.7
6	Segezhskiy district	37.9	37.3	36.6	35.8	35.3	34.8	-8.2
	Republic of Karelia as a whole	*629.9*	*627.1*	*622.5*	*618.1*	*614.1*	*609.1*	-3.3

The economic entities of the Karelian Arctic industries (logging, woodworking and mining) "annually lose professionals because of labor migration" both due to harsh natural and climatic conditions and sociocultural reality [22, Suvorova I.M.]. The industrial potential of the Karelian Arctic "is characterized by spatial unevenness, concentrating mainly in the cities of Segezha and Kostomuksha... the cities of Kem and Belomorsk have almost lost their industrial significance, retaining nevertheless their logistical, historical and cultural potential" [23, Suvorova I.M.]. However, the transport potential of the Karelian Arctic, taking into account the specifics of the physical-geographical (White Sea) and geopolitical position (EU), represented by various types of transport infrastructure, can be considered as a strong point of high importance for tourism development. Taking into account the severity of the natural and climatic conditions, the importance of restoring the physical and emotional strength of a person on the basis of opportunities for leisure and recreation is increasing [15, Kondratyeva S.V., Moroshkina M.V.].

Tourist and recreational potential

The tourist and recreational potential of the Karelian Arctic, represented by unique objects of natural and anthropogenic origin, some of which have no analogues either in the Russian Federation or in the world, reveals the possibilities for developing various types of tourism and recreation. The unique potential of the territory is conditioned by:

- specifics of the border position (Green Belt of Fennoscandia, rune-song villages);
- specifics of the physical and geographical position (White Sea);
- original culture and traditions of the local population (Pomor culture, White Sea petroglyphs, sieidid);
- historical milestones of state life (Osudareva Road, White Sea – Baltic Canal).

According to the data of the Republican Center for State Protection of Cultural Heritage Objects (Table 3), one fifth of the RK cultural heritage objects (18.5%) is located in the Karelian Arctic. Moreover, 75.7% of them are objects of federal significance, half of which are located on the territory of the Belomorskiy district (50.1%), the smallest part of them are in the Segezhskiy

[3] Source: compiled by the author based on state statistics.

district (4.9%). In addition, 26.1% of the identified objects have not yet been included in the Unified State Register (potential).

Table 3

Cultural heritage sites of the Karelian Arctic (as of April 21, 2022) [4]

No.	Municipality	Objects included in the unified state register			Identified objects
		Total	Federal significance	Regional significance	
1	Kostomuksha urban district	56	45	11	33
2	Belomorskiy district	239	207	32	134
3	Kalevalskiy district	74	46	28	90
4	Kemskiy district	68	47	21	152
5	Louhskiy district	66	44	22	78
6	Segezhskiy district	37	20	17	37
	Total	*540*	*409*	*131*	*524*

The unique ecological frame “Green Belt of Fennoscandia”, which has no analogues in other border regions of the Russian Federation, stretches along the state border from the Barents Sea to the Baltic Sea and represents a system of protected areas of federal and regional subordination with a total area of about 1/3 million hectares (over 80% are on the Russian side) with valuable recreational facilities that are promising for the development of tourism. Rune-song villages with preserved original traditions and culture (the village of Kestenga of the Louhskiy district, the village of Kalevala of the Kalevalskiy national district, the village of Voknavolok of the Kostomuksha urban district) have aroused interest since the late 19th century due to the publication of the world-famous Karelian-Finnish epos “Kalevala” [23, Stepanova S.V.]. White Sea petroglyphs on the territory of the Karelian Arctic are examples of monumental fine art of the primitive era, dating back to the end of the 5th – the first half of the 4th millennium BC. In 2021, the petroglyphs of the Onega and White Seas are included in the list of UNESCO World Heritage Sites [5]. The uniqueness of the White Sea is revealed by the possibilities of organizing diving, including under-ice diving (several diving centers operate on the territory); Pomor culture and nearby Spaso-Preobrazhenskiy Solovetskiy Monastery deserve special attention.

Tourism infrastructure development

A comparison of the Karelian Arctic municipalities with the rest of the Karelian districts reveals a significant lag in the level of development of the accommodation infrastructure (almost twice as much) (Table 4).

[4] Source: compiled by the author based on data from [27, Statistical information].
[5] Lobanova N. Skaly s petroglifami trebuyut berezhnogo otnosheniya [Rocks with petroglyphs require careful treatment]. URL: https://gazeta-licey.ru/science/faces-of-science-in/100850-nadezhda-lobanova-skaly-s-petroglifami-trebuyut-berezhnogo-otnosheniya (accessed 18 July 2022).

Table 4

Tourism infrastructure development by structural elements, median [6]

No.	Territory	Accommodation infrastructure	Catering infrastructure	Leisure and recreation infrastructure
1	Karelian Arctic	0.54	1.05	1
2	Republic of Karelia	1	1	0.9

In addition, there is an uneven distribution of structural elements within the municipalities, which is manifested in some "patterns of localization of tourist infrastructure objects" [24, Stepanova S.V.]:

- accommodation infrastructure near the coasts of water bodies (for the Karelian Arctic: the White Sea, as well as picturesque lakes and rivers) and along the Karelian section of the federal Kola Motorway;
- catering infrastructure in administrative centers and along the Karelian section of the federal Kola Motorway;
- leisure and recreation infrastructure in administrative centers and near tourist attractions.

Largely due to the specifics of the location and the unique tourist and recreational potential, the Loukhskiy district occupies a leading position among the studied municipalities in terms of the development of tourist infrastructure, the values of indicators of all structural elements of the tourist infrastructure of which exceed the medians of the Republic of Karelia and the Karelian Arctic (Fig. 2, Petrozavodsk urban district is not presented).

[6] Source: calculated by the author.

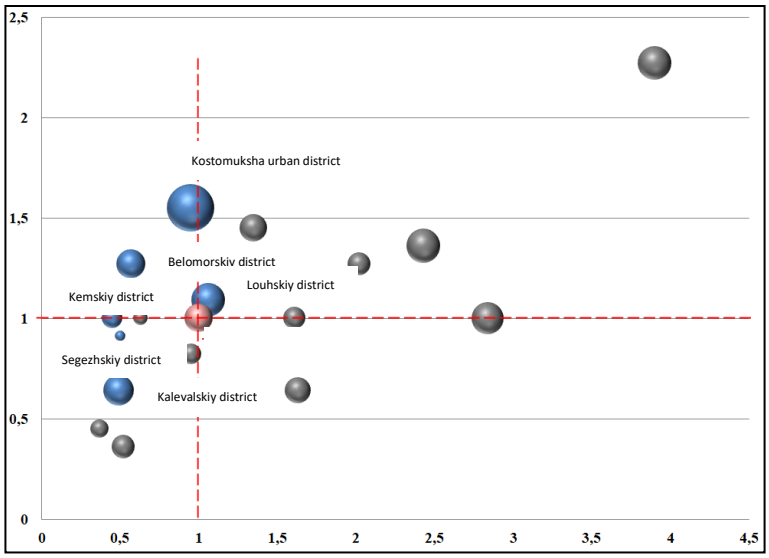

Fig. 2. Municipalities of the Karelian Arctic according to the level of development of tourist infrastructure: X (accommodation infrastructure); Y (catering infrastructure): Z (circle size — leisure and recreation infrastructure) [7].

The high values of the catering infrastructure indicator and the low values for the location of the Belomorskiy, Kemskiy and even Segezhskiy districts are determined by the focus on transit travelers; the Kostomuksha urban district occupies a border position (the distance to the checkpoint Lyttya–Vartius is 30 km), which was an incentive for the development of cross-border mobility before the pandemic.

Thus, most of the municipalities of the Karelian Arctic belong to the territories of the restrained development of tourist infrastructure and only the Kostomuksha urban district and Loukhskiy district are characterized by its active development. At the same time, the existing territorial disproportions, determined by the specifics of the economic development of the territory, tourist and recreational potential, and other factors, may be natural, without requiring leveling if they are able to meet the needs of the local population in leisure and recreation.

Tourism in the Karelian Arctic: facts and figures

Tourist flow to the Karelian Arctic in 2019 amounted to more than 150 thousand people, a third of which was received by the Belomorskiy district (more than 50 thousand people), the second third fell on the Kemskiy and Loukhskiy districts. The high recreational load is due to the presence of a unique potential (White Sea, White Sea petroglyphs, Paanajärvi National Park), as well as the advantage of the location (the city of Kem — the Solovetskiy Spaso-Preobrazhenskiy Monastery). The specifics of the location, along with the insufficient level of development of tourist infrastructure, despite the uniqueness of the territory, have a restrained development in the incoming tourist flow to the Kalevalskiy national district (about 2.5 thousand people per year).

The dominant share of visitors (more than 65%) independently organizes the program of stay on the territory. The main tourist flow is represented by domestic tourists (Moscow, St. Pe-

[7] Compiled by the author based on the data [24, Stepanova S.V.].

tersburg, etc.), as well as a sufficient number of transit travelers (Karelian section of the federal Kola Motorway).

The priority and promising types of tourism in the Karelian Arctic include:

- *ecological*, including various types of recreation in protected areas;
- *cultural and educational*, including ethno-cultural, military-historical, religious, industrial tourism, etc.;
- *rural*, recreation in the countryside;
- *active*, including fishing and hunting, diving, canoeing, rafting, cycling tours, etc.;
- *event-based*, involving cultural events of various levels and directions;
- *sports*, related to competitions.

Separately, it should be noted that tourism achievements of a number of Karelian Arctic companies are highly recognized at the level of the Republic of Karelia. The guest house "Kotiranta" (Kostomuksha urban district) more than once became the winner of the regional competition "Leaders of the Karelian tourist business" in the nomination "The best small hotel" (up to 30 rooms). In 2019, VelT–Karelian Travels LLC (Kalevalskiy national district) was awarded in the nomination "For creative tourist offer (route, excursion, service)" for the excursion "Floating in the ice of North Karelia". In addition, the route of this company "Along the ancient paths. Journey to Voknavolok and Kormilo" on a hovercraft was recognized as the best ethnographic route of the Russian Federation in the final of the IV annual All-Russian award "Route of the Year 2017", supported by Federal Tourism Agency. It is also worth mentioning the Karelian Hundred ultramarathon for amateurs, organized by them since 2008, which is unique because it is a 100 km long single-circle route (the only such route in the Russian Federation).

Due to the border position and the development of cross-border tourism on the territory of the Karelian Arctic, two cross-border tourist and recreational micro-regions formed around two checkpoints are at different stages of creation. These checkpoints (Kostomuksha urban district and Loukhskiy district) served a quarter of the total traffic on the Karelian section of the Russian-Finnish state border (about 500 thousand people annually). Adjacent territories are connected by cross-border tourist routes: "Kantele Route", uniting rune-singing territories associated with the epic Kalevala; "White Road", stretching along the ancient trade route from the White Sea to the Baltic [21]. At the same time, the restrictions of the COVID-19 pandemic of the past two years and the events in Ukraine in recent months have a significant impact on the development of cross-border tourism, the final impact of which can be seen later.

Tourism-oriented projects

The republic of Karelia has a large number of projects directly or indirectly related to tourism development, including international, federal, regional and individual projects of organizations which are effective instruments for enhancing tourism. The practice of the Republic of Karelia

demonstrates significant results in the implementation of projects: the creation of tourist attractions, routes, tourist information centers, the construction and equipping of tourist infrastructure facilities, the promotion and restoration of natural and anthropogenic heritage, the development of strategic documents, advanced training of specialists, marketing, development of cross-border regions, creation of mobile services and applications.

The analysis of international tourism projects supported by various programs (TACIS, INTERREG, Cross-Border Cooperation Programme, etc.) and implemented in the Karelian Arctic for the period 1990–2020 reveals the leading positions of the Kostomuksha urban district (third place in the Republic of Karelia). Loukhskiy district, ranking fourth in terms of the number of implemented international projects, was the only beneficiary from the Russian side in four of them [28, Kondrateva S.V.].

Federal projects make it possible to add various infrastructural facilities. Thus, according to the results of the federal competition (2020), about 106 million rubles were allocated for 20 Karelian project ideas, of which 46.5 million rubles were provided by Federal Tourism Agency. Within the Karelian Arctic, the following should be indicated: “The path of ancient artists” (LLC “Karelika”, Belomorskiy district) — an eco-route to the White Sea petroglyphs from the village Vygostrov and the year-round 100 km trail “Karelian Hundred” (“VelT–Karelian Travels”, Kalevalskiy national district). In addition, the Republic of Karelia was included in the list of 19 regions of the Russian Federation, which will receive a subsidy in the amount of 250 million rubles for the construction of modular hotels.

Tourism development in the Karelian Arctic: opinion of residents

The opinion of the local population, interested or, on the contrary, wary of the development of this sphere of economic activity, is important in the tourist and recreational development of the territory. This section presents some results of the 2021 survey on tourism development in the Republic of Karelia.

One of the key issues was the prospects of tourism as a direction for the economic development of the municipality in the opinion of the local population (Table 6).

Table 6

Do you consider tourism a promising area of economic development for your region? (2021) [8]

No.	Municipality	Total number of answers, pers.	Respondents' answers, pers.		
			I believe that tourism can become one of the key sectors of the economy of my region	I believe that tourism in my area can be developed, but mainly to meet the needs of the local population for recreation	I believe that tourism is not promising for my area
1	Kostomuksha urban district	26	17	4	5

[8] Compiled by the author.

2	Belomorskiy district	12	9	3	0
3	Kalevalskiy district	8	4	1	3
4	Kemskiy district	14	7	3	4
5	Louhskiy district	12	9	0	3
6	Segezhskiy district	31	12	5	14
	Total, %		*56.3*	*15.5*	*28.2*

The dominant number of respondents (71.8%) has a positive attitude towards the development of tourism, and most of them consider tourism as a key area of the municipal economy. Residents of the Belomorskiy district are unanimous in the prospects for the development of tourism (100%), followed by residents of the Kostomuksha urban district (80.8%), Loukhskiy and Kemskiy districts (75% and 71.4%, respectively). At the same time, the proportion of those who are skeptical and/or negative about the development of tourism in the Karelian Arctic is high in comparison with the rest of the RK territory (4.9%), with almost half of them living in the Segezhskiy district. The second question allows deeper understanding of the mood of the local population regarding the development of tourism and reflects the problems of growth in the inbound tourist flow accompanied by the development of the sphere (Table 7).

Table 7

How do you feel about the possibility of an increase in the tourist flow (both Russian and foreign tourists) to your area? (2021) [9]

No.	Municipality	Total number of answers, pers.	Respondents' answers, pers.		
			I have a positive attitude, because this will improve the economic situation of the region	Difficult to answer	I have a negative attitude, because I think that tourists create only problems and difficulties
1	Kostomuksha urban district	26	23	2	1
2	Belomorskiy district	12	12	0	0
3	Kalevalskiy district	8	8	0	0
4	Kemskiy district	14	11	2	1
5	Louhskiy district	12	8	2	2
6	Segezhskiy district	31	26	3	2
	Total, %		*85.4*	*8.8*	*5.8*

Respondents' answers demonstrate an increased share of positive sentiments (85.4% versus 56.3% in the previous question), revealing the hidden conviction of the inhabitants of the Karelian Arctic in the importance of tourism development. It should also be noted that there was a decrease in the share of negative answers (5.8% versus 8.7%) and unformed opinions concerning tourism (similarly: 80.8% and 19.5%).

In the municipal context, the situation seems to be even better, even if the issue of leisure and recreation of the local population is excluded from consideration (Table 8).

Table 8

Opinion of Karelian Arctic residents about the prospects of tourism development, 2021 [10]

[9] Compiled by the author.
[10] Compiled by the author.

No.	Municipality	Total number of answers, pers.	Respondents' answers, pers.			
			I believe that tourism can become one of the key sectors of the economy of my region	Share, %	I have a positive attitude, because this will improve the economic situation of the region	Share, %
1	Kostomuksha urban district	26	17	65.4	23	88.5
2	Belomorskiy district	12	9	75	12	100
3	Kalevalskiy district	8	4	50	8	100
4	Kemskiy district	14	7	50	11	78.6
5	Louhskiy district	12	9	75	8	66.7
6	Segezhskiy district	31	12	38.7	26	83.9
	Total, %		*56.3*	-	*85.4*	-

Hope for the tourism vector of the development of the Karelian Arctic is revealed in the responses of residents to the possibility of an increase in the flow of tourists, which is especially evident for the Segezhskiy and Kalevalskiy districts. In this regard, the conclusion arises about the need to create and maintain conditions for tourism development in the Karelian Arctic regions, both as a factor of socio-economic development of municipalities and as a platform for maintaining and restoring the physical, emotional strength and health of the local population.

Strategic directions of tourism development

With the recognition of tourism as a promising (priority) direction of the socio-economic development of the Republic of Karelia, since the 1990s, a system of strategic management of the development of this sphere of economic activity has been elaborated and improved in the region.

For example, in 2007, the Institute of Urbanistics, jointly with the Institute of Economics of the Karelian Research Center of RAS, developed the “General scheme for the Location of tourism facilities and infrastructure in the Republic of Karelia”. According to the document, among the 12 tourist zones (basic and secondary), five belong to the territory of the Karelian Arctic: Pyaozerskaya, Pripolyarnaya, Kalevalskaya, Kemsko-Belomorskaya and Segezhskaya with a total predicted tourist flow of more than 1.1 million people.

At the federal level, among the key factors and competitive advantages of the Karelian development, the Federal target program “Development of the Republic of Karelia for the period up to 2020” indicated “a rich tourist and recreational potential, a unique natural landscape complex”; “favorable economic and geographical position, including border position, transit potential (transit rail and road communication, international road and simplified checkpoints, border infrastructure, water corridor — the White Sea-Baltic Canal)”, as well as developed trade and economic links, including positive experience in implementing cross-border cooperation programs [11].

[11] Federal'naya tselevaya programma «Razvitie Respubliki Kareliya na period do 2020 goda»: postanovlenie Pravitel'stva RF ot 09.06.2015 g. №570 [Federal target program "Development of the Republic of Karelia for the period up

However, despite the perception of tourism as a sphere of recreation and social activity, in contrast to the modern interpretation of the tourism business as a factor of regional development, spatial planning of tourism was first paid attention to in the USSR. In 1979, the Leningrad Design Institute for Urban Planning (now Institute of Urbanistics) developed a "Scheme for the development of recreation, treatment and tourism areas in the Karelian Autonomous Soviet Socialist Republic" for the period up to 2000. Among the settlements of the modern Karelian Arctic, the cities of Belomorsk, Kem and settlement Kalevala was assigned the role of additional tourist service centers. Later, in 1985, the Institute "Lengiprogor" prepared "District planning scheme of the Karelian Autonomous Soviet Socialist Republic", which was approved by the Council of Ministers of the Karelian ASSR and entered into force in 1987. According to the document, five large recreational areas were allocated on the territory of the Karelian ASSR, including the White Sea (Karelian coast of the White Sea), uniting the Belomorskiy, Kemskiy, Loukhskiy and Kalevalskiy districts [19].

At present, the management of the tourism sphere in the Karelian Arctic is carried out within the framework of documents of the federal and regional levels. It should be emphasized that tourism is a significant area of socio-economic development of the municipalities of the Karelian Arctic, for example:

- "Development of the tourist complex of the urban district, including the development of a system of specially protected natural areas" is one of the Strategic tasks of the Kostomuksha urban district (Strategy for the socio-economic development of the municipality "Kostomuksha urban district" up to 2030. Decision of the Council of the Kostomuksha urban district dated March 26, 2020 No. 457-SO/III);
- "The Belomorskiy municipal district is one of the main tourist centers of attraction of the Republic of Karelia" (Strategy for the socio-economic development of the municipal formation "Belomorskiy municipal district" of the Republic of Karelia for the period up to 2030. Decision of the Council of the Belomorskiy Municipal District of December 28, 2020 No. 165);
- "The Loukhskiy municipal district is seen as a tourist center with a developed infrastructure of hospitality, catering, shopping and entertainment and sports centers by 2030" (Strategy for the socio-economic development of the Loukhskiy municipal district of the Republic of Karelia for the period up to 2030. Decision Council of the Loukhskiy municipal district dated June 24, 2021 No. 176);
- Despite the fact that the Segezhskiy district is considered to be the industrial territory of the Republic of Karelia, the Municipal strategy emphasizes its significant tourism potential, outlining plans to "create a tourist and recreational cluster "Karelian White Sea" by 2041 (Strategy for the socio-economic development of the Segezhskiy municipal district

to 2020": Decree of the Government of the Russian Federation of 09.06.2015 No. 570]. URL: government.ru/docs/all/102226/ (accessed 04 May 2022).

up to 2030. Decision of the Council of the Segezhskiy municipal district dated November 31, 2021 No. 202).

Constraints and contemporary challenges

The development of tourism in the Karelian Arctic is limited by a number of constraints, which, according to municipal Strategies, can be grouped as follows:

- *economic problems* associated with the lack of large investors, weak management and marketing;
- *social problems* caused by the negative trend of population decline, unemployment, lack of qualified personnel in hotel and tourism services, etc.;
- *infrastructural problems*, including insufficient development of tourism infrastructure; significant moral and physical depreciation of the material base, especially vehicles; unsatisfactory condition of highways, both national and local; low level of arrangement of tourist attractions;
- *ecological problems* associated with the deterioration of the quality of the environment and unfavorable environmental conditions in industrial areas;
- *organizational problems*, including imperfect measures to support investment activity; lack of tours and tourist routes, insufficient number of events.

The restrictions of the last two years, caused by the COVID-19 pandemic, have had a negative impact on the development of tourism in the Karelian Arctic. First of all, this is almost complete cessation of the tourist flow of visitors from neighboring Finland. Secondly, it is necessary to indicate the reduction in the internal tourist flow of Russian tourists, including Karelian residents. However, in the face of modern challenges, domestic tourism is becoming a priority type of tourism development in the Karelian Arctic, one of the support tools for which is the Basic Tourist Cashback Program and cashback for families for trips to children's camps. Another significant tool to support the development of this area of economic activity is the implementation of tourism projects.

Conclusion

Summarizing the above, it is possible to formulate several main conclusions about the tourism vector of the Karelian Arctic development.

The studied municipalities, cumulatively serving about 150 thousand tourists and sightseers per year, are diverse in terms of tourist and recreational potential, the degree of tourist development of the territory, and the possibilities for developing tourism.

The tourist and recreational potential of the Karelian Arctic, represented by unique objects, a number of which have no analogues either in the Russian Federation or in the world, opens up opportunities for the development of various types of tourism and recreation. At the same time,

economic, social, infrastructural and other constraining factors have an impact on the tourist and recreational development of the territory.

The significance of the development of the tourist vector for the development of the Karelian Arctic is confirmed by a set of strategic documents of the federal, regional and municipal levels, indicating the priorities of the tourist and recreational development of the territory. In addition, there is a significant positive and expectant opinion of the local population about the effects of the tourism sector of activity on the socio-economic development of municipalities.

In the face of contemporary challenges, the focus on domestic tourism and the emphasis on the leisure and recreational needs of the local population as a tool for physical and emotional recreation is significant.

Further research will be aimed at identifying the opportunities and needs of the local population for leisure and recreation in order to develop recommendations for strengthening the tourism component for residents of the Karelian Arctic.

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The article was submitted 18.07.2022; approved after reviewing 19.07.2022; accepted for publication 20.07.2022.

The author declares no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 167–180.
Original article
UDC [316.346.32-057.87+314](470.21)(045)
doi: 10.37482/issn2221-2698.2022.49.193

Vocational and Educational Strategies of SVE Students (Based on a Survey in the Murmansk Oblast)

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Abstract. The article analyzes the educational and professional strategies of graduates of secondary vocational education (SVE) of the Murmansk Oblast, formed on the basis of prevailing values in the conditions of socialization in a particular region. The paper focuses on the existing contradictions in understanding the reasons for the growth in the number of applicants to secondary vocational institutions. On the basis of statistical data from various sources, an analysis of the system of vocational training at the secondary professional level is presented and the features of the human resources potential and needs of the region are indicated. The authors of the article focus on environmental factors that contribute to the formation of values and the implementation of vocational and educational strategies for the youth of the region. The theoretical framework of the study is based on the social constructivism theory of P. Berger and T. Lukman, as well as the value theory of R. Inglehart. The object of the study is graduate students in the secondary vocational education system of the Murmansk Oblast. The choice of a specific subject of the Russian Arctic (Murmansk Oblast) is due to a number of reasons: intensive migration loss of the population; significant reduction in the number of educational institutions; reduction in the number of students. The empirical base of the article was formed by the results of a sociological study conducted in April–May 2021 in the Murmansk Oblast by online questionnaire survey among graduates of educational institutions of secondary vocational level — 519 people. The study of professional and educational strategies of graduates of secondary vocational education, an analysis of educational plans, attitudes towards employment, including the direction of training, labor value orientations as well as migration attitudes of students were additionally considered.

Keywords: *youth, educational and professional strategies, Murmansk Oblast, human resources potential of the region*

Acknowledgments and funding

The study was carried out as part of the initiative R&D No. 122060900078-3.

Introduction

In recent years, rather contradictory trends have emerged in the Russian education system, which attract the attention of the expert community. Since 2010, there has been an increase in the number of graduates of 9–11 grades, who increasingly choose to study in the system of sec-

For citation: Nedoseka E.V., Sharova E.N. Vocational and Educational Strategies of SVE Students (Based on a Survey in the Murmansk Oblast). *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 193–210. DOI: 10.37482/issn2221-2698.2022.49.193

ondary vocational education [1, Maltseva V.A., Shabalin A.I.]. According to the Minister of Education of the Russian Federation Kravtsov S.S., in the early 2000s, about 10–12% went to colleges, since 2015, this number is at least 60% [1]. Statistics show that every second student today prefers studying in institutions of secondary vocational education (SVE) and obtaining a working specialty rather than passing the final exam [2, Proshkova Z.V.]. The main reasons for this trend, which is controversial, are revealed through the prism of understanding the motivation for choosing SVE by young people.

This trend, on the one hand, is interpreted as positive and reflects the growth in the prestige of professions that guarantee employment and demand for workers, which in turn is interpreted at the state level as a manifestation of economic growth [2]. On the other hand, in the sociological literature, a whole range of social problems and their consequences are distinguished, which rather indicate the aggravation of social inequality, rather than the increasing prestige of working professions [3, Alexandrov D.A. et al.; 4, Kosyakova Yu. et al.; 5, Bessudov A.R. et al.; 6, Abankina I.V., Abankina T.V.; 7, Malinovsky S.S., Shibanova E.Yu.]. This argument is strengthened by the conclusions of studies that record the predominant value of higher education in the professional and educational preferences of schoolchildren [8, Konstantinovskiy D.L., Popova E.S.; 9, Cherednichenko G.A.]. The works of sociologists analyze the motives for choosing SVE institutions, among which the predominant ones are: fear of passing the USE, high probability of entering a state-funded place, opportunity to get a profession, simplified way to get into a university (since 2015, the situation has changed and admission to a university is possible only after passing the USE or specialized subjects at the discretion of the educational institution), etc. [2, Proshkova Z.V.; 10, Lomteva E.V.]. The trajectories of graduates of 9 and 11 grades choosing SVE are analyzed [6, Abankina I.V., Abankina T.V.; 11, Maltseva V.A. et al.]. Speaking about the connection of education and the labor market, G.A. Cherednichenko notes that young personnel with a secondary education are rated lower by employers, receive a lower salary than those who have a higher education diploma [12, Cherednichenko G.A.; 13, Zubok Yu.A., Chuprov V.I.].

The accumulated experience of research in this trend allows us to identify two groups of reasons for this contradiction: the first group, which focuses on institutional constraints of the education system, thereby indicating the problems associated with its reforming; the second group, which deals with the specifics of social behavior of young people, defining the special role of family, school, environment and other agents of socialization in the formation of educational strategies [14, Konstantinovskiy D.L.].

At the same time, the coverage of youth by SVE programs continues to grow steadily, as well as the recognized need of the economy for specialists with secondary vocational education.

[1] Kravtsov rasskazal, skol'ko vypusknikov 9-kh klassov postupayut v kolledzhi [Kravtsov told how many graduates of the 9th grade go to colleges]. RIA Novosti. URL: https://na.ria.ru/20210810/minprosvescheniya-1745179965.html (accessed 27 August 2022).
[2] Ibid.

The mass character of this flow suggests that it consists of those who were forced into it due to the economic situation and circumstances, and those who chose the SVE on the basis of personal preferences, assessment of the resources required for education and the situation on the labor market [15, Konstantinovskiy D.L., Popova E.S.].

The focus of this article is on the study of professional and educational strategies of SVE students, which are formed under the influence of the values prevailing in the consciousness. The object of the study is graduate students in the system of secondary vocational education in the Murmansk Oblast. The emphasis on graduates is due to the fact that this group of students is the closest to the situation of choice between entering the labor market and continuing education. At the same time, this is a period of time when the search and definition of strategies for the further life path is actualized.

Attention to a particular region is associated with the already existing experience in researching the educational and professional strategies of the youth of the Murmansk Oblast [16, Sharova E.N., Nedoseka E.V.; 17, Nedoseka E.V., Sharova E.N.]; secondly, this study complements the existing scientific and empirical groundwork for the study of professional and educational strategies of the youth of the Arctic zone of the Russian Federation [18, Dregalo A.A., Ulyanovsky V.I.; 19, Vasilyeva O.V., Maklashova E.G.; 20, Galimullin E.Z.]; thirdly, the studied subject is included in the Arctic zone of the Russian Federation, which is regulated by a number of documents [3], focusing on the staffing needs of the region, where the demand for specialists, including those with secondary vocational education, is indicated.

The system of secondary vocational education in the Murmansk Oblast and staffing needs of the region

The SVE system in the Murmansk Oblast in 2021 is represented by 26 institutions, including 23 vocational educational organizations (including 20 state, 3 non-state) and 3 universities implementing vocational education programs.

As of 10.01.2021, 18.2 thousand students studied in the region in 123 vocational programs. Enrollment in 2021 amounted to more than 5.6 thousand people, including almost 4.1 thousand people at the expense of the regional and federal budget. Graduation in 2021 was about 3.7 thousand people. Expected graduation in 2022 was over 4.5 thousand people [4].

[3] Ukaz Prezidenta Rossiyskoy Federatsii ot 26 oktyabrya 2020 g. № 645 «Strategiya razvitiya Arkticheskoy zony Rossiyskoy Federatsii i obespecheniya natsional'noy bezopasnosti na period do 2035 goda» [Decree of the President of the Russian Federation of October 26, 2020 No. 645 “Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035]. URL: https://www.garant.ru/products/ipo/prime/doc/74710556/ (accessed 27 August 2022). Postanovlenie Pravitel'stva Rossiyskoy Federatsii ot 21.04.2014 g. № 366 «Ob utverzhdenii gosudarstvennoy programmy Rossiyskoy Federatsii «Sotsial'no-ekonomicheskoe razvitie Arkticheskoy zony Rossiyskoy Federatsii» [Decree of the Government of the Russian Federation dated April 21, 2014 No. 366 “On approval of the state program of the Russian Federation “Socio-economic Development of the Arctic Zone of the Russian Federation”]. URL: https://www.garant.ru/products/ipo/prime/doc/70544266/ (accessed 27 August 2022).

[4] Data from the official website of the Ministry of Education and Science of the Murmansk Oblast. URL: https://minobr.gov-murman.ru/activities/prof-obrazovanie/ (accessed 16 July 2022).

Table 1

Number of students in secondary vocational education in Murmansk Oblast [5]

Number of students enrolled in training programs for mid-level specialists				Number of students enrolled in training programs for skilled workers, employees			
2005/ 2006	2020/ 2021	2005/ 2006	2020/ 2021	2005/ 2006	2020/ 2021	2005/ 2006	2020/ 2021
thousand people		for 10 thousand		thousand people		for 10 thousand	
13.1	14.8	152	202	10.2	3.3	n. d.	45

Table 1 shows the dynamics of the number of students in the secondary vocational education system of the Murmansk Oblast over the past 15 years. As for the number of students enrolled in secondary vocational training programs, there is an increase by 13%, as for the number of students enrolled in skilled workers and office workers training programs, there is a decrease by 68%. The reasons for this situation is in infrastructural shifts, resource and personnel contraction of the region's economy, taking place in the context of transformational changes in Russian society as a whole.

The reduction in the number of skilled workers and employees affects the needs of the modern labor market in the region. Thus, the employment center service regularly publishes vacancies in the public domain, most of which concern workers with secondary vocational education [6]. In addition to the "traditionally" scarce jobs, the Murmansk Oblast also has an updated demand for personnel within the framework of the projects being implemented for the development of the Arctic zone of the Russian Federation.

In particular, one of the key investment projects in the region is the LNG Construction Center in the village of Belokamenka, whose main economic activity is construction. The staff requirement of this enterprise for the period from 2020 to 2035 is estimated at 15 thousand employees. Traditionally, the key project for the region is Apatit JSC, which specializes in the extraction of minerals, the staffing requirement of which in the comparable period amounted to 570 people.

It is important to note that a significant economic potential for both the Murmansk Oblast and the Arctic as a whole is the development of the Northern Sea Route (NSR). The presence of a strategically important port determined the fate of the region throughout its history. Both secondary and higher education institutions, aimed at industrial communication with maritime enterprises, are becoming even more important in modern conditions. In the future, shipbuilders, ship

[5] Regions of Russia. Socio-economic indicators. URL: https://rosstat.gov.ru/folder/210/document/13204 (accessed 16 July 2022).
[6] List of 50 most demanded in the labor market, new and promising professions requiring secondary vocational education. URL: https://murman-zan.ru/News/Detail/29cee4b5-7399-43ff-a3bb-1edf74260525 (accessed 16 July 2022).

repairmen, navigators, electromechanics, sailors, etc. will remain the key specialties of SVE for the NSR.

According to the estimates of the Agency for the development of human capital in the Far East and the Arctic, the total staffing needs in the Murmansk Oblast in 2024 will be 345.5 thousand people, in 2035 — 346.4 thousand people.

The region's staffing demand in 2021 is shown in Table 2.

Table 2

Number of personnel with secondary vocational education required for the region by type of economic activity, 2021 [7].

Personnel need for mid-level specialists by type of economic activity	Quantity	Personnel need for workers by type of economic activity	Quantity
Nursing	372	Seller, controller, cashier	545
Pre-school education	285	Auto mechanic	250
Economics and accounting (by industry)	184	Cook, confectioner	184
Fire safety	136	Operator in non-ferrous metal production	170
Analytical quality control of chemical compounds	120	Engineer for construction and installation works	149
Installation and technical maintenance of industrial equipment	116	Welder (electric and gas welding and welding works)	103
Transport service	103	Master of housing and communal services	106
Heat supply and heat engineering equipment	99	Locomotive driver	104
Thermal power stations	80	Firefighter	93
Organization of transportation and transport management	67	Docker mechanic	93
Hotel service	59	Mineral enrichment technician	85

According to hh.ru experts, who regularly assess the most demanded professions in the regions, the "top 10" needs of employers in the Murmansk Oblast in 2021 concerned specialists in the areas of Marketing, Advertising, PR, Extraction of raw materials, Administrative strategic personnel, Banks, investments, leasing, Science, education, Beginning of a career, students, Transport, logistics, Tourism, hotels, restaurants, Personnel management, trainings and Account-

[7] Statistics for the Murmansk Oblast. Analytics HH Index. URL: https://stats.hh.ru/murmansk_oblast#structureVacancies%5Bactive%5D=true (accessed 19 July 2022).

ing, management accounting, enterprise finance [8]. It can be concluded that a number of areas in demand are associated with vacancies for specialists with secondary vocational education.

At the same time, the key problems are the existence of industrial relations between employers and educational institutions; the quality of training programs for specialists and workers with secondary vocational education that meets the requirements of the digital economy and modernized industries; compliance with the social expectations of young students, etc.

Problem statement

The effectiveness of the education system of a particular region largely determines the success of its development indicators. The educational potential of territories influences the formation of a certain set of values and ideas about opportunities for self-realization in the region, from which young people's life strategies are further constructed. Despite the recognized shortage of personnel with secondary vocational education in the conditions of the regional labor market and state support for the SVE system, the key question is how effectively the system itself, with its existing educational programs, copes with new challenges, dictated by the needs of regional economy in personnel with the required competences for the employer. A possible answer to this question is the analysis of professional and educational strategies of graduates of secondary vocational education, reflecting certain prevailing values. These are either the values of self-expression, manifested in the strategies of searching for opportunities and readiness to realize themselves, or the values of survival, adaptation, which are characterized by strategies of passivity and uncertainty. The predominance of certain values can be an indicator of regional development. Thus, if the population acts as a bearer of survival values, this indicates the stagnation and depressive state of the region, the absence or lack of opportunities for self-realization. However, this is a time of self-diagnosis and professional self-assessment, indicating the validity and lacunae of the existing professional training and the need to search for further educational opportunities.

The main purpose of this research is to study the educational and professional strategies of vocational graduates formed on the basis of certain values in a particular region (Murmansk Oblast).

Theoretical and methodological framework

Young people's perceptions of proper conditions and opportunities for self-realization are a reflection of social reality in their minds. Based on M. Heidegger's ideas about social reality as something that exists only in the minds of subjects, we believe that young people directly perceive that part of objective reality about which they have their own knowledge. Within the framework of this reality, they construct their own one [21, Berger P., Lukman T.], adapting the changing real-

[8] V Murmanskoy oblasti nazvali samye vostrebovannye professii [The most popular professions are named in the Murmansk Oblast]. URL: https://www.tv21.ru/news/2022/07/11/v-murmanskoy-oblasti-nazvali-samye-vostrebovannye-professii (accessed 20 July 2022).

ity to the realization of their goals and needs. Social action itself proceeds from the value orientations prevailing in consciousness [22, Inglehart R.], on the basis of which life strategies are formed, including educational and professional ones.

According to R. Inglehart's theory, the predominance of self-expression values (post-materialist values) in the youth environment is an indicator of the formation of progress society [23, Hofstede G.], focused on strengthening personal independence, expanding freedom of choice [24, Inglehart R. et al.], including an integral element in the formation of a creative class [25, Mellander C. et al.]. Personal independence can be defined as financial independence or desire to achieve it (for example, through combining work and study), and freedom of choice is interpreted as freedom in decision-making, regardless of agents of influence. Both are associated with the sustainable formation of self-expression values [26, Garmonova A.V. et al.]. Survival values (materialistic values) come from the prevailing uncertainty, dependent choice, passivity. According to R. Inglehart, survival values are manifested in the desire for material goods, security, humility, desire to stay in a stride, promoted by low self-esteem and conformity [24].

Studies of professional and educational strategies have a scientific tradition in Russian sociology and are represented by works that have already become classics, Yu.A. Zubok, V.I. Chuprov [27; 28], V.T. Lisovskiy [29], D.L. Konstantinovskiy [30], Yu.R. Vishnevskiy [31–33]. These authors focused on the dependence of professional and educational orientations on such factors that form the basis of social stratification: social status of parents, place of residence and resources.

The educational and professional attitudes of students of secondary vocational education are reflected in the works of A.T. Gasparishvili and co-authors, who studied satisfaction with the quality of education received and training in the chosen specialty [34]. I.G. Dezhina and G.A. Klyucharev, who studied the peculiarities of students' motivation to receive secondary education and identified the most popular professions that students choose, paid special attention to corporate education as an analogue of SVE in the form of additional professional education [35]. Voloshina I.A. and Kozlova L.V. emphasized the tactics of job search and career preferences of graduate students of secondary vocational education [36]. With regard to educational strategies, one of the most common conclusions in sociological research is the opinion about the prevailing trajectory of movement towards a university degree through secondary vocational education [3, Aleksandrov D.A. and etc.; 5, Bessudnov A.R. et al.; 37; 38, Dudyrev et al.].

In general, the authors who studied the educational and professional strategies of young people are similar in their conclusions about the discrepancy between Russian secondary education and the expectations of young people, they point to a poor connection between the SVE system and production structures, the real needs of the regions, etc.

In this study, educational and professional strategies are understood as future-oriented characteristics of consciousness and behavior of a person, performing value-oriented functions and manifesting in specific life situations related to the choice of goals and means of achieving them in education and profession [39, Sharova E.N., Nedoseka E.V.].

Research results

In order to identify and analyze the features of the vocational and educational attitudes of SVE students, a sociological study was conducted in April-May 2021, using the method of online questionnaires among full-time graduate students of educational institutions of secondary vocational education in the Murmansk Oblast.

The main objectives of the study included the analysis of the following components of professional and educational strategies: 1) educational plans of graduates and their attitude to continuing education; 2) employment plans after graduation from the educational institution and attitude to work in the field of study received; 3) labor value orientations of graduates. As an additional task, relevant in terms of the current demographic situation in the region, it was set to identify students' attitudes towards studying in the region, including their migration plans.

A total of 519 students were interviewed, 31.0% of them were from Murmansk, 24.9% from Apatity, 22.2% from Monchegorsk — the largest cities in the region. The remaining 21.9% were distributed among eight smaller municipalities. 80.3% of the respondents entered colleges after the 9 grade. Regarding the type of secondary educational institution, the distribution is as follows: the majority (85.9%) are college students and 14.1% are technical and vocational school students. 88.2% of respondents study on a budget-financed basis, 62.9% have a relatively high academic performance (only good and excellent marks). 68.5% of the respondents are trained under the programs for mid-level specialists (hereinafter — MLS), 31.5% — under the training programs for workers and employees (hereinafter — W&E).

It was assumed that the level of education before entering the vocational education institution (grades 9 or 11) and the level of qualification of the chosen areas of training (MLS or W&E) of students are significant distinguishing factors that determine the differences in the vocational educational strategies of graduates. However, when constructing two-dimensional distributions with Pearson's chi-squared test, it was found that for most of the data, there are no statistically significant differences between the components of vocational and educational strategies with the level of education. At the same time, dependencies with the level of qualification of the selected areas of training (MLS or W&E) were identified. In addition, a cross-sectional analysis of educational groups by skill level showed that "ninth-graders" are relatively more oriented towards W&E training programs, while "eleventh-graders" overwhelmingly choose MLS training programs. Socio-demographic portraits of W&E and MLS students also have their own specifics: there are significantly more young men (51.6%) among W&E than among MLS (37.5%); there are more residents of the regional center (38.9%) among MLS than among W&E (13.0%). There are also more students on a contractual basis among MLS (15.6% versus 3.7%). Among W&E, there are significantly more representatives of low-income groups: 24.1% noted that they either do not have enough money even for food, or they have enough for food, but other purchases cause difficulties

(9.1% of low-income groups among MLS). Thus, further analysis of vocational educational strategies was carried out in the context of qualification groups.

Educational plans of graduates and their attitude towards further education

The relative majority of respondents (41.8%) have not decided on their plans for further education, with statistically significant differences in plans depending on the level of qualification (significance level according to the chi-square test — 0.000). Among the MLS graduates, the proportion of those oriented towards a university is almost 2 times higher (25.3% vs. 13.0%), and among the W&E graduates, there are twice as many of those who do not plan to continue their studies (29.6% vs. 15.3%).

In the structure of motivation for further education, the motive related to the direction of training already obtained is relatively leading ("I want to improve the level of knowledge in the field of study in which I am studying now" — 30.5%), in second place is the opposite motive ("I have no desire to work in the field of study in which I am studying now" — 19.3%). Interestingly, among the MLS, there are relatively more of those who are positively motivated by the education they already have and see further education as a continuation of what they have already received (33.1% vs. 21.7%), and among W&E, on the contrary, there are relatively more of those who do not want to work in the direction they are studying, therefore, will receive a different education (26.1% vs. 17.2%).

Plans of graduates for employment after graduation and attitudes towards work in the received area of training

A significant factor that determines employment plans is the existing work experience gained during full-time study. More than half of SVE students (69.4%) already have work experience, including 29.5% of respondents noted that they are still employed at the moment. Less than a third of the students chose the alternative "never worked" (30.6%). W&E students were found to be relatively more likely to have no secondary employment while studying (38.3%) than MLS students (27.6%).

The majority of respondents (61.8%) plan to work after graduation, including 13.4% who indicated that they would continue to work where they are already employed. Almost every fourth respondent has no definite plans (23.5%). 14.6% do not plan to work. Interestingly, among those studying in the W&E programs there are slightly more of those who say they are not going to work (19.8% vs. 12.2%), which may be due to the unwillingness to work on the basis of the education received.

In general, every fifth student studying under the MLS and W&E programs noted their unwillingness to work in the received area of training (differences between the categories were not statistically confirmed).

When it comes to the certainty of future employment, every second (54.6%) has several job options in mind, but without any guarantees. At the same time, among MLS students, there are relatively more of those who already know for sure where they will work (27.7% vs. 15.3%).

The majority of all students rated their field of study as being in high demand (51.9% noted that it is easy to find a job). This indicator is statistically significantly higher among W&E students (59.3% vs. 48.6%). Less than 5% of all respondents noted that they could not find a job.

Labor value orientations of graduates

The prevailing value orientations were determined by the question "What qualities of work do you consider the most important?", to which it was proposed to give no more than 3 answers. Among all respondents, there were two dominant value orientations: high wages (69.1%) and stability/reliability of work (49.8%). A third of the respondents noted the interesting content of work (33.9%) and the possibility of professional/career growth (33.3%). About a quarter of the respondents valued a good psychological climate in the team (26.7%), comfortable/safe working conditions (23.9%) and flexible hours (22.6%). With a probability of over 99.9%, differences in the labor value orientations of students under the W&E and MLS programs were revealed. Thus, the orientation towards interesting work content and high pay, as well as career growth and the prestige of the profession in society, stood out more among the MLS students than among the W&E students. At the same time, the orientation towards team climate, flexible working hours, and comfortable and safe working conditions was relatively more present among the W&E students than among the MLS students.

In addition, the common life guidelines were determined by the question "What does it mean for you to achieve success in life?", to which it was proposed to give no more than three answers. In general, for all respondents, the two central criteria for a successful life were "do what you love" (51.1%) and "have a high income" (50.7%). In second place are such values as "have a happy family, children" (46.9%) and "develop personal qualities, abilities and talents" (46.5%). Significant differences were identified in the context of qualification groups: for example, MLS students relatively more often chose "do what they love" (54.4% vs. 44.0% among W&E), as well as "have a good position, a responsible job" (15 .1% vs. 11.9% among W&E). The remaining value orientations of the two groups are structurally similar.

Attitude towards studying in the region and migration plans of SVE graduates

Among those who will continue to study, most plan to continue their education within the region (28.4%), almost as many intend to leave for St. Petersburg (26.9%). In total, 51.8% of all respondents plan to leave the region. Every fifth person found it difficult to answer (19.8%). The dependence of intention on qualification is not confirmed.

As for plans to leave the region, the following is observed: the vast majority of respondents (59.9%) plan to leave their settlement. For 33.9%, this is a practically resolved issue, 26.0% noted

the alternative “more likely yes than no”. 21.0% of respondents found it difficult to answer. Less than 20% of respondents generally do not have such plans. The dependence of intention on qualification is not confirmed.

Conclusion

The empirical research confirmed the assumption that students of different qualification groups — “workers and employees” (W&E) and “middle-level specialists” (MLS) — in the SVE system are predominantly carriers of different types of values, on the basis of which they build educational and professional strategies. It was revealed that graduates of MLS training programs are represented to a greater extent than W&E by young people who continue the linear educational trajectory “school-college-university”, which is typical for both ninth-graders who do not want to take the Unified State Exam, and for those who, due to various circumstances, ended up in the secondary school after the 11th grade. This group of young people is more motivated in their further educational and professional plans. The labor orientation of these young people is based on such indicators as an interesting content of work, high pay, as well as career growth and the prestige of the profession in society. In general, using the terminology of R. Inglehart, one can state the predominance of self-expression values (post-materialistic) in this qualification group.

Regarding the graduates of W&E training programs, several indicators are noteworthy, which, in addition to the conclusion about the predominance of survival (materialistic) values, update the existing discourse on the aggravation of social inequality. The socio-demographic profile of W&E students indicates a relatively higher concentration of representatives of low-income groups of the population living in remote areas from the regional and district centers than among the MLS. This group of young people has a weak interest in the training they receive, in continuing their education, and in finding interesting work and career development. The prevailing labor orientations are the climate in the team, flexible schedule, comfort and safety of working conditions.

At the same time, according to the results of the survey, the research attention is focused on a significant number of respondents who have not defined their educational and professional plans. This circumstance generally signals the stability of materialistic values, or survival values, in the youth environment in the context of a particular regional society, which is a gap that the authors plan to study with the help of a qualitative research strategy, by means of a series of interviews and focus groups.

The Murmansk Oblast, on the one hand, is a space with prevailing “push” factors due to harsh natural and climatic and limited socio-economic conditions, on the other hand, it is a subject that is fully included in the Russian Arctic, a border region of strategic importance. An important conclusion of the study was made in the course of analyzing the orientation of SVE youth to the application of their professional and educational strategies within the Murmansk Oblast. Despite the region’s staffing needs outlined above, almost every second respondent plans to leave their place of residence to implement their life plans. It is noteworthy that every fourth graduate of

W&E training programs does not want to work according to the education received and intends to change professional and educational track outside the region. At the same time, MLS graduates who want to continue their education at a university also tend to consider options for further education outside the region.

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The article was submitted 28.07.2022; approved after reviewing 19.08.2022; accepted for publication 23.08.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 181–199.
Original article
UDC [331.108:316](470.11)(045)
doi: 10.37482/issn2221-2698.2022.49.211

Staffing of the Leading Enterprises of the Shipbuilding, Forest and Fishing Industries of the Arkhangelsk Oblast: the Experience of a Sociological Survey

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Abstract. The article discusses the features of staffing of the shipbuilding, forestry and fishing industries of the Arkhangelsk Oblast. Based on the data of a sociological survey conducted in 2022 among the management of enterprises, the following features are analyzed: the forecasting of personnel needs by employers, the content of personnel forecasts, the level of current and expected personnel shortage, including its causes, mechanisms for filling personnel needs. The following conclusions are drawn from the survey results. Firstly, a relatively small number of enterprises in each industry makes it possible to carry out targeted work on the development of regional sectoral personnel policies, considering the interests and specifics of each organization. Secondly, the studied industries of the Arkhangelsk Oblast are characterized by a moderate shortage of personnel. The most in-demand personnel are those with education in the enlarged groups of professions and training areas “Technique and technology of shipbuilding and water transport”, “Agriculture, forestry and fisheries”, “Engineering”. The personnel shortage is most of all revealed by the representatives of fishing industry, including due to the lack of training of the necessary specialists in the Arkhangelsk Oblast. Thirdly, a flexible and adaptive system of additional professional education in the region can become extremely important for ensuring stability in the labor market. This is due to the employers’ recognition of the high efficiency of this mechanism for filling staffing needs, as well as the rapidly changing socio-economic situation.
Keywords: *staffing, staffing forecasting, staffing need, labor market, shipbuilding industry, timber industry, fishing industry, Arctic zone of the Russian Federation, Arctic*

Acknowledgments and funding

The study was supported by the Russian Science Foundation grant No. 22-28-20440, https://rscf.ru/project/22-28-20440/.

For citation: Saburov A.A., Minchuk O.V., Tsikhonchik N.V., Nikiforov A.S., Zaikov K.S. Staffing of the Leading Enterprises of the Shipbuilding, Forest and Fishing Industries of the Arkhangelsk Oblast: the Experience of a Sociological Survey. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 211–233. DOI: 10.37482/issn2221-2698.2022.49.211

Introduction

In recent decades, global and local labor markets have undergone serious structural transformations associated with a number of long-term trends. These include the reduction of the working-age population, the liberalization of the labor market and, as a consequence, the phenomenon of precarization of employment (decrease in the social protection of workers, the growth of informal and non-standard employment) [1, Kalleberg A.L., p. 258–270; 2, Popov A.V., Solovieva T.S., p. 103–113].

A particularly strong impact on employment and recruitment of labor is caused by automation (replacement of manual labor by electronic computing machines) and digitalization (restructuring/renewal of business processes based on the use of digital technologies). These trends are changing the content of work at a high speed, reducing the demand for certain professions and creating new jobs and entire industries [3, Kalleberg A.L., Leicht K.T.]. The COVID-19 pandemic, in turn, has further accelerated the trends associated with the growth of remote employment, digitalization, and the growth of labor relations flexibility [4, Nikitina N.A., p. 125–136].

Staffing issues are undoubtedly relevant for the Arctic zone of the Russian Federation — a strategically important region in terms of providing the country's economy with natural resources and defense capability. The Arctic macro-region produces 12–15% of the country's GDP and accounts for about a quarter of Russia's exports. Population decline, outflow of labor resources, and low replacement of human resources are negative trends that characterize the current state of socio-economic development of municipalities in the Arctic zone of Russia. The Strategy for the development of the Arctic Zone of the Russian Federation and ensuring national security for the period up to 2035 [1] states the necessity to bring the system of vocational education and additional education in line with the predicted staffing needs of employers in the economy and social sphere of the Arctic zone of Russia.

The solution to the issue of staffing of a macro-region, especially such a complex one as the Arctic zone of the Russian Federation, is comprehensive, due to the fact that the subjects included in the Russian Arctic differ greatly both in terms of the level of economic development and industries of specialization, as well as the level of development of higher and secondary vocational education (hereinafter — HE and SVE). Thus, the solution to the problem of balancing the labor market in the Russian Arctic is associated with the development of an optimal personnel policy at the level of individual regions and industries.

[1] Ukaz «O Strategii razvitiya Arkticheskoy zony Rossiyskoy Federatsii i obespecheniya natsional'noy bezopasnosti na period do 2035 goda» [Decree "Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035"]. URL: http://kremlin.ru/acts/news/64274 (accessed 10 September 2022).

Approaches to the staffing analysis

Currently, the leading approach to the analysis of staffing is the macroeconomic methodology developed by the Budget Monitoring Center of Petrozavodsk State University (V.A. Gurtov), taking into account foreign experience, which allows forming quantitative indicators of additional staffing requirements of the economy, necessary to ensure the projected production of goods and services. Additional staffing needs are calculated in the context of regions (municipalities), levels of education, professions and specialties [5, Gurtov V.A., p. 130–161]. This methodology is based on statistical data (primarily on the number of employees), as well as estimates of economic growth, labor productivity and projected demographic indicators. The calculation of the projected staffing needs is specified by means of employer surveys on the most demanded professions. The indisputable practical result of applying the macroeconomic methodology is a wide sectoral and territorial coverage, as well as the ability to make decisions on the formation of enrollment targets both at the level of the Ministry of Higher Education and Science of the Russian Federation (higher education) and at the level of subjects of the federation (secondary vocational education). Regarding the Arctic zone of the Russian Federation, a study was carried out in 2020 at the request of the Agency for Human Capital Development in the Far East and the Arctic using this methodology. The data obtained revealed the insufficiency of internal labor resources in the Arctic territories to meet future staffing requirements. The expected staffing demand of the Russian Arctic by 2024 in the amount of 66 thousand people can be provided by a little more than 50% due to graduates of Russian educational institutions, retraining of unemployed citizens and vocational training for those who do not have vocational education.

At the same time, the conducted study does not allow answering a number of questions that are important for analyzing the situation in individual regions and sectors of the Russian Arctic. Firstly, the shortage of which specialists is the most sensitive for employers and to what extent it affects the activity of organizations. Secondly, what competencies of employees are most in demand among enterprises, especially in view of the rapidly developing processes of automation and digitalization and increasing need for the so-called “flexible skills”. Thirdly, to what extent employers use the resource of cooperation with regional educational institutions of higher and secondary vocational education to meet their staffing needs. Finally, how employers’ staffing needs and strategies have evolved in a turbulent socio-economic environment, particularly the disruption caused by the COVID-19 pandemic as well as the Special military operation, followed by Western sanctions and partial mobilization.

In this regard, the use of sociological tools to investigate staffing at the level of individual sectors and regions seems appropriate. Russian and world practice actively uses questionnaires and interviews with employers in order to analyze staffing deficit in enterprises, search and recruitment patterns, satisfaction with quality of graduates training, current and expected shortage

of professional and flexible skills among employees, interaction with educational organizations, training their own employees.

Studies of this nature have been and are being carried out in Russia (Higher School of Economics) [6; 7; 8, Bondarenko N.V], Great Britain (British Employer Skills Survey) [9, Winterbotham M., Kik G., Selner S., Menys R., Stroud S., Whittaker S., Hewitt J.H.], Ireland (Irish National Employer Survey) [2], USA (The National Employer Survey) [10, Cappelli, p. 635–635; 11, Shapiro D.], Azerbaijan [12, Rutkowski J.] and Cambodia [13, Bruni M., Luch L., Kuoch S.]. The study of de Larquier and Marshal [14, De Larquier G., Marchal E., p. 567–589], based on data from a survey of French employers in 2005, classifies the job applicant selection process according to four main types and determines the degree of influence of various types of selection on the discrimination of certain groups of candidates (women, unemployed, applicants without formal education). Recruitment and readiness of employers in the Arctic zone of the Russian Federation to hire job applicants who have received education with the use of distance learning technologies are studied in the work of Zaikov K.S. et al. [15].

Literature review shows that, despite the extensive use of sociological tools to analyze the staffing situation, the specifics of staffing needs, their forecasting and replenishment by employers in certain sectors of the Russian Arctic regions remain unexplored.

Research methodology

Institute for Strategic Development of the Arctic of NArFU named after M.V. Lomonosov conducted an applied sociological study “Personnel support for the shipbuilding, forestry and fishing industries of the Arkhangelsk Oblast in the context of digitalization” in 2022. The study is part of the implementation of the scientific project “Staffing models for the economic sectors of the Russian Arctic regions in the context of digitalization”.

The purpose of the study was to analyze the perceptions of the management of enterprises in the shipbuilding, forestry and fishing industries in the Arkhangelsk Oblast on staffing and strategies to meet the staffing needs of these enterprises.

The survey was conducted by means of electronic questionnaires using LimeSurvey software. The survey was conducted from August 3 to September 6, 2022. The questionnaire included 36 questions divided into three main blocks: 1) forecasting staffing needs; 2) demanded competencies and satisfaction with the level of training of graduates; 3) interaction with educational organizations. The questions related to the subject matter of the article were in the first block. Within this block of questions, the following tasks were set: to assess the level of forecasting by enterprises of their own staffing needs; to study the management’s perception of the current and expected in the short and medium term staffing shortage; to study the measures taken by the management of enterprises to fill the staffing needs.

[2] Irish National Employer Survey. 2019. URL: https://www.solas.ie/f/70398/x/ba617d5d3d/irish-national-employer-survey-final-report-3.pdf (accessed 10 September 2022).

In this study, the issues of staffing requirements were addressed to the following categories of employees engaged in production units (responsible for the main activities), as well as in functional departments (e.g. accounting, financial, human resources, marketing):

- executives and highly qualified specialists;
- mid-level specialists, technical staff;
- skilled workers.

The following categories of workers were not covered by the survey:

- senior managers;
- line managers of departments responsible for the main production activities, heads of functional departments (financial, planning, HR services, etc.);
- unskilled workers.

The choice was conditioned by the necessity of higher or secondary professional education in certain areas of training. The questionnaire did not address managers and unskilled workers due to the fact that the level of education, training and qualifications are usually not a significant factor in the employment of these categories at the enterprises of specific industries.

The enterprises of shipbuilding, forestry and fishing industries of the Arkhangelsk Oblast were included in the general population of the study, taking into account the main and additional types of economic activity in accordance with the Russian Joint Academic Coding System (Table 1).

Table 1

Types of economic activity

Industry	Types of economic activity
Forestry	02 Forestry and timber production 16 Woodworking and production of wood and cork products, except furniture, straw products and plaiting materials
Fisheries	03 Fishing and fish farming 10.2 Processing and preservation of fish, crustaceans and molluscs
Shipbuilding	25.99.26 Manufacture of ship propellers and paddle wheels 30.1 Construction of ships, vessels and boats 33.15 Repair and maintenance of ships and boats

The main criterion for selecting the presented industries was their significance for the region's economy: these industries are among the priorities for the region in accordance with the "Strategy for the socio-economic development of the Arkhangelsk Oblast up to 2035" [3].

The general population of the study was 90 legal entities of various organizational and legal forms. The total number of completed questionnaires is 21, which correspond to 50 enterprises that participated in the survey. The difference in values is explained by the specifics of the survey of employers: several large organizations filled out the questionnaire for their subsidiaries and branches, which are separate legal entities.

[3] Strategiya sotsial'no-ekonomicheskogo razvitiya Arkhangel'skoy oblasti do 2035 goda [Strategy for socio-economic development of the Arkhangelsk Oblast up to 2035]. URL: https://strategy24.ru/29/news/strategiya-sotsialnoekonomicheskogo-razvitiya-arkhangelskoy-oblasti-do-2035-goda (accessed 10 October 2022).

All industries are represented in the sample — fishing industry, shipbuilding, and forest industry. The survey covered large (46%) and medium and small (54%) industrial enterprises. Distribution of the surveyed enterprises by the industry is shown in figure 1.

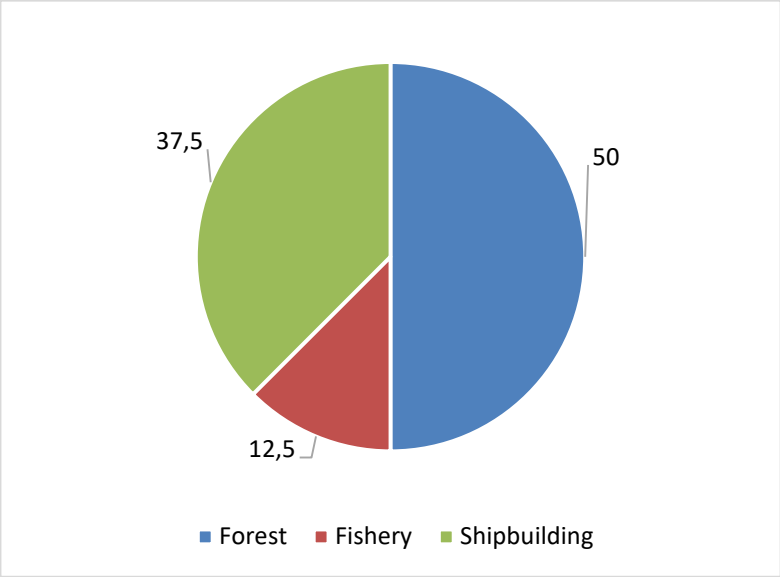

Fig. 1. Distribution of the surveyed enterprises by the industry, %.

From the general population of legal entities of each of the industry under consideration, the survey was completed by: the fishing industry — 40% of enterprises; forestry — 64% of enterprises; shipbuilding — 44% of enterprises. In the forest industry, 36 enterprises were surveyed, which employ more than 54% of employees from the entire industry. In the fishing industry, 10 enterprises were surveyed, which employ more than 54% of employees from the entire industry. In the shipbuilding industry, 4 enterprises were surveyed, which employ 93% of employees from the entire industry.

Thus, it can be stated that the survey data meet the representativeness criterion and can be used to evaluate each of the sectors under consideration, respectively [4].

Implementation of staffing forecasting

According to the results of the study, 90.4% of the surveyed enterprises carry out forecasting of staffing needs. At the same time, only 19% carry out this forecasting on the basis of normative documents and requirements developed in the organization. Enterprises which realize forecasting do it mainly in the short-term perspective. Thus, 68.4% of the respondents plan staffing requirements for the period up to 3 years, 26.3% — for the medium term. Only 5.3% are planning for a longer perspective.

Comparison of enterprises by the availability of forecasting in the context of industries and the average number of employees (hereinafter — ANE) makes it possible to draw the following

[4] Data on the average number of employees at enterprises were obtained from the following sources: the results of a survey of employers as part of a study of the personnel needs of employers conducting economic activities in the territories included in the Arctic zone of Russia "Personnel for the Arctic" and data from the B2B.House service (https://b2b.house/).

conclusions. All large enterprises (ANE over 250 people) carry out forecasting of personnel needs. In turn, small and medium-sized enterprises (ANE 250 people or less) carry out forecasting of staffing needs to a lesser extent (Fig. 2). Most often, this planning is short-term (up to three years), not regulated by internal documents.

The tendency for large enterprises to prevail over medium-sized and small ones in the context of the availability of staff forecasting seems to be natural. Large enterprises of the Arkhangelsk Oblast, included in the sample of the study, have a large ANE. Thus, leading enterprises, first of all shipbuilding and timber industry, employ more than 10 thousand people, which requires a systematic approach to personnel planning.

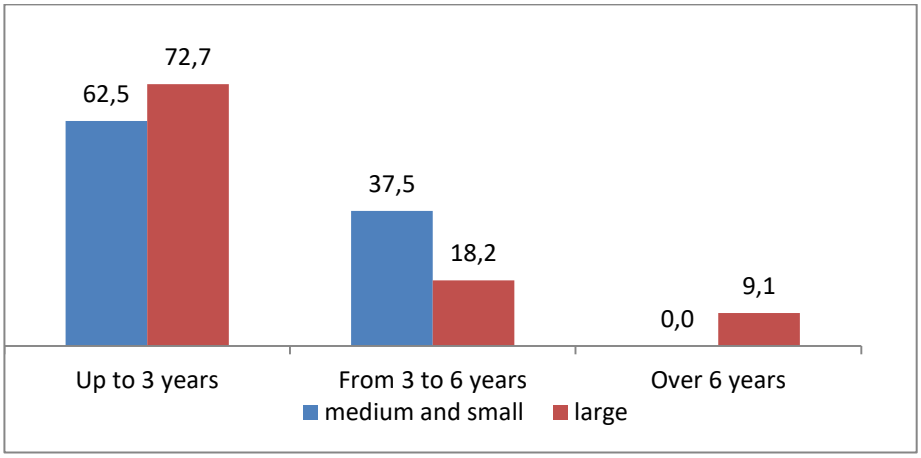

Fig. 2. Term of staffing forecasting at the surveyed enterprises in the context of ANE, %.

The highest share of forecasting staffing needs is demonstrated by companies from the fisheries sector, but they do not have documents regulating it. Only one shipbuilding employer and one timber industry employer reported that they do not forecast staffing requirements. The forecasting of personnel needs regulated by internal normative acts is typical for one large enterprise in the shipbuilding industry and three enterprises in the forestry industry (Fig. 3).

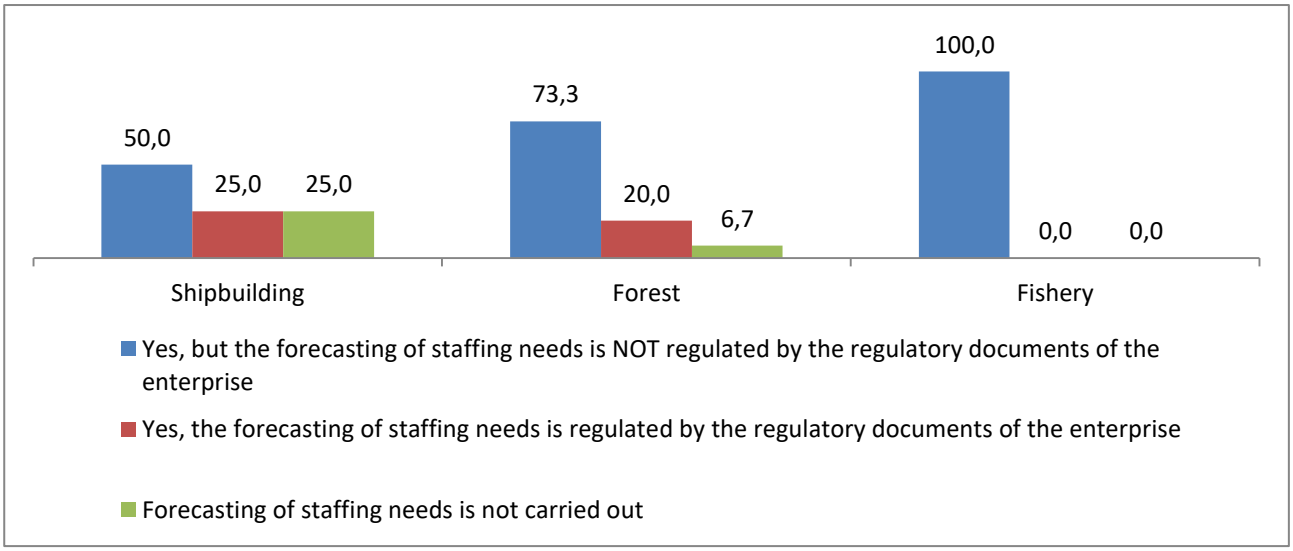

Fig. 3. Staff forecasting by the surveyed enterprises by industries, %.

While most organizations do only short-term planning of staffing needs, one major employer in the shipbuilding industry performs forecasting for a period of more than 6 years. Besides,

one shipbuilding organization and 4 forest industry companies carry out forecasting for a period of 3 to 6 years.

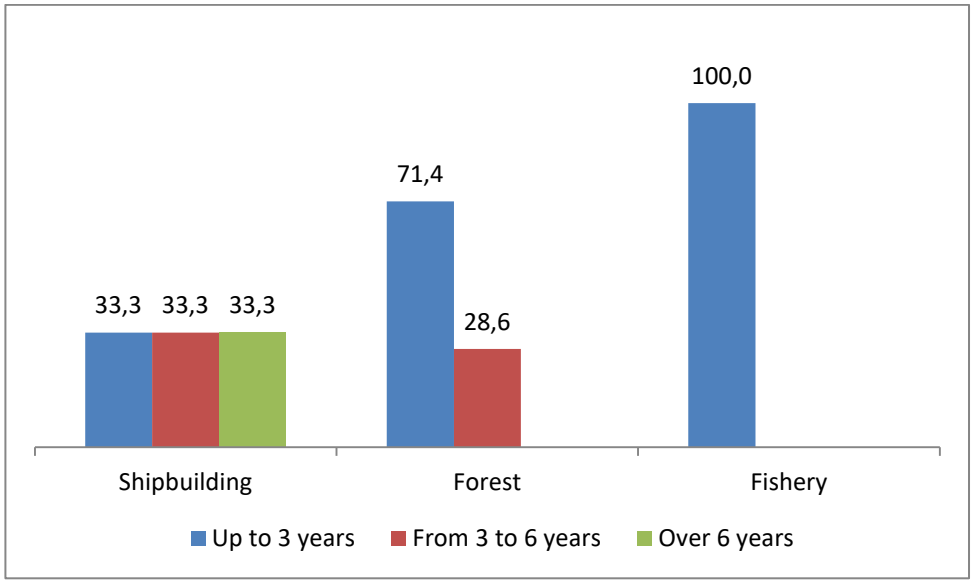

Fig. 4. Duration of staff forecasting by the surveyed enterprises by industries, %.

The relative majority of surveyed enterprises (57.9%) focus on both the number of employees and the required competencies (Fig. 5). A quarter of the respondents are guided only by the number of employees, another 15% — on competencies that are relevant for the enterprise.

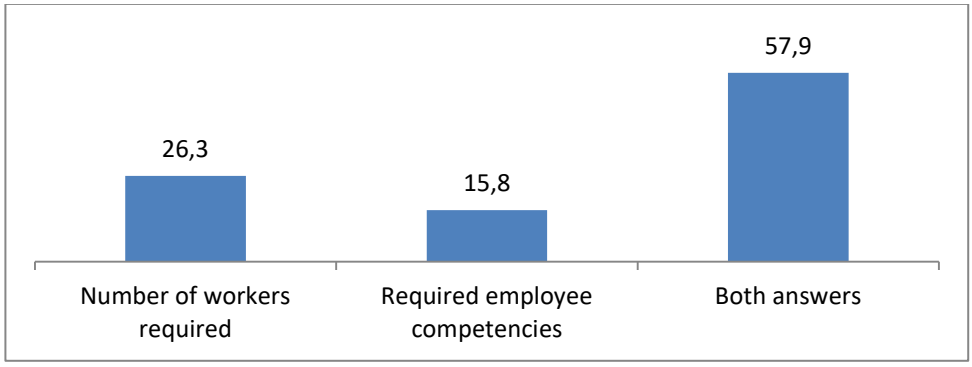

Fig. 5. Content of forecasting the staffing needs of the surveyed enterprises, %.

Enterprises of the fishing industry are more focused on the required competencies of employees than representatives of other sectors (Fig. 6).

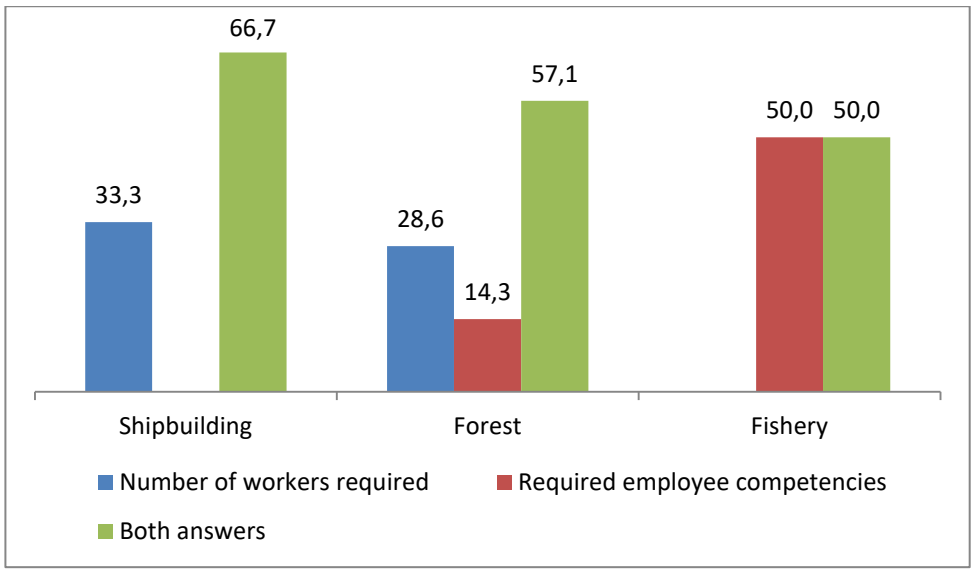

Fig. 6. Content of forecasting the staffing needs of the surveyed enterprises by industry, %.

The survey data show that the main objectives of staff forecasting at enterprises are the search for employees in the labor market to fill vacant positions and the planning of retraining and advanced training of employees (Fig. 7). 38.1% of respondents indicated that the results of forecasting form a request for the training of specialists in educational institutions.

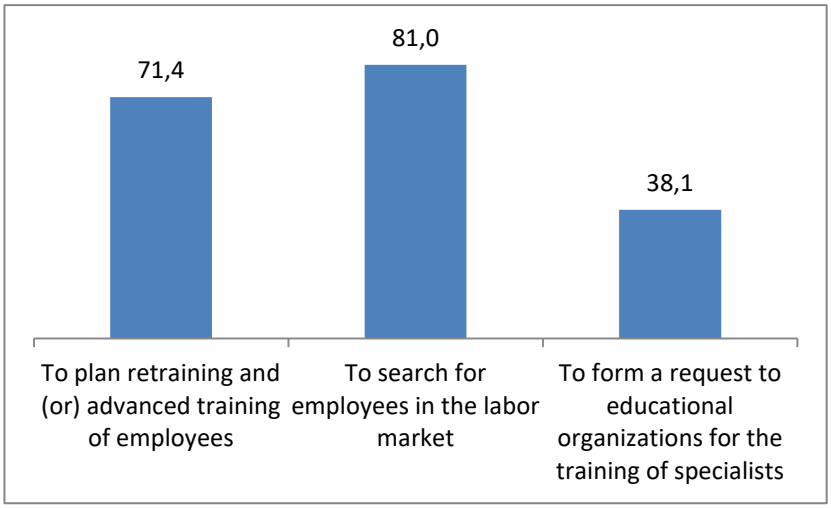

Fig. 7. Personnel forecasting objectives of the surveyed enterprises, %.

It is important to note that the results of forecasting staffing needs in order to form a request to educational organizations are used exclusively by large enterprises of all considered industries (Fig. 8).

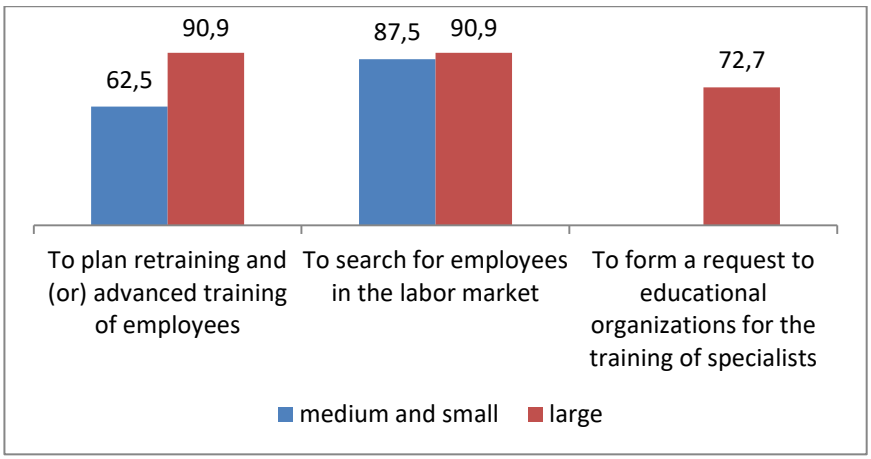

Fig. 8. Goals of staff forecasting of the surveyed enterprises, %.

Level of current and expected staffing deficit

Today, many enterprises are experiencing a shortage of skilled labor, or at least difficulties in finding the necessary specialists.

According to the survey, only one large company in the timber industry is experiencing a serious shortage of personnel. In general, the situation can be characterized as a moderate shortage of personnel: 42.9% of respondents answered this way (Fig. 9). 19% of employers do not feel a shortage of personnel; in particular, this is a large enterprise in the shipbuilding industry, as well as 3 forestry and wood processing enterprises.

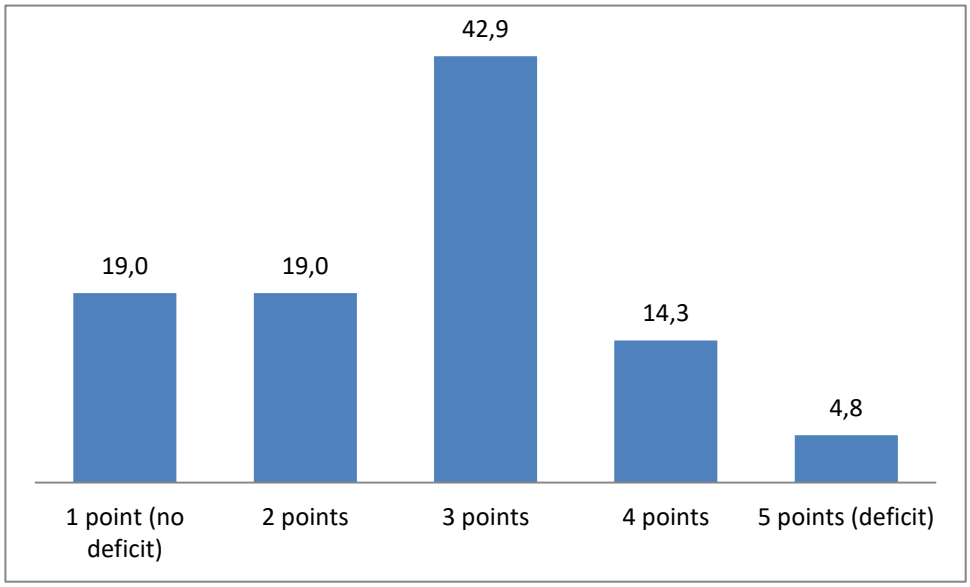

Fig. 9. Estimation of staff shortage by the surveyed enterprises, %.

It is interesting to note that all enterprises of the fishing industry estimate the personnel shortage at an average level (Fig. 10). At the same time, medium and small enterprises have a less pronounced personnel shortage in contrast to large enterprises.

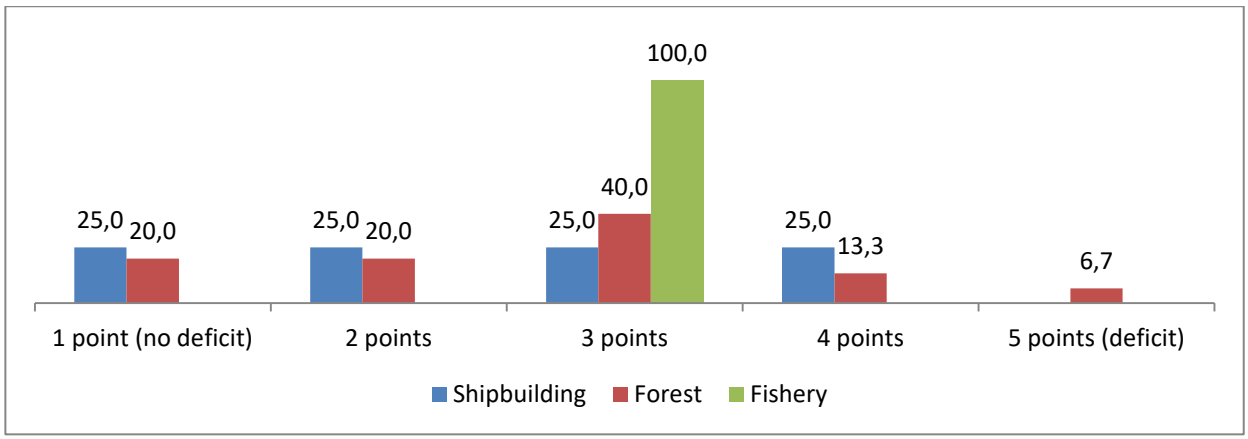

Fig. 10. Estimation of staff shortage by the surveyed enterprises by industries, %.

In order to analyze the most deficient professions indicated by the respondents, they were summarized and compared within the enlarged groups of specialties and areas of training in accordance with the Russian Joint Academic Coding System (RJACS [5]). This procedure makes it possible to correlate the real staffing needs of employers with the probable areas of training for these professions. The analysis was conducted in the context of the industries under consideration.

The survey conducted showed that forest industry enterprises are experiencing the greatest shortage of professions (specialties) of workers who require education in the group 2.15.00.00 "Engineering" and 4.35.00.00 "Agriculture, forestry and fisheries", 30.5% and 31.1% of the total requirement indicated by them, respectively (Fig. 11).

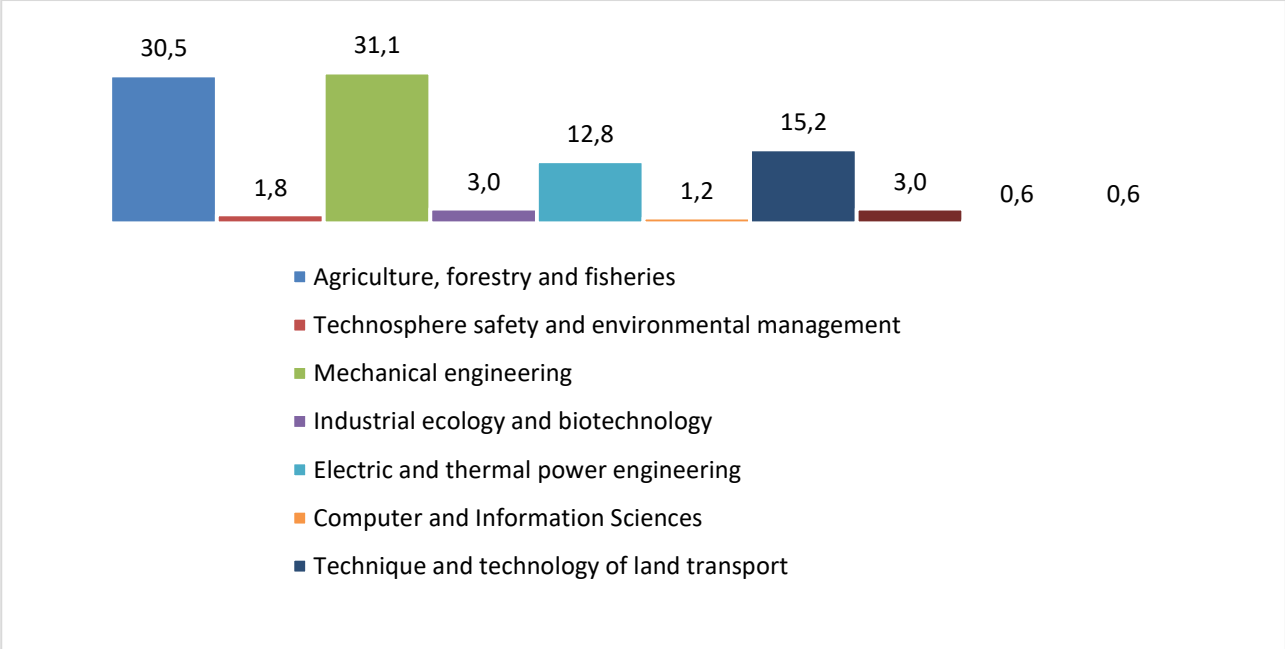

Fig. 11. Distribution of staffing needs by enlarged groups of training areas of the forest industry, %.

Respondents indicated the following professions as the scarcest: a logging and skidding machine operator, a repairman, a mechanic, a forestry foreman, a tractor driver of agricultural production.

[5] RJACS is used for classification and coding of professions, specialties and areas of training in the implementation of professional educational programs of secondary vocational and higher education.

The fishing industry is experiencing a shortage of personnel, primarily in professions that correspond to the enlarged group 2.26.00.00 “Technique and technology of shipbuilding and water transport” — 70.1% of the total number of declared shortages (Fig. 12). Among these professions, the following should be distinguished: a shipbuilder-ship repairer of metal vessels and a ship mechanic.

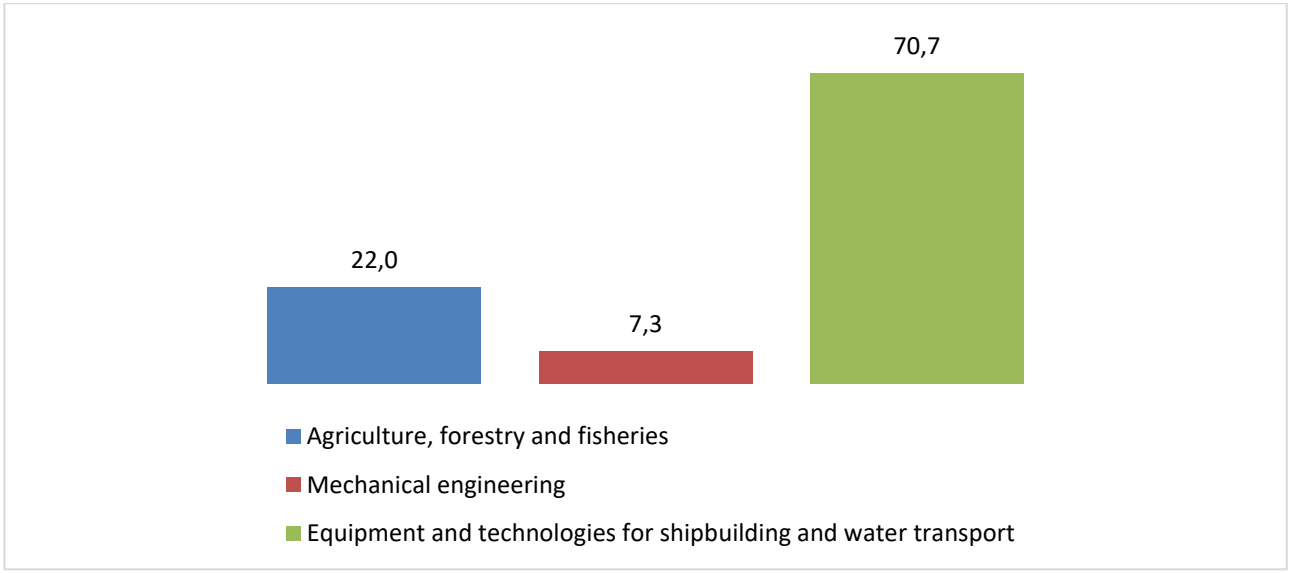

Fig. 12. Distribution of staffing needs by enlarged groups of training areas of the fishing industry, %.

The largest staffing requirement in absolute terms is stated by shipbuilding industry — over 800 people, which is comparable to the number of several large enterprises. There is a pronounced need for professions that require education in the enlarged group 2.26.00.00 “Technique and technology of shipbuilding and water transport” — 86.2% of the total (Fig. 13). First of all, these are ship electricians, shipbuilders and ship-repairers of metal and non-metal vessels (more than 500 people).

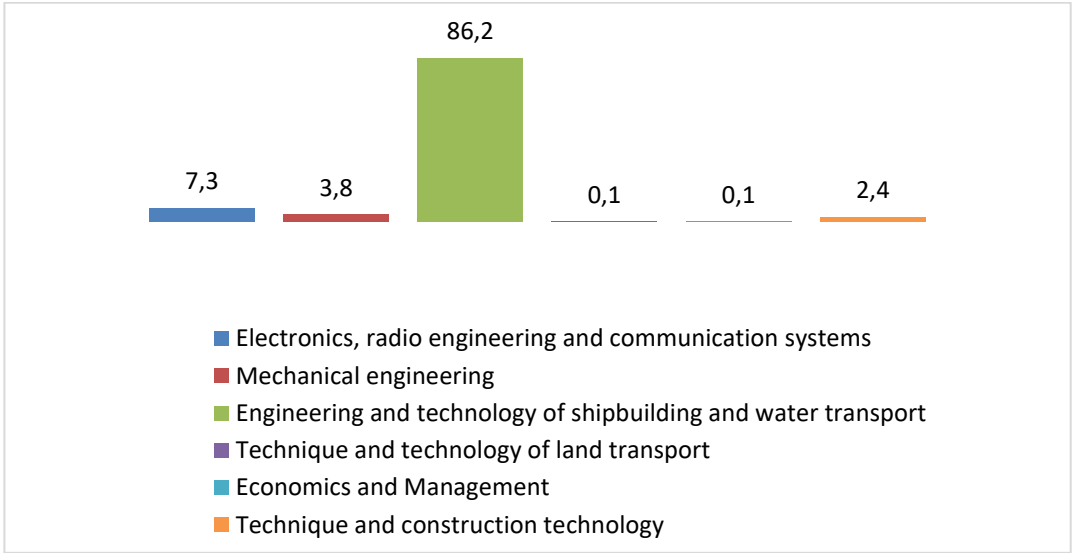

Fig. 13. Distribution of staffing needs by enlarged groups of training areas of the shipbuilding industry, %.

Representatives of enterprises see the causes of staffing shortage mainly in the absence of necessary specialists in the labor market (answer options: “there are no specialists with the re-

quired level of qualification in the labor market", "the required specialists are not fully trained" made up the vast majority of answers). The second most important problem, according to respondents, is the inability to offer competitive working conditions to specialists (Fig. 14).

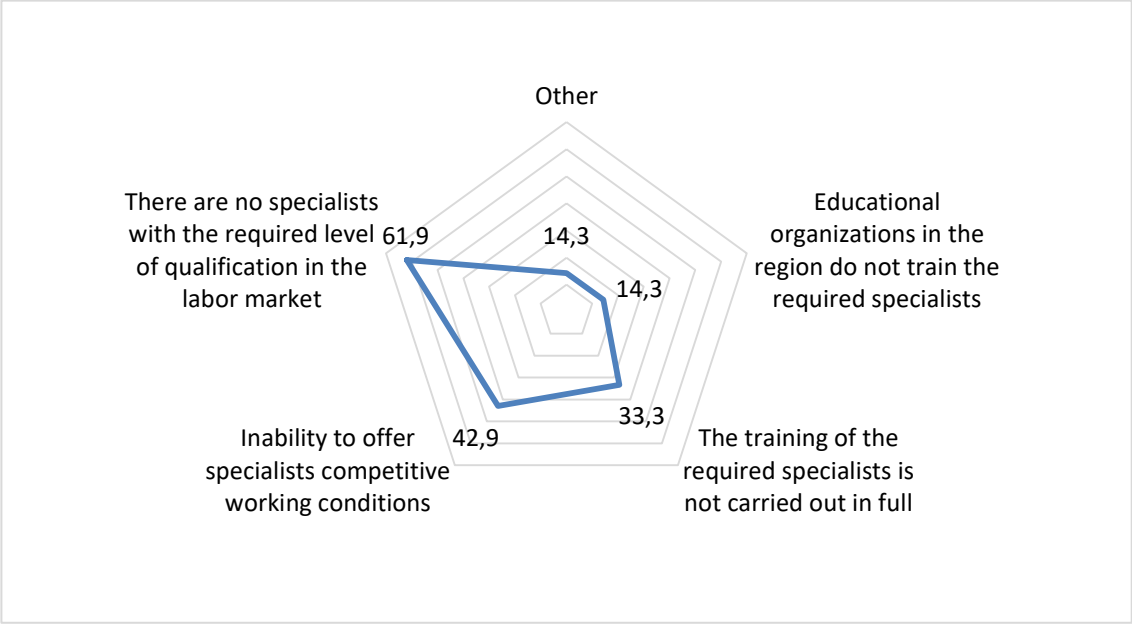

Fig. 14. Reasons of staff shortage at the enterprises.

Respondents of the fishing industry, to the greatest extent compared with other industries, stated both the absolute shortage of demanded specialists and the fact that the educational organizations of the region do not provide training in the necessary specialties (Fig. 15).

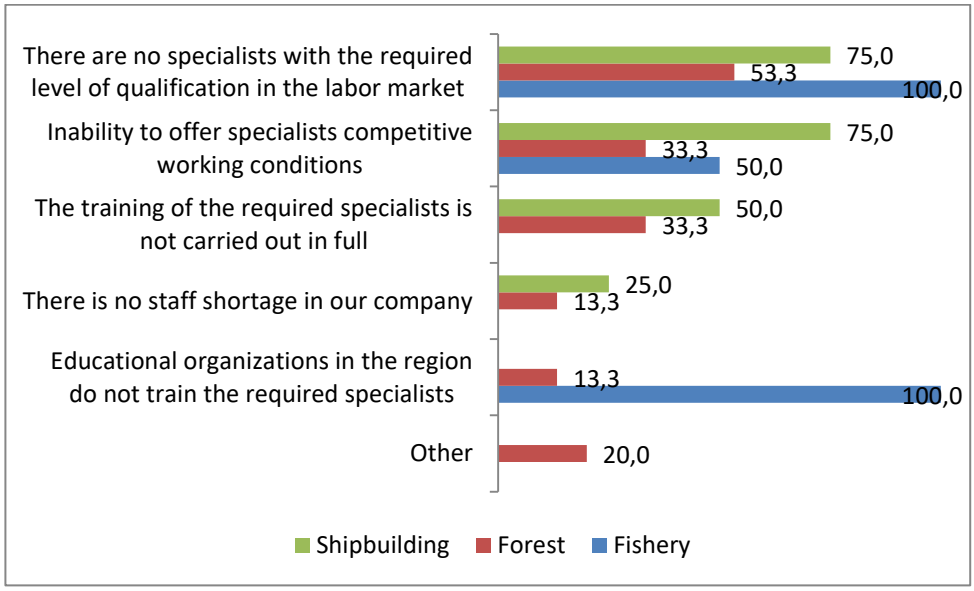

Fig. 15. Reasons of staff shortage at the enterprises, %.

Level of expected staff shortage

The more distant the planning horizon is, the less certain the respondents' assessments of the expected staffing needs are. Thus, the share of those who found it difficult to answer within the 3-year planning perspectives was 10%, and within the 6-year planning — already 43% (Fig. 16). Nevertheless, both in the near future and in the long term, representatives of enterprises predict a

staff shortage. In the perspective of 3-year planning, 52% of respondents expect a shortage of personnel at their enterprises.

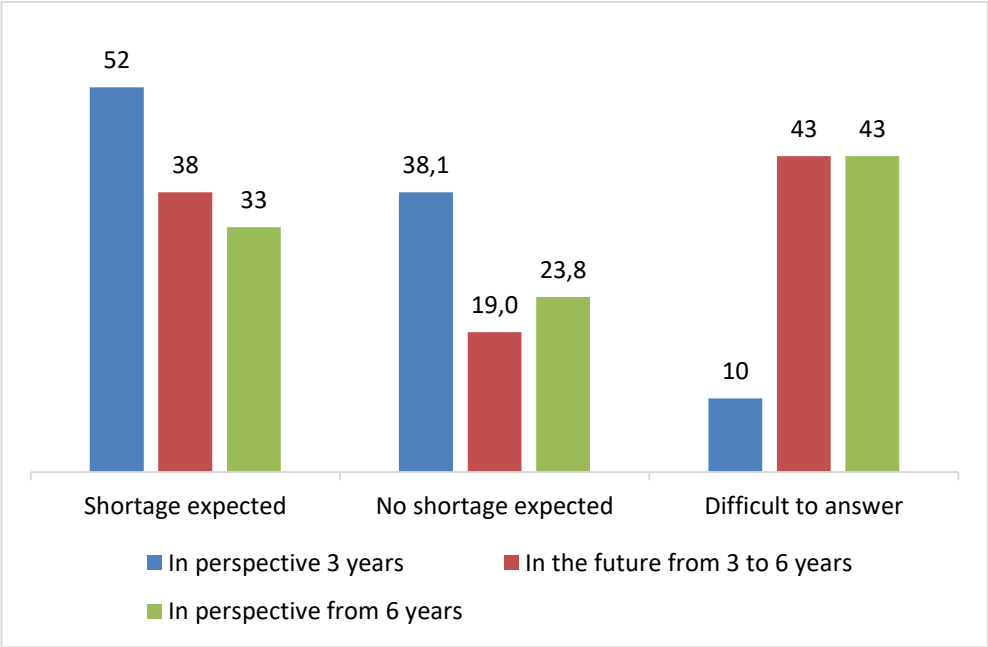

Fig. 16. Level of staff shortage expected by enterprises, %.

The largest shortage in the short term perspective is expected at the enterprises of the fishing industry, which corresponds to the previous data on assessing the state of the staff shortage (Fig. 17).

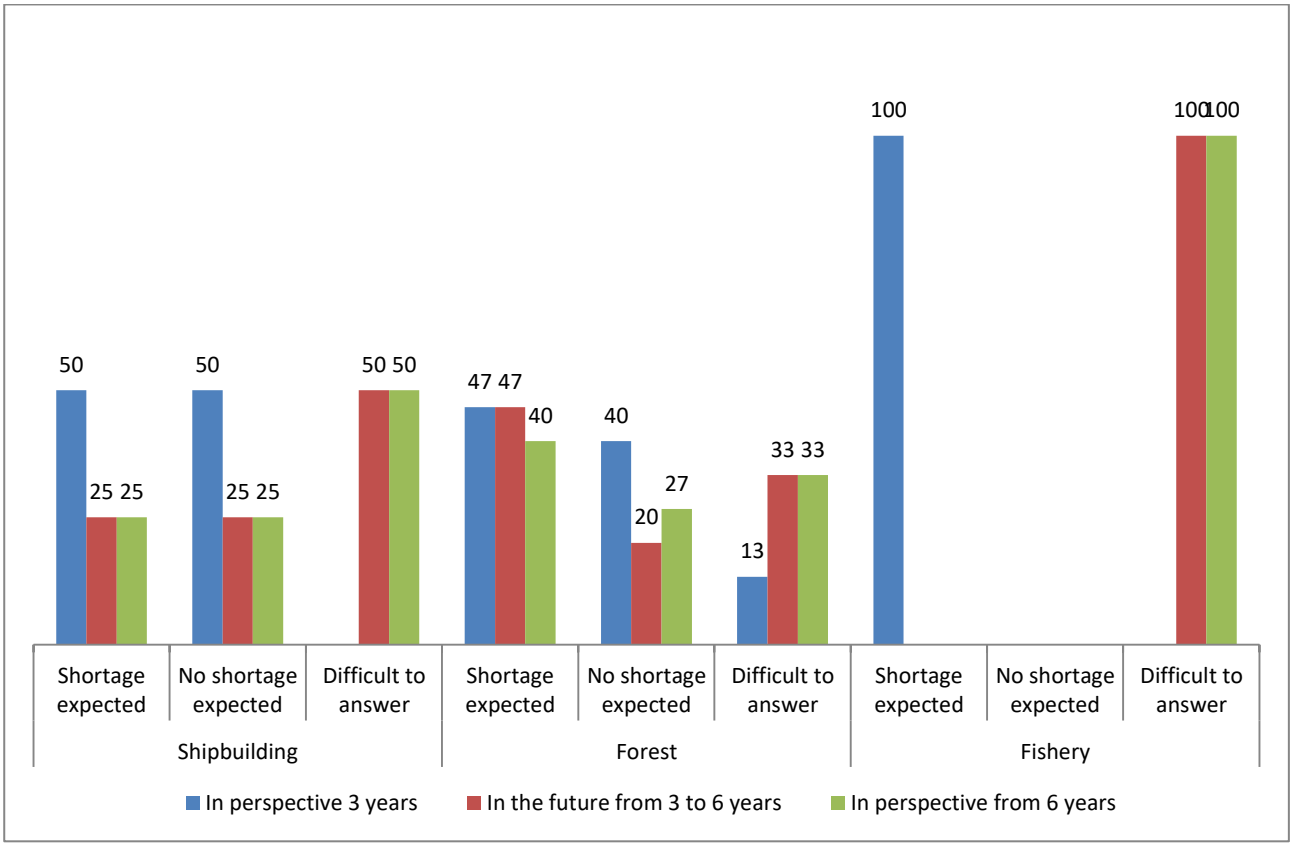

Fig. 17. Level of staff shortage expected by enterprises by industries, %.

Mechanisms for filling staffing needs

In order to solve the problem of staff shortage, the surveyed enterprises actively use a wide range of tools, including open publications in the Internet and mass media, retraining employees on their own, using personal connections, attracting resources of educational organizations (industrial practice of students and staff retraining) (Fig. 18). Target training (indicated by 61.9% of respondents) and private recruitment agencies (38.1%) are the least popular among the proposed methods.

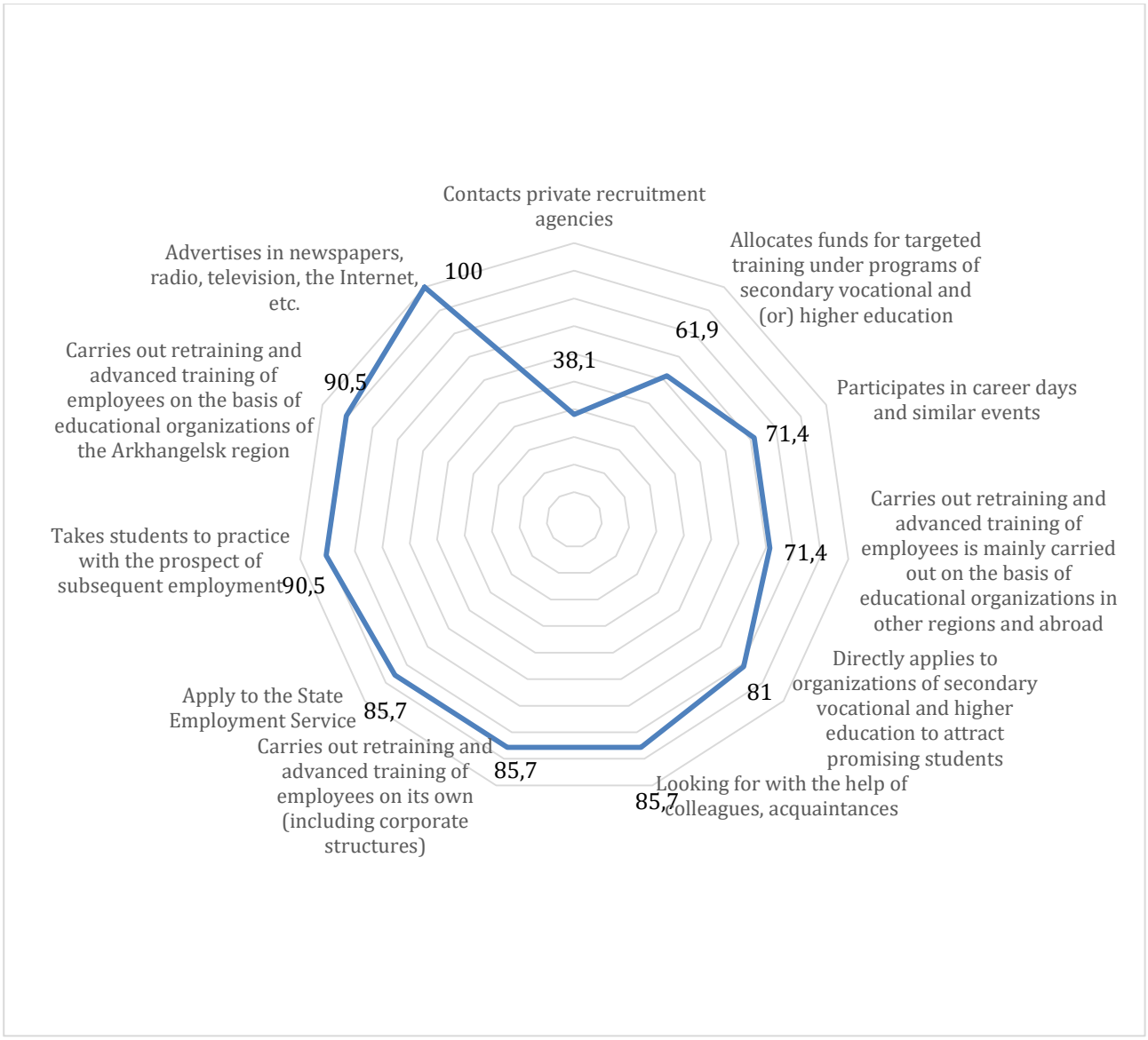

Fig. 18. Ways of filling the staffing needs of the surveyed enterprises.

The frequency of using tools to fill staffing needs generally corresponds to the assessment of their effectiveness (Table 2). According to respondents, the following measures have the greatest effect: retraining and advanced training of employees on their own; advertisements in newspapers, radio, TV, the Internet, etc.; search with the help of colleagues, acquaintances; application to secondary and higher educational institutions to attract promising students; retraining and advanced training of employees on the basis of educational organizations of the Arkhangelsk Oblast. Respondents consider

the public employment service and private employment agencies to be the least efficient ways to get new employees, as well as the allocation of funds for targeted training.

Table 2

Evaluation of the effectiveness of mechanisms for filling staffing needs by enterprises, % (the answer "this mechanism is not used" is not included in the table)

Mechanism for filling staffing needs	Completely ineffective or ineffective	Moderate efficiency	Effective and very effective
Retraining and advanced training of employees on its own (including corporate structures)	9.5	9.5	66.7
Retraining and advanced training of employees on the basis of educational organizations of the Arkhangelsk Oblast	9.5	19	61.9
Advertisements in newspapers, on radio, television, on the Internet, etc.	19.1	23.8	57.1
Help of colleagues, acquaintances	14.3	14.3	57.1
Appeals directly to organizations of secondary vocational and higher education to attract promising students	23.8	9.5	47.6
Practice of students with the prospect of subsequent employment	23.8	23.8	42.9
Career days and similar events	19.1	9.5	42.9
Retraining and advanced training of employees (mainly on the basis of educational organizations in other regions and abroad)	14.3	23.8	33.3
Public employment service	28.6	28.6	28.6
Allocation of funds for targeted training under programs of secondary vocational and (or) higher education	19	19	23.8
Private recruiting agencies	19.1	9.5	9.6

The enterprises search for job applicants not only in the Arkhangelsk Oblast, but also outside the region. Thus, half of the respondents search for workers in other regions of Russia (none of the respondents chose the option of searching abroad). The following professions are searched by enterprises in other regions of the Russian Federation: a ship pipe fitter, a ship fitter, a metallurgical engineer, a turner-bore operator, an electrician, a ship electrician, a taxator, a forest fund specialist, a forest fund allotment foreman, shipboard personnel specialists. This list generally corresponds to the most demanded professions, for which employers have indicated a staff shortage.

Conclusion

The conducted research allows a number of conclusions to be drawn regarding the staffing situation in the shipbuilding, fishing and forestry industries in the Arkhangelsk Oblast.

1. The bulk of workers employed in these industries are concentrated at large enterprises (their branches, subsidiaries). In the context of regional labor market development, it has positive consequences, as it allows realizing targeted work on development of regional sectoral personnel policies, taking into account the interests and specifics of each organization. At the same time, the reverse side of this situation is the potential vulnerability of the regional labor market in case of significant staff reductions of major players.

2. In general, the situation in the three studied sectors of the Arkhangelsk Oblast can be characterized as a moderate staffing shortage. The greatest shortage of personnel is observed in specialists in enlarged groups of training areas and specialties “Technique and technology of shipbuilding and water transport”, “Agriculture, forestry and fisheries”, “Mechanic engineering”. The shortage of personnel is most noted by representatives of the fishing industry, who forecast a shortage of personnel in the perspective of three years. All the representatives of the fishing industry actualized the problem of the lack of necessary specialists training in the Arkhangelsk Oblast.

3. Despite the fact that most of the surveyed organizations carry out forecasting taking into account the quantitative and competence characteristics of the workforce, this forecasting in absolute majority of cases extends to short-term perspective due to unstable socio-economic situation. In this regard, a flexible and adaptive system of additional vocational education in the region can become of great importance for ensuring stability in the labor market. Its role is emphasized by the fact that the majority of employers indicated retraining and advanced training of employees both on their own and on the basis of educational organizations of the Arkhangelsk Oblast as the most effective tools for filling the staffing needs.

The revealed tendencies determine the necessity of subsequent surveys of employers regarding the competencies that are in demand and interaction with educational organizations. The objectives of this study are to continue and deepen the data by conducting in-depth interviews with managers and experts in these sectors, who will clarify the content of staffing forecast of enterprises and its impact on decision-making in the staffing sphere, the impact of the lack of specialists of different professions on the activities of the company and other aspects of staffing.

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The article was submitted 17.10.2022; approved after reviewing 19.10.2022; accepted for publication 16.11.2022.

Contribution of the authors: Saburov A.A. — research concept, research methodology, writing the original text, finalizing the text, final conclusions; Minchuk O.V. — research concept, research methodology, writing the original text, finalizing the text, final conclusions; Tsikhonchik N.V. – research methodology, writing the original text, finalizing the text; Nikiforov A.S. – research methodology, revision of the text; Zaikov K.S. — scientific guidance, writing the original text.

The authors declare no conflicts of interests.

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Arctic and North. 2022. No. 49. Pp. 200–213.
Original article
UDC 316.654(985)(045)
doi: 10.37482/issn2221-2698.2022.49.234

The Russian Arctic Image at the Present Stage of Development: Romance or Pragmatism?

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Abstract. The purpose of the article is to identify the characteristics of the Russian Arctic image at the present stage of its development in terms of a romantic and pragmatic context. In order to achieve this purpose, the content analysis of publications on the Arctic topic in the federal and regional media was carried out. A pilot sociological survey of the European part of the Russian Arctic zone residents was used as an additional research method. The study results showed that pragmatic orientation prevails in the "Arctic" content of modern media. The Arctic is presented in a positive way as a special priority territory of the country, the power and strength of the Arctic territories are emphasized, the images of the Arctic and their unique potential are revealed. In the population minds, the Arctic images are presented in a more romantic way — the associations of local residents are associated with the nature splendor, love for the North and beautiful winter. It is substantiated that the integrated development of the Arctic territories requires qualified personnel, not only filled with the romance of northern beauty, but also pursuing specific practical goals. The results of the study will be useful and interesting to specialists involved in the Arctic territories development, to executive bodies of state power, as well as to the general public.
Keywords: *Russian Arctic, romantic image, pragmatic image, the Arctic in the media, Arctic image*

Introduction

Every year, the Arctic agenda becomes increasingly relevant in the context of economic and geopolitical development priorities of the circumpolar countries. Such attention and interest in the Arctic stimulates the dynamic growth of this topic in the discourse of modern mass media around the world. In the studies of the international Arctic media discourse, the following trends are observed: high frequency of publications, coverage of the Arctic development problem through informational and analytical genres, as well as the internationalization of the Arctic [1, Dolgoborodova S.O., Avdonina N.S., p. 77].

The rise of interest in the Russian Arctic in the 21st century as a macro-region of the future, which determines the power and capabilities of Russia, is associated with the beginning of a new stage of its "re-development", declaration of priorities, goals and objectives, as well as mechanisms for implementing the state policy of the Russian Federation in the Arctic for a long-term period up to 2035. Various aspects of Russian Arctic development, the problems of its exploitation

For citation: Simakova A.V., Stepus I.S. The Russian Arctic Image at the Present Stage of Development: Romance or Pragmatism? *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 234–251. DOI: 10.37482/issn2221-2698.2022.49.234

are becoming the subject of the information agenda of the Russian mass media of various formats, directions and levels.

Mediatization of the Russian Arctic, in turn, contributes to an increase in the number of scientific studies devoted to the context of the broadcast information agenda. A.Yu. Zhigunov [2, p. 104], based on the analysis of documentaries and publications in the federal Internet media and for the period from 2013 to 2020, has identified the main thematic dominants of materials about the Arctic; the key among them are the militarization of the region, its economic potential, climatic conditions, tourism, research into understudied areas and new hydrocarbon deposits. On the basis of the results of the analysis, the author concludes that the Russian media are fully involved in the idea of developing the Arctic. Interestingly, according to the author's research, the media image of the Arctic in the Soviet era (1930–1970) was focused on its development, the construction of the Arctic infrastructure and its conqueror-polar explorer.

The multifaceted image of the Russian Arctic is also emphasized in the monograph by Yu.F. Lukin "The many faces of the Arctic in the flow of time and meanings" [3, p. 4], which comprehensively examines all the main spheres of life in the Arctic countries — economics, geopolitics, society and culture.

T.A. Kovrigina's work [4, p. 71] compares the Arctic content presented in domestic and foreign media. Despite some differences in the information agenda of the circumpolar states, the media agree that the exploration and development of the Arctic territories is a long process, in which the problems of ecology and environmental protection deserve special attention.

It is important to note that the interest in the Russian Arctic is qualitatively different from the Soviet era. Today the state, the business community, Russian and international corporations, public organizations, cultural and art organizations, politicians, bloggers and ordinary people from different parts of the country and the world are interested in the Arctic. Sheila Watt-Cloutier defines it briefly but concisely: "The Arctic is a lot for many people" [5, p. 37].

However, the Arctic has always fascinated with its mystery, beauty, strength, attracted many generations of people who come to "conquer" and "develop" these territories, to study and travel. O.S. Kryukova notes that the Arctic in Russian literature was perceived as "the territory of a severe struggle with the recalcitrant forces of nature, polar romance, northern exoticism, exceptional feelings, true friendship, camaraderie, collectivism and mutual assistance, heroism in peacetime" [6, Kryukova O.S., p. 21].

Today, the Arctic is not just a harsh territory that attracts romantics, but also a strategically important part of the country that requires a new conscious and integrated approach. As part of this study, we decided to look at the Russian Arctic from this side. First, to analyze the image of the Arctic created in the media from romantic and pragmatic perspective.

Since media resources have a great influence on the mass perception of the Arctic, forming the image of the region and the opinion on the socio-economic processes in the Arctic [7, Bolsunovskaya L.M., Dibrova Yu.A., p. 148], the second task of this study is to analyze the images de-

veloped directly among the inhabitants of the Arctic zone of Russia, and to find an answer to the question — "Is the modern Arctic romantic or pragmatic in the minds people"?

Materials and methods

Achieving the objectives of the study necessitates the collection and analysis of factual information, which consists of a selection of media, followed by a study of the content and a survey of the local population. With the help of the indicated methods, on the one hand, the image of the Arctic, broadcast to the general reader in the media, is analyzed, on the other hand, the image of the Arctic, which has developed among the local population as a consumer of media content, is revealed.

Analytical framework, coding system and sampling frame for content analysis

On the basis of the study's focus, let us outline the territorial framework for the study. Federal media content analyses the image of the Russian Arctic as a whole, and in order to study the regional media context and the perceptions of local residents, the regions of the European part of the Arctic zone of Russia were selected — the Murmansk Oblast, the Arkhangelsk Oblast, the Komi Republic and the Republic of Karelia.

As a source of information for content analysis, electronic media were chosen, which have recently been gaining more and more popularity [8, Ilchenko D.A., Maykova V.P., p. 18]. By the criterion of popularity, three federal level media [2] and eight regional level media have been selected [3] — the leaders in the ratings of media resources by citation rate according to Medialogy as of January 2022. The selected media position themselves as the leading information platforms, promptly covering the latest information and events.

For the study, manifest and latent methods of coding information were chosen [9, Newman L., p. 123], that were used for quantitative analysis, determination of context and search for explicit and latent (implicit) meanings of text. For example, when examining a text, a researcher decides whether it contains a pragmatic or romantic image of the description of the Russian Arctic and records the characteristics of content, key words and sentences. Thus, the unit of analysis is an article published in the media, the unit of context is a characteristic of the context, the construct is the "pragmatic"/"romantic" image of the Arctic broadcast in the media, as well as the context of the population's perception of information about the Arctic. The fact of mention was used as a conceptualization; positive/negative context, and the frequency characterizes the num-

[2] TASS news agency. URL: https://tass.ru/tass-today; Russian Agency for International Information "RIA Novosti". URL: https://ria.ru/; Russian newspaper. URL: https://rg.ru/ (accessed 02 June 2022).

[3] Media of the Murmansk Oblast: Information agency "SeverPost.ru". URL: https://severpost.ru/; Newspaper "Murmansk Bulletin". URL: https://www.mvestnik.ru/. Media of the Arkhangelsk Oblast: Online edition 29.ru. URL: https://29.ru/; Information agency "Echo of the North". URL: https://www.echosevera.ru/. Media of the Republic of Karelia: Karelinform. URL: https://karelinform.ru/; Information agency "Respublika". URL: http://rk.karelia.ru/; Media of the Republic of Komi: Komiinform News Agency. URL: https://komiinform.ru/, Sever Media Information Agency. URL: https://severmedia.org/ (accessed 02 June 2022).

ber of mentions of the categories of analysis (and their variations) in the articles selected for analysis.

Thus, content analysis in this study has two directions — quantitative and qualitative. A set of scoring units is formed for each region based on the analysis of the broadcast content. For the content analysis of federal and regional media, a search of relevant news content on media websites for 2019–2021 was conducted. Taking into account that the federal media also covers information about individual Arctic regions, reports that present the Arctic as a macro-region were selected for analysis.

On average, a single federal media source contains 450 articles about the Arctic per year, while the regional media contains 30–100 articles on Arctic topics. There are approximately 900 articles per year, for a total of 2700 articles over three years (2019–2021). Thus, the sampling frame is set by the list of all these articles. Since the volume of articles for analysis is large, we will limit the sample to a quantitative ratio of 200 articles in the regional level media and 100 articles in the federal level media. Thus, the representativeness of the sample in the total population is about 10%. Since all issues and years of media outlets are important for the study, a stratified sample type was chosen. Stratification is done by regions, 250/4=62 articles per region. In order to represent the articles for each year, for each region, the sample is divided into 3–20 articles for each of the three years in one region. For the selection of articles, a complete list of articles that mention the Arctic Zone of Russia was compiled. Then, with a given step, every third article gets into the sample.

Population survey as an additional research method

As an additional research method, a population survey was chosen, the purpose of which was to identify the image of the Russian Arctic that has developed among the population of the European part of the Arctic zone of Russia (romantic or pragmatic). The answer options to the questionnaire contain features describing romantic and pragmatic evaluation of the Arctic through associative representations. The object of the study is the permanently residing population of the Murmansk Oblast, the Arctic territories of the Arkhangelsk Oblast, the Republic of Karelia and the Republic of Komi aged over 16.

The survey was conducted by means of an accessible sampling method using an online questionnaire, which was published in the thematic communities of the Arctic regions on the VKontakte social network. The total minimum sample size is preliminarily determined — at least 100 people from each region under study, that is, a total of 400 people, with a gender distribution of 72% women and 28% men, the average age of respondents is 39 years old. The study is characterized as a pilot one, conducted with the aim of probing public opinion. The results of the survey on the implemented sample population, due to their small representativeness, can only be extended to the audience represented in the study.

Research results

The image of the Arctic, broadcast in the media at the federal level

In the official discourse, the Arctic is traditionally presented in different semantic categories [10, Nazukina M.V., p. 40]; therefore, during the analysis of the media at the federal level, various images of the Russian Arctic were also identified. It should be noted that the study period of 2019–2021 coincides with the period of adoption of new strategically important documents on the development of the Arctic zone of Russia, so most of the content is related to the implementation of Russia's state policy in the Arctic. Most of the articles that highlight the Arctic as a *national priority* contain references to the top government officials.

The second most popular image of the Russian Arctic in the media is the "*investment attraction zone*": at the current stage, one of the priorities of Russia's economic policy in the Arctic is to stimulate entrepreneurial and investment activities [4]. The image "Arctic as a zone of investment attraction" was detailed in 24% of the articles selected for analysis, which deal with investment projects, residents of the Arctic zone, and the system of benefits and preferences for business development.

In third place in terms of publications in the federal media is the image of the Arctic as a *place for human life* (Fig. 1). These publications raise important topics about creating a social ground — the development of social infrastructure and conditions for a comfortable long-term stay of people, curbing the migration outflow of the population, attracting personnel to the Arctic and developing human capital. Relevant for coverage in this direction was the program of providing land plots up to one hectare — "Arctic hectare".

Fig. 1. The most popular images of the Russian Arctic, broadcast in the discourse of the federal media.

The image of the Arctic as a unique ecosystem is identified in 20% of the analyzed articles. This image is revealed through the coverage of the problem areas of the Arctic ecosystem — the need for general cleaning of the Arctic, the climate agenda and global warming, the preservation of biodiversity.

[4] O gosudarstvennoy podderzhke predprinimatel'skoy deyatel'nosti v Arkticheskoy zone Rossiyskoy Federatsii: federal'nyy zakon ot 13 iyulya 2020 g. N 193-FZ [On state support for entrepreneurial activity in the Arctic zone of the Russian Federation: federal law of July 13, 2020 N 193-FZ]. URL: http://www.consultant.ru/document/cons_doc_LAW_357078/ (accessed 12 June 2022).

It is impossible to talk about the sustainable development of the Arctic without science, which accounts for 18% of the total messages. Scientific research in the Arctic is carried out in a fairly wide range of areas: military topics, climate and wildlife, geological exploration, historical research, etc. The image "*Arctic as a territory of research*" is also broadcast in articles on the creation of world-class scientific and educational centers in the Arctic, as well as international Arctic stations "Snezhinka".

The Arctic, in terms of the richest diversity of the *mineral resource base*, is also quite often covered in the federal media. Articles focus on current and prospective oil, gas and other mineral production, on the activities of large corporations in this sector, as well as on the exploration of Arctic mineral deposits. The field of "Arctic topics in the media is expanding": for example, a study of media content in 2011–2015, conducted by D. Gritsenko, showed that the agenda of both federal and regional newspapers was mainly devoted to the development of hydrocarbon resources [11, p. 10].

The image of the Arctic as a *global transport corridor* is devoted to 16% of the analyzed articles, where the main focus is on the development of the Northern Sea Route.

The next two images, "*Arctic as a space for international cooperation*" and "*Arctic as an outpost of national security*" occur with equal frequency and are interconnected with each other. Nowadays, interest in the Arctic is shown not only by the countries of the circumpolar space, but by other leading world powers (China, India, Singapore, etc.). Media coverage is aimed at broadcasting the need to build an effective dialogue with these states, reliable protection of Russia's state borders in the Arctic.

The development of the Arctic goes hand in hand with increasing accessibility for tourists from different countries, which must be combined with efforts to preserve the unique nature and original culture of the region. The image of the *tourism Arctic* is not so often covered in the federal media (10% of articles), but there are forecasts that the Arctic will become the pearl of tourism in five years.

In general, the media discourse in the federal media presents the Arctic in a positive way as a special priority territory of Russia. The identified images of the Russian Arctic emphasize the power and strength of the Arctic territories, reveal their special potential. Of course, the federal media does not ignore problematic points (military claims, social infrastructure, climate change, etc.), but in general, all the analyzed information content is optimistic — long-term goals have been set, long-term strategic plans on the development have been outlined. This content corresponds to the slogan "Arctic is the macro-region of the future".

As for the predominance of a romantic or pragmatic orientation of messages, the highlighted key images of the Arctic suggest that, on the federal level, the Arctic is presented in a more pragmatic way. Only every fourth analyzed article in the media contained some elements of romanticism, mystery, dreaminess. This type of content is found in news reports about the unique Arctic nature, the history of research, the representation of the Arctic in photography, cinema and painting, and descriptions of the culture and traditions of the northern peoples. All statements in

the media about the Arctic are generally positive, highlighting specificity, importance and priority of the Russian Arctic. At the same time, attention is focused on the complexity of its development, which is broadcast even in statements that have a "romantic" connotation.

The image of the Arctic, broadcast in the media at the regional level

A separate consideration of the content of the regional media is due to the reflection of the regional context, which forms specific ideas about the Arctic, revealed through images, but in a more detailed dimension. Already at the stage of identifying categories for media content analysis, it can be concluded that pragmatic attitude towards the Arctic (20 categories of analysis) predominates romantic content (5 categories of analysis). Each of the selected articles was then checked for coverage of the topics in the categories shown in Table 1. The largest number of news related to the Arctic topics was recorded in the Murmansk Oblast, followed by the Arkhangelsk Oblast. In the Komi Republic, there is noticeably less news about the Arctic, and in the Republic of Karelia, there is the least amount of "Arctic" news. At the same time, in each of the regions the number of news reports dedicated to the Arctic is growing from year to year.

Similarly to the federal media, in the regional news resources, the most popular content is also about the development prospects of the regions, individual Arctic territories, attraction of investments, general socio-economic development, creation of comfortable life, development of deposits, etc. (Table 1). The intentions of federal and regional authorities and residents of the Arctic zone are broadcast in the media, and the results already achieved are described. In the regions, whose territories are partially included in the AZRF, the information space broadcasts the Arctic as a concentration of serious opportunities for the development of the entire region.

The context of media coverage is predominantly positive. This often includes the identification of particular "pressure points", which are often described as areas for future development, and which could be further advanced through the implementation of plans for the economic development of the Arctic territories. In the regional media, the Arctic is perceived not as a poor and lagging area, but as a region which has certain limitations that can be overcome with the full attention of the government and the region. From an economic development point of view, the declared objective is to stimulate economic growth, especially in the development of enterprises, the mining sector, the activities of AZRF residents, and social growth is seen as a consequence of successful economic development.

Table 1

Number of articles presenting categories of analysis, broadcast in regional media [5]

Categories of analysis	Arkhangelsk Oblast	Murmansk Oblast	Republic of Karelia	Komi Republic
Content categories that characterise coverage of the Russian Arctic from a pragmatic perspective				
Development of the Arctic territories	15	24	22	23

[5] Compiled by the authors.

Attracting investments, specific investment projects, increasing investment attractiveness	18	20	21	30
Residents of the Russian Arctic, including residents of the Murmansk Oblast's PDA	6	11	19	8
Development of the socio-economic sphere, creation of a comfortable environment for life, improvement of the quality of life	13	11	18	25
Inclusion of new territories in the Russian Arctic, a reminder of which areas are already part of the AZRF	-	-	18	11
Creation of new jobs, implementation of personnel policy, including the involvement of specialists and special personnel programs	9	17	16	8
Tax preferences, benefits for investors	8	10	13	12
Arctic package – new laws, measures to support entrepreneurs	6	6	11	10
Arctic hectare	2	-	10	3
Development of the Russian Arctic infrastructure (transport and communications, energy, roads, ports)	6	5	9	16
Mining and development of mineral deposits, modernization of enterprises and their capacities	4	7	7	17
Tourism potential, tourism	3	-	6	6
Coverage of federal and regional events (forums, conferences, commissions, etc.)	7	10	6	14
Northern Sea Route	7	4	4	6
AZRF Strategy-2035	8	7	3	7
Conducting scientific research in the Arctic	13	12	-	6
Ecology in the Arctic	10	-	-	10
Cooperation in the Arctic, including international, interregional cooperation	5	9	-	-
Ensuring national and military security in the Russian Arctic	2	8	-	-
Indigenous peoples of the North	2	4	-	4
Content categories that characterise coverage of the Russian Arctic from a romantic perspective				
Description of the nature and beauties of the Arctic, sights and heritage	5	5	2	-
Educational activities about the Arctic in the form of expeditions and educational events	12	14	1	3
Exhibitions, art objects, films, events, conferences, festivals	12	21	-	6
Separate reports dedicated to photo and video sketches about the beauties and nature of the Arctic	7	10	-	4
Expression of first-person emotional state of the narrator (reports, stories)	7	-	-	2

In the context of regional media news reports, it is also possible to identify key collective images transmitted to the mass reader. For example, in the media of the Republic of Komi, the Arctic is characterized as "a rich region with great infrastructure potential", "a territory for the implementation of large-scale and significant infrastructure projects", "a region whose resources will help in the development of northern municipalities", "a region with great opportunities for expanding mining", "a region with prospects and worthy of investors", "a promising region for tourism development", etc. The images of the Arctic broadcast in the media of the Arkhangelsk Oblast are similar: "a region for the implementation of profitable projects", "a unique and naturally rich region", "a unique and fragile region requiring special care", "an artery of the Northern Sea Route", "a foothold for scientific research and cooperation". The images broadcast in the media of

the Murmansk Oblast have much in common with other regions, in which the Arctic is presented as a "region for a new generation", "a region of profitable investment and business development", "a region rich in minerals and having a high industrial potential", "the region is the main artery of the Northern Sea Route", "the region is the base of the Northern Fleet of Russia", "the capital of the Arctic". In general, the images of the Arctic, presented in the regional media, have much in common with the images broadcast by the federal media.

As for the content that broadcasts a romantic image of the Arctic, it is not presented so actively. The Murmansk and Arkhangelsk oblasts stand out in terms of such content. In the Republic of Komi and the Republic of Karelia, is almost not covered from a romantic point of view. It should be noted that the "romantic" content is mainly associated with a description of the beauties of nature, the uniqueness of the climate and the environment, focusing on educating the reader about the most remote territories of the Arctic zone, its exclusivity, fragility and pristine nature. For example, in the Arkhangelsk Oblast, much attention is paid to educational activities, especially among the younger generation: the subject "Arctic studies" has been introduced in schools, and festivals are held. One of the important aspects of broadcasting a positive image of the Arctic among the population is the "first-person" narrative, where the narrator shares his or her impressions about life, work and travels in the Arctic. In one of the articles, the narrator, a volunteer from Moscow, explained in two sentences what the Arctic is like on his personal example: "I thought that polar bears, snow, severe cold are everywhere in the Arctic. But it turned out that so far it is even warmer here than in Moscow. I was also surprised by nature — I did not expect such beauty" [6]. Photographs and first-person impressions of Arctic space are not only useful, but essential tools for fully understanding and managing the quality of experiences in unique travel destinations where little is known about the visitor experience [12, Fefer J.P. et al.].

The image of the Arctic in minds of the population

When identifying images of the Arctic in minds of the local population, an open-ended question was used, containing a prompt to guide the respondent's reasoning using standard stereotypes about the Arctic, associating the Arctic with cold and snow and polar bears, on the one hand, and mining, on the other. The resulting associative series are presented in the form of a word cloud, which is a visual model of text content compression in the form of lexemes differentiated by size depending on the frequency of their use. The obtained associative representations of the population of the Arctic regions contain standard stereotypes, including those reflecting the main characteristics of the Arctic (northern) territories (Fig. 2).

In general, the description of associative representations — images of the Arctic, given by the respondents, contains a more romantic context than a pragmatic one, while the statements

[6] V Komi volontery «Chistoy Arktiki» sobrali bolee 150 tonn otkhodov [Volunteers of "Clean Arctic" collected more than 150 tons of waste in Komi] // Komiinform. 02.10.2021. URL: https://komiinform.ru/news/222431/ (accessed 03 June 2022).

are often dominated by the judgment as a statement of fact — “The Arctic is cold, frost, ice”, etc. , description of natural phenomena and emotional attitude to the Arctic, indicated by every third respondent.

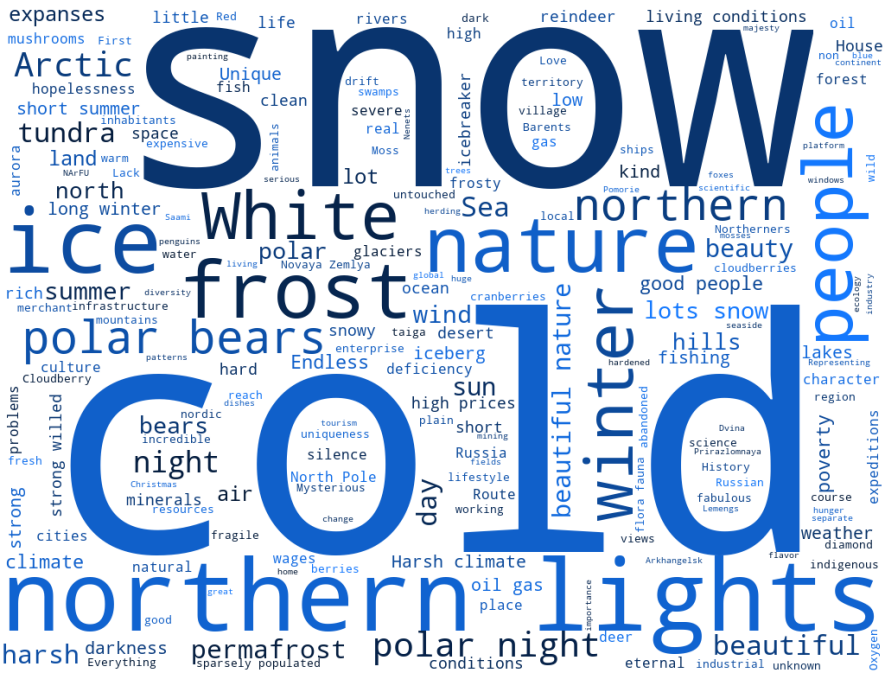

Fig. 2. Associative representations of the Arctic by local residents of the studied regions, presented in the form of key images, N=409.

It should be noted that negative characterizations of the Arctic among the local population are rare. In the statements of residents about the Arctic, pride for their region and love for the North, the “features” of northern people, are read between the lines. It is also important to note the regional specificity in the associative series. For example, residents of the Murmansk Oblast provided the most detailed answers: images associated with nature and natural phenomena are more common. Every third respondent (33% of the number of respondents from the Murmansk Oblast) noted that the word “Arctic” brings up the image of the northern lights, which is symbolic, since the main symbol of the region and the city of Murmansk — the emblem, depicts the northern lights. As for pragmatic images, the inhabitants of the Murmansk Oblast, in relation to romantic ones, represent 3% and they are expressed through ideas about minerals, work in ice on ships of the merchant and icebreaking fleet. Interestingly, every tenth respondent from the Republic of Karelia associates the Arctic with white nights, while in the Murmansk Oblast, there are more associations with the polar night.

The directions of romantic or pragmatic view of the population about the Arctic are supplemented by the identification of the personal value of the Arctic territories by answering the open question: “What is the value of the Arctic (northern) territories for you personally?”. During the primary data processing, the responses were grouped by region into a number of thematic blocks classified as romantic (6 categories) or pragmatic (3 categories) images. The unequal number of selected categories is due to the prevalence of the description of the value of the Arctic ter-

ritories for respondents in a romantic context. Figure 3 shows the share distribution of analysis categories by region. The romantic context is expressed in the fact that for every third respondent, the Arctic territories are valuable by nature, which they describe as unique, pristine, special, beautiful, etc. In second place in terms of value, the Arctic territories are important to respondents because it is their homeland, their place of residence, indicating the importance of being rooted in the Arctic zone and their Arctic (northern) identity. This is most pronounced among residents of the Arkhangelsk Oblast, where every third respondent noted that the Arctic territories are important to him precisely because "this is his homeland". For every fifth respondent from the Murmansk Oblast, the surrounding beauty of the Arctic space is important. Separately, the importance of the category "people" should be noted, in the description of which the respondents indicate the peculiarity of the northern people, their kindness, hardened Nordic character, and resilience.

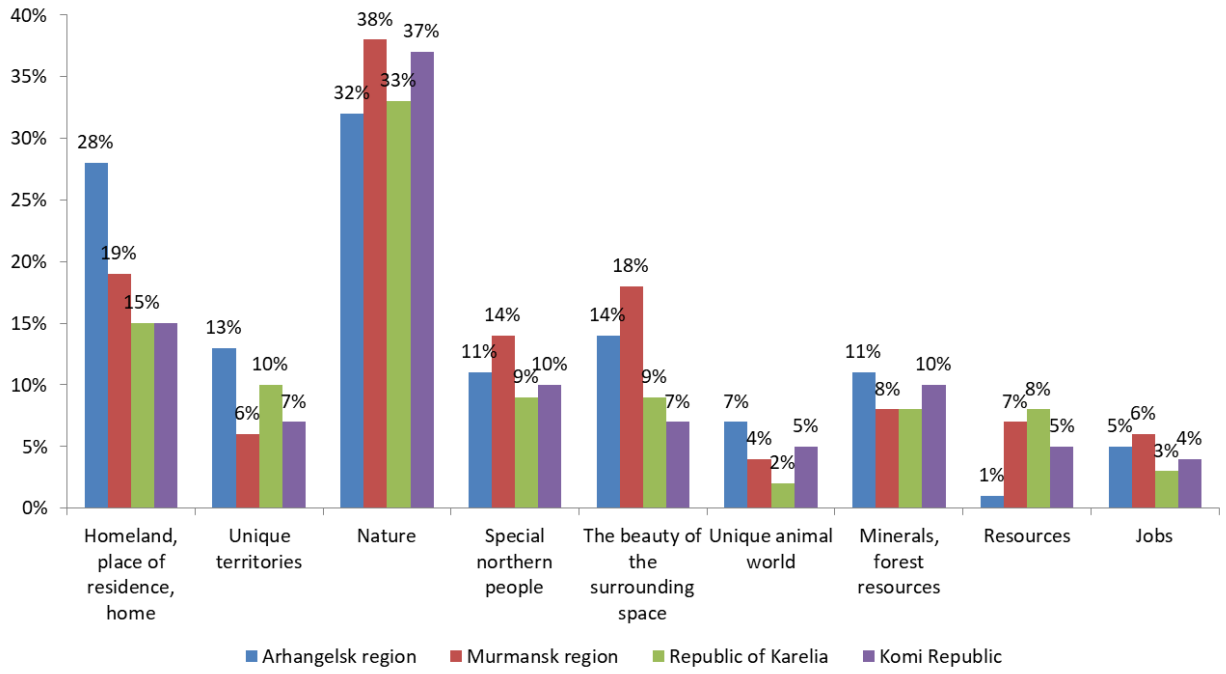

Fig.3. "What is the value of the Arctic (northern) territories for you personally?", in % of respondents by region, N=409.

In addition to personal value, the respondents also described the value of the Arctic for the country as a whole in a closed-ended question. The responses to this question are also regionally specific. Thus, for residents of the Murmansk Oblast, where the largest ice-free port in the world is located, the value and importance of the Arctic territories for Russia lies mainly in the Northern Sea Route and fish, bioresources (these answers were chosen by more than 60% of respondents). Every second respondent from the Arkhangelsk Oblast believes that the Arctic territories are valuable and important for Russia with minerals, northern peoples and their traditions, as well as pristine northern nature (Fig. 4). According to the majority of respondents from the Republic of Karelia, the value and importance of the Arctic territories for Russia lies mainly in the unique flora and fauna and pristine northern nature (57% of respondents).

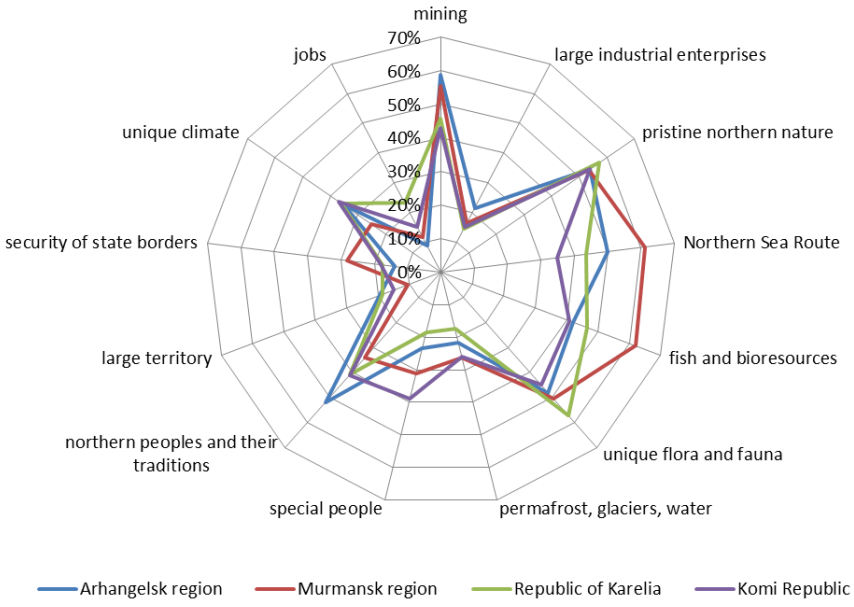

Fig. 4. Distribution of respondents' answers to the question "What is the value and importance of the Arctic territories for Russia?" in %, N=409.

Based on the results of the survey and the analysis, a typology of the image of the Arctic in minds of the local population was formed. This typology is based on a set of respondents' opinions on the questions posed. According to the results of the analysis, "pure" types of romantics and pragmatists were identified. The survey data set for the formation of the typology is deciphered in Table 2.

The type is defined under the condition of simultaneous selection of a set of semantic units. Thus, every third respondent belongs to one or another "pure" type of romantics or pragmatists, the remaining 42.7% belong to a mixed type, where romantic and pragmatic attitudes to the Arctic are mixed.

Table 2

Typology of Arctic images in minds of the local population, according to the survey [7]

Type	Characteristic	Share of respondents
Romantics	They believe that "to be a northerner" means to be born in the North, to live in the North all your life, to love the North and feel like a northerner. The value of the Arctic territories lies in the unique flora and fauna, special people living there – northerners, unique climatic conditions. Among the advantages of life in the North, closeness to nature, enjoying winter, northern weather are distinguished.	27.3%
Pragmatics	They believe that "to be a northerner" means to be born in the North, to live in the North all your life. The value of the Arctic territories lies in the extraction of minerals, large industrial enterprises, the Northern Sea Route and jobs. Among the advantages of living in the North, they	30%

[7] Compiled by the authors.

	note social support, preferential (northern) vacation, wage supplements, possibility of earning money and early retirement compared to other regions of Russia.	

Conclusion

The results of the study showed that the "Arctic" content of modern media at the federal and regional levels is dominated by a pragmatic focus. In general, the Arctic is presented positively as a special priority area of the country. The revealed images of the Russian Arctic, broadcast in the media, emphasize the power, strength, "diversity" of the Arctic territories, reveal their special potential, while drawing attention to "pressure points", which are points of growth and development.

In people's minds, the images of the Arctic are presented in a more romantic way. The Arctic is associated by locals with the state of nature, love for the North and beautiful winter. For every third respondent, the Arctic territories are valuable precisely because of nature, is described as unique, pristine, special, beautiful. Every third surveyed resident has a romantic idea and attitude towards it; about half of them have mixed romantic and pragmatic views. The people have mostly positive opinions about the Arctic and no more than 5-7% of respondents have pessimistic views.

The combination of romantic and pragmatic elements is also relevant to specialists working in the Arctic. Today, the integrated development of the Arctic territories requires qualified personnel who are not only filled with romanticism of the northern beauty, but also pursue specific practical goals. Leading employers of the Arctic zone of Russia consider the professionally important qualities of employees, first of all, the desire to live and work in the conditions of the Far North, sufficient health, endurance, readiness for new and complex tasks [13, Stepus I. et al., p. 10004].

One cannot but agree that "the pragmatics of the current moment in the development of the Arctic territories has shown that now it is not so much the northern romance that is important, but the change in the quality of life of the northerners, the creation of conditions for comfortable living in urban and rural areas by arranging infrastructure for people" [14, Fedotovskih A.V., p. 263]. The attraction and retention of human resources requires clear educational, professional and life trajectories, modern jobs and vibrant socio-cultural environment [15, Stepus I.S., Simakova A.V., p. 1880]. This will ensure the dynamic development of the Arctic territories, which have a unique potential and are filled with the romance of northern splendor.

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The article was submitted 30.06.2022; approved after reviewing 16.07.2022; accepted for publication 16.07.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

REVIEWS AND REPORTS

Arctic and North. 2022. No. 49. Pp. 214–223.
Review article
UDC [327+378+001](985)(045)
doi: 10.37482/issn2221-2698.2022.49.252

Outcomes of the International Forum of Young Scientists "Russia in the Arctic Dialogue: Global and Local Contexts"

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Abstract. The year 2022 marked a turning point in the activity of the Arctic Council and development of international relations in the Arctic region. Despite the challenging geopolitical situation, Russia continues to work consistently through its chairmanship of the Arctic Council. This review briefly presents the outcomes of the International Forum for Early-Career Scientists "Russia in the Arctic Dialogue: Global and Local Contexts", organized in May 2022 at Northern (Arctic) Federal University named by M.V. Lomonosov. The Forum was one of the activities within the "Arctic Youth" portfolio of the Action Plan for Russia's Chairmanship in the Arctic Council 2021–2023. According to its organizers, in face of the global tensions and current restrictions, the event had brought together nearly 100 early-career researchers from more than 20 countries to discuss and seek solutions to pressing issues of development and exploration of the Arctic region.
Keywords: *Arctic, international forum, early-career scientist, youth cooperation, international projects*

Introduction

On May 20, 2021, as part of the work of the ministerial session of the Arctic Council, held in the capital of Iceland, Reykjavik, the chairmanship of the Arctic Council for the period 2021–2023 was transferred from Iceland to Russia. The cross-cutting priority of the Russian chairmanship in the Arctic Council (hereinafter referred to as AC) is "ensuring responsible governance for the sustainable development of the Arctic" [2]. Along with this, the comprehensive program of the Russian chairmanship determined international cooperation in the following priority areas:

- Arctic population including indigenous peoples;
- environmental protection including climate change issues;
- social and economic development;
- strengthening the Arctic Council.

For citation: Zarubina L.A., Popkova S.V., Kuznetsova S.Yu. Outcomes of the International Forum of Young Scientists "Russia in the Arctic Dialogue: Global and Local Contexts". *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 252–262. DOI: 10.37482/issn2221-2698.2022.49.252
[2] Sourced from the Arctic Council website. URL: https://arctic-council-russia.ru/ (accessed 21 November 2022).

The Chairman of the Government of the Russian Federation M.V. Mishustin approved the Action Program Plan for the Russian chairmanship of the Arctic Council in 2021–2023. [3] The plan includes 116 activities grouped into 11 sections. In 2021, 38 events were planned, in 2022 — 50, in the first half of 2023 — 28 [1, Zhuravel V.P.]. Due to the high urgency of the task of increasing the role of youth in addressing issues of the Arctic agenda, international youth cooperation platforms were singled out as a separate area "Arctic Youth".

The year 2022 has become a turning point for the activities of the Arctic Council and the development of international relations in the Arctic region. Despite the difficult geopolitical situation, Russia continues its consistent work within the framework of the AC chairmanship.

Northern (Arctic) Federal University named after M.V. Lomonosov (Arkhangelsk) was determined as the venue for a number of events within the framework of the implementation of the "Arctic Youth" direction: the international forum of young scientists "Russia in the Arctic dialogue: global and local contexts" (May 2022), the student summit on preservation and maintenance of the ecology of the Arctic region (June 2022), the international youth model of the Arctic Council (November 2022), the festival of youth creativity of the Arctic Council (November 2022).

This review presents the results of the largest-scale event by the scope of the participating countries — the international forum of young scientists "Russia in the Arctic Dialogue: Global and Local Contexts", which was held at NArFU from May 25 to May 27, 2022.

Event concept

One of the key challenges in the Arctic is the development of human capital and the training of personnel with a high level of competence for the exploration and development of the Arctic, ready to cooperate in industrial projects at the national and global levels. In this regard, the overall objective of the Forum was to develop youth scientific and educational cooperation and popularize the geographical, environmental, ethno-cultural and historical identity of the Russian Arctic among the international youth community.

Target group: postgraduate students, master's students, undergraduate and graduate students of Russian and foreign universities.

Event partners: Ministry of science and higher education of the Russian Federation, Ministry of the Russian Federation for the development of the Far East and the Arctic, Corporation for the development of the Far East and the Arctic, the Alexander Gorchakov Public Diplomacy Fund, Russian and foreign partner universities and research centers.

The concept of the event reflected the priorities of the program of the Russian Chairmanship in the Arctic Council, addressing, in particular, the following key issues:

- Arctic strategy of the Russian Federation up to 2035;

[3] "Plan osnovnykh meropriyatiy v svyazi s predsedatel'stvom Rossiyskoy Federatsii v Arkticheskom sovete v 2021–2023 godakh" (utv. Pravitel'stvom RF 30.04.2021 N 4161p-P2) ["Plan of the main events in connection with the chairmanship of the Russian Federation in the Arctic Council in 2021-2023" (approved by the Government of the Russian Federation on April 30, 2021 N 4161p-P2)]. URL: https://base.garant.ru/400874495/ (accessed 21 November 2022).

- environmental challenges and risk management in the Arctic;
- local communities in the changing Arctic environment;
- transport systems and logistics in the Arctic;
- geopolitics and international relations in the Arctic.

The main tasks included:

- contribution to the training of future leaders of the Arctic region; enhancing students' professional knowledge of Arctic development issues;
- involvement of participants in solving the global challenges of the Arctic through participation in the interdisciplinary international projects on the most pressing issues of the Arctic development;
- ensuring the promotion of the Russian Arctic agenda and the formation of a positive image of Russia in the international scientific space;
- strengthening of international youth cooperation and development of scientific diplomacy in the Arctic in the changed conditions.

Event structure

The three-day program of the Forum was held in a hybrid format (online and offline tracks), included several thematic areas, discussion sessions and a program of cultural events.

Track I: Forum of young scientists in full-time format at NArFU, Arkhangelsk. The working language was Russian.

The program included the "Arctic Lecture Hall" — a series of lectures from leading Russian scientists and experts in the field of Arctic research, events at regional venues in the Arkhangelsk Oblast, cultural and educational activities and the excursion program "Discovering the Russian North". An interactive format was the "Project Laboratory" platform, which brought together students to develop joint project initiatives to address the common challenges of the Arctic. Student projects were created as part of the work of international teams, supervised by mentors from among experienced international project managers.

Track II: International PhD School in online format. The working language was English.

The program was aimed at working with young researchers, providing opportunities to expand scientific knowledge about the Russian Arctic for PhD students from around the world, to exchange views on the existing challenges of the region and possible vectors for building scientific collaboration, as well as to present their research in a peer-review format, involving leading Arctic experts from Russia and foreign countries.

General results of the Forum

The authors of the article summarized and presented the results of the event, as well as the prospects for its holding on an annual basis.

Overall, more than 100 people from 24 countries, including the countries of the Arctic Council and AC observer states, took part in the Forum venues. The total attendance in terms of online platform views was more than 500 people. The geography of the Forum included the following countries: Argentina, Algeria, Armenia, Belarus, Great Britain, Ghana, Germany, India, Indonesia, Jordan, Italy, Cameroon, Kazakhstan, Kyrgyzstan, China, Mexico, Moldova, Russia, Romania, Senegal, Syria, USA, Tanzania, Turkey, Uzbekistan.

The offline platform of the Forum of young scientists in Arkhangelsk brought together Russian and foreign undergraduate and graduate students from 11 countries, studying in the areas of humanities and natural sciences at 26 Russian universities.

18 young researchers from 12 countries became participants of the Online Postgraduate School. Leading arctic scientists from Russia, China, Norway, and Switzerland acted as lecturers and scientific opponents.

The lecture block of the Forum ("Arctic Lecture Hall") was opened by a plenary session that brought together participants from all Forum sites. "The forum is intended to set a constructive start to the processes of scientific diplomacy in the difficult foreign policy situation that the whole world is experiencing today," said Elena Kudryashova, Rector of NArFU, at the opening of the event [4].

Fig. 1. Opening ceremony of the Forum. Elena Kudryashova, Rector of NArFU. May 25, 2022 Arkhangelsk.

Natalya Vyakhireva, expert and program manager of the Russian International Affairs Council, noted the relevance and significance of the Forum in her plenary report "Is the Arctic Council possible without Russia?". "Shortly after the start of the special operation, the seven participating countries of the Arctic Council announced the suspension of participation of their repre-

[4] V SAFU startoval mezhdunarodnyy forum «Rossiya v Arkticheskom dialoge: global'nyy i lokal'nyy konteksty [The international forum "Russia in the Arctic Dialogue: Global and Local Contexts" started at NArFU]. URL: https://narfu.ru/international/news/all/368694/ (accessed 21 November 2022).

sentatives in all official events of the Arctic Council. However, Russia continues its consistent work within the framework of its AC chairmanship. As of today, the future of the Arctic Council is very uncertain. But at the same time, it is obvious that the solution of many challenges of the Arctic in the field of economy, ecology, health care, and prevention of emergency situations is not possible without the participation of Russia. Now it is very important to preserve those channels of dialogue that can be maintained today and at all levels where possible. Therefore, holding the Forum of Young Scientists right now is especially important and valuable" [5]. The plenary report largely set the general rhetoric of the event and became the basis for further scientific discussions.

Leading scientists from the Russian International Affairs Council, Moscow State University named after M.V. Lomonosov, St. Petersburg State University, the Corporation for the Development of the Far East and the Arctic, the World Wildlife Fund, the Russian Arctic National Park, the Northern (Arctic) Federal University and a number of universities and research centers of the Russian Arctic participated as key speakers and experts in the lecture series of the Forum. The topics of the lectures corresponded to the priorities of the Forum and provided the information to comprehend the following key issues: the main directions of the Strategy for the development of the Arctic zone of the Russian Federation up to 2035, the development of the Arctic in terms of the theory of the technological order, the legal regime of the Arctic, climate change, the artistic rethinking of the North, the policy transformation of the USA in the Chinese direction, Arctic scientific diplomacy.

Fig. 2. Speech by Aleksandr Pilyasov, General Director of ANO "Institute of Regional Consulting", Professor of Lomonosov Moscow State University, May 25–27, 2022. Arkhangelsk.

Separate formats that aroused great interest among young people were meetings with outstanding people whose fates are connected with polar expeditions. Hero of Russia Mikhail

[5] V SAFU startoval mezhdunarodnyy forum «Rossiya v Arkticheskom dialoge: global'nyy i lokal'nyy konteksty [The international forum "Russia in the Arctic Dialogue: Global and Local Contexts" started at NArFU]. URL: https://narfu.ru/international/news/all/368694/ (accessed 21 November 2022).

Georgievich Melekhov shared his memories of organizing and conducting scientific expeditions in high latitudes with the future leaders of the Arctic. The cultural and educational program "Discovering the Russian North" on the basis of regional museums and the representative office of the National Park "Russian Arctic" made it possible to acquaint participants with the cultural and natural heritage of the Arkhangelsk Oblast. The presentation of the NArFU research project "Arctic Floating University" [6] opened new opportunities for Russian and international students to participate in scientific expeditions to the Arctic seas.

Fig. 3. Forum participants. Arctic Lecture Hall. May 25–27, 2022. Arkhangelsk.

"Project Laboratory"

According to the organizers, it was important not only to increase the level of students' knowledge about the Arctic by providing lecture material, but also to ensure an interactive format for the event, involve participants in active dialogue and direct engagement in the search for solutions to the key challenges of the Arctic region. These tasks were solved through the organization of the "Project Laboratory" platform, which brought students together to develop group project initiatives. Student projects were created as part of the work of international teams on the following thematic axes:

- Arctic: to leave or to stay;
- Arctic: to preserve or to develop;
- ecology and climate change in the Arctic;
- Arctic cultural heritage;
- role of universities in the Arctic development.

[6] Arctic floating university. URL: https://narfu.ru/science/expeditions/floating_university/ (accessed 21 November 2022).

The effective implementation of this platform and mentoring of the participants were facilitated by the considerable experience of the university's international project activities accumulated as a result of international projects under the EU-Russia cross-border cooperation programs and other foundations [2, Kudryashova E.V., Zarubina L.A.], [3, Kudryashova E.V., Zarubina L.A., Popkova S.V., Baikina N.V.], [4, Zaikov K.S., Zarubina L.A., Popkova S.V., Kuprikov N.M., Kuprikov M.Yu., Kvon D.A., Ponyaev L.P.], [5, Kalinina M.R., Zarubina L.A.], [6, Zarubina L.A., Popkova S.V., Kudryashova E.V.].

Eight student teams, guided by experienced mentors, generated ideas and offered their visions for solving the acute challenges of the global Arctic.

As a result of three days work, the following student initiatives were presented to the jury (Table 1):

Table 1

Projects — student initiatives

Project	Aim
Project "Island of rescue"	Reducing mammal mortality from melting ice by developing artificial platforms as resting places for marine mammals.
Project "Arctic routes"	Raising awareness of young people around the world about the Arctic region and its challenges, taking into account new geopolitical realities and changing partnership vectors.
Project "Human being is the key resource of the Arctic"	Making the Arctic zone more attractive to live and work by finding mechanisms to attract young people to the Arctic region and identifying positive experiences in Arctic development activities.
Project "Sustainable Arctic: green fuel"	Assessing the prospects for sustainable socio-economic development of the Arctic regions through the introduction of low-carbon technologies for capturing and using carbon.
Project "Assessment of the impact of iceberg disposal on microorganisms in the Arctic zone"	Studying the effect of iceberg disposal on microorganisms.
Project "Technology center in the Arctic Region"	Improving the quality of life of the able-bodied young population of the Arctic region in the context of a constant outflow of the population from the North.
Project "Generation Arctic"	Creation of a career guidance platform for talented young people, aimed at attracting applicants to Arctic universities.
Project "The Arctic around you"	Preservation and promotion of the cultural heritage of the Arctic by creating a single website aggregating the diversity of the cultural heritage of the Arctic regions by topics: architecture, crafts, cuisine, costumes, folklore.

Fig. 4. “Project Laboratory”. Project initiatives defense. May 27, 2022.

Representatives of the Government of the Arkhangelsk Oblast, the Arkhangelsk Regional Branch of the Russian Geographical Society, Laverov Federal Center for Integrated Arctic Research of the Ural Branch of the Russian Academy of Sciences, Department of Training and Certification of Scientific and Pedagogical Staff of NArFU, Murmansk State Technical University were invited to evaluate the student projects.

Fig. 5. “Project Laboratory”. Project initiatives defense. May 27, 2022.

The projects were highly appreciated by the jury and were recommended for further development and practical implementation including with the support of the university and the Government of the Arkhangelsk Oblast.

Conclusions

Summing up the results of the international forum of young scientists “Russia in the Arctic Dialogue: Global and Local Contexts”, it can be noted that the interdisciplinary nature of the event program made it possible to unite future specialists from various scientific fields and organize an interesting international educational platform on a large scale. The topics of the Forum covered a wide range of issues and allowed participants to expand their knowledge on various aspects of Russian and global Arctic development, to learn about major scientific and industrial projects in the region, to discuss topical issues in the development of the Arctic with experts, and to model their own vision of contemporary Arctic challenges and propose ways to solve them in the format of project team interaction between the participants of the face-to-face platform of the Forum and peer review of research work as part of the Postgraduate School.

The combination of organizational models (parallel tracks in online and offline format) made it possible to minimize the risks associated with epidemiological restrictions and provide an expanded composition and geography of participants, as well as to test new educational formats and communication models.

The organizers of the Forum are convinced that in the current geopolitical situation this international discussion platform was very important and symbolic, as it clearly demonstrated that science and education remain the language of dialogue. Therefore, holding the Forum on a regular basis could systematically promote an open constructive dialogue, the search for solutions across the entire spectrum of the integrated development of the Arctic region in the interests of ensuring stability and sustainable development of the Arctic for all its inhabitants.

For its part, NArFU as the organizer of the event confirmed its readiness to hold an international forum on an annual basis. The social significance of the event is determined by the Decree of the President of the Russian Federation dated April 25, 2022 No. 231 on the Decade of Science and Technology [7]: attracting talented youth to research and development, promoting the involvement of researchers and developers in solving the most important tasks of the development of society and the country, increasing the availability of information about the achievements and prospects for the development of science for Russian citizens, as well as issues of patriotic education of young people.

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The article was submitted 21.11.2022; accepted for publication 22.11.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 224–238.
Original article
UDC 553.3/.4(98)(09)(045)
doi: 10.37482/issn2221-2698.2022.49.263

History of the First Ore Prospecting Expedition of 1491 in the Arctic Zone of the Russian State

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Abstract. In the Middle Ages, the Russian state, formed around Moscow, was in dire need of metals. However, only comparatively poor quality swamp iron was mined on the territory of the Russian principalities. There were no deposits of copper, silver, gold, or any other nonferrous metals, and all these metals had to be purchased abroad, paying mainly in furs. At the same time, the supply of metals was constantly threatened by bans from Western countries. In the 15th century, during the reign of Ivan III, under the influence and with the active help of his wife Sophia Palaeologue, the Muscovite state was strengthened and developed, which required more and more financial resources. The development of artillery created a need for large quantities of copper. There was an urgent need for own metal deposits, the search for which began in the vast northern Novgorod lands, annexed to the Moscow state. In 1491, the first state ore prospecting expedition was sent to the Pechora River basin, with the participation of ore explorers from Western Europe, which discovered copper and silver ores on the Tsilma River. The Tsilemskoye deposit was the first developed ore deposit in the history of the Russian state. The first copper smelter was built here. Therefore, 1491 is considered to be the beginning of the mining and metallurgical industry in the Russian state. This expedition marked the beginning of prospecting, exploration and mining in the newly annexed lands of the Urals and Siberia, where new ore deposits were later found, which served to create the mineral resource base of Russia.
Keywords: *Arctic zone, non-ferrous metals, Ivan III, ore prospecting expedition, Tsilemskoye deposit*

Acknowledgments and funding

The authors express their deep gratitude for the materials provided by the staff of the Institute of Geology of the Komi Scientific Center of the Ural Branch of the Russian Academy of Sciences Kolonichenko E.V., Shumilov I.Kh., Astakhova I.S. and an employee of the Museum of St. Petersburg Mining University Shabalov M.Yu.

The work was financially supported by the topic of the State Assignment of the IGEM RAS “Main features of ore-forming systems of magmatogenic deposits Au, Ag - Mo, Re, W, Cu, Zn - Cu, Ni, PGE in different geological and tectonic frameworks”.

For citation: Lobanov K.V., Dokuchaev A.Ya., Kulakov F.V., Chicherov M.V. History of the First Ore Prospecting Expedition of 1491 in the Arctic Zone of the Russian State. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 263–280. DOI: 10.37482/issn2221-2698.2022.49.263

Introduction

Throughout its history, the Muscovite state experienced an extreme shortage of resources for the metallurgical industry. The development of the state and its strengthening led to a constant increase in the demand for non-ferrous and precious metals. Gold and silver were required for minting coins and jewelry, copper and tin — for casting bells, making cannons and various utensils.

However, the extraction and production of non-ferrous and precious metals were completely absent, and the need for them was covered exclusively by imports from abroad. The reason of it was the fact that till the middle of the 15th century, the Muscovite state had occupied a limited territory in the center of the Russian platform, the sedimentary cover of which did not contain non-ferrous metal deposits on the surface. Correspondingly, there was no possibility to learn and develop skills of searching and mining of such deposits, skills of metal extraction from ore, as it was done for many centuries on the territory of Western Europe in old mining areas (Fig. 1).

Fig. 1. Mining in Western Europe in the 14th century [8].

The situation escalated in the 15th century, when artillery began to develop actively. The production of bronze cannons required a lot of copper and tin. Almost all non-ferrous and precious metals, as well as a significant part of iron, had to be purchased abroad, paying mainly with furs. Furs, mined in Rus', were the main currency due to the lack of gold and silver. Imported metals were expensive. By that time, only iron production was developed in Rus'. It was produced from swamp ores and was of low quality. Therefore, iron had to be bought additionally in Germany and Sweden, although it was more expensive than Russian. Russian iron cost 60 kopecks/pood, and Swedish iron — 1 ruble, 30 kopecks/pood, imported iron wire — 1–3 rubles/pood, copper — 1.5–3 rubles/pood, roofing copper — up to 6 rubles/pood, tin — 5 rubles/pood, silver — 450 rubles/pood, gold — 3300 rubles/pood. For comparison: a horse cost 2 rubles, and a serf — 3–5 rubles.

The only metal that was mined and produced in significant quantities on the territory of Rus' was iron. Limonite (brown iron ore) was used for manufacture of iron. It occurred almost in all

territory of Rus' in large quantities. Limonite was mined in swamps, which is why it was called “swamp ore” (Fig. 2).

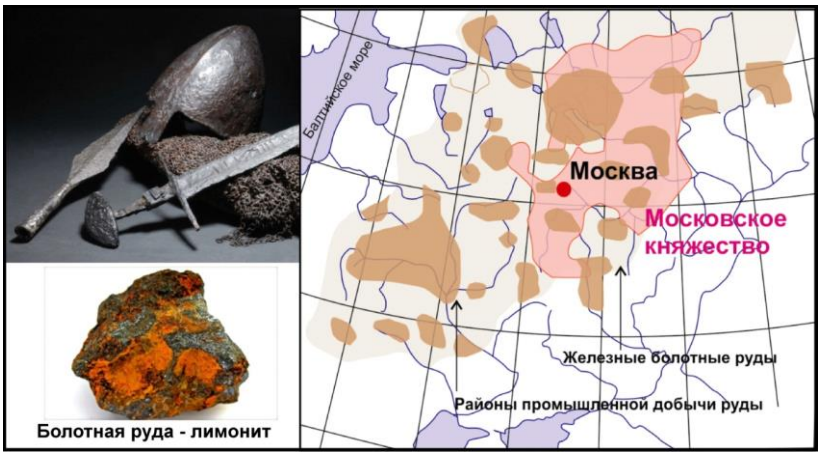

Fig. 2. Distribution of swamp ores in Russian lands and on the Moscow Principality territories in the 15th century.

In Rus', production technology of direct reduction of iron from ore was used. This method is called bloomery process. It was used in the world for almost 3000 years till the beginning of the 17th century. This way of obtaining iron was possible in simple, small furnaces — bloomeries. During the bloomery process, the rock was finely crushed and loaded into a furnace along with charcoal. Carbon monoxide, which arose during the combustion of coal at the bottom of the furnace, rose to the top, heated the ore and charcoal and reacted chemically with them. Part of the ore was reduced to metallic iron, and the rest was turned into slag. As the coal burned off, the solid pieces of iron were welded together, forming a bloom — an iron lump. The manufacturing process was called “iron smelting”. Charcoal derived from the birch was used to smelt iron. Despite the low content of iron, swamp ores had an advantage — metal could be extracted from them at 400°C, and iron of acceptable quality could be obtained at 700–800°C. The resulting incandescent incoherent iron mass — “bloom”, filled with slag, was repeatedly forged with hammers to thicken and remove impurities.

In the 13th–14th centuries, Novgorod land was a major center of iron-ore industries in Rus'. However, their own iron was not enough, and Novgorod had to buy additional iron from Germany and Sweden, although it was much more expensive. In general, the external trade turnover of Novgorod at that time looked approximately as follows [16].

Export	Import
Fur	Fabrics, salt
Wax	Silver, gold
Honey	Copper, tin, lead
Leather	Iron (wire)
Handicrafts	Glass, alum
Hunting birds	Bread, wine, weapons, horses

The only goods that paid for all imports were furs and wax. This made Rus’ heavily dependent on foreign trade, which foreign governments took advantage of more than once. During political tension, the Hanseatic League repeatedly stopped selling metals to Novgorod. For example, on

February 12, 1421, the Hanseatic League decided to “stop the sale of copper, tin and other metals from which weapons are made”. In 1422, this decision was supported by the Livonian Order [16].

Novgorod could receive some copper and tin and, probably, silver as a result of trade with the peoples of Prikamye, where the extraction of these metals reached a fairly high level.

Grand Duke Ivan III and Sophia Palaeologue — the founders of the Russian Empire

In 1462, Ivan III Vasilyevich (Ivan the Great, 1440–1505) became Grand Duke of Moscow. During his reign, a significant part of the Russian lands was united around Moscow, for which he received the nickname “collector of Russian land”, and the reforms which radically changed the internal organization of the Russian state were carried out. These achievements were inextricably linked with the enormous influence exerted on Ivan III by his second wife, the niece of the last Byzantine emperor Sophia Palaeologue (1455–1503). She became the mother of Vasily III and the grandmother of Ivan the Terrible. Russian rulers would use this kinship afterwards, emphasizing their continuity from Byzantine kings and the idea of “Moscow is the third Rome” (Fig. 3). Ivan III declared the Russian state the successor of the Byzantine Empire and became the first emperor.

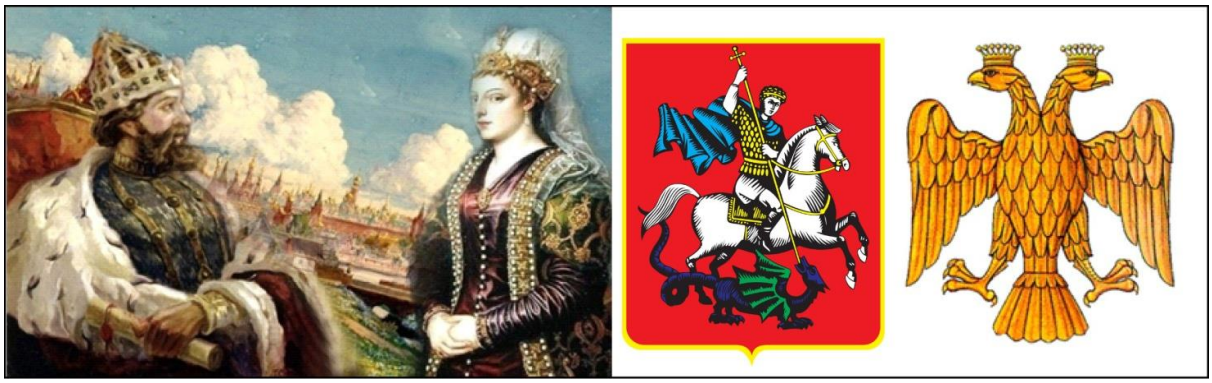

Fig. 3. Grand Duke of Moscow Ivan III and Sophia Palaeologue, emblem of the Moscow Principality, emblem of the Russian state under Ivan III.

Sophia Palaeologue brought with her a dowry, which included, in addition to treasures, a special throne for her husband, made of ivory with biblical scenes, as well as 60 ancient texts of great value, were the main part of Ivan the Terrible’s library, including Greek parchments, Latin chronographs, ancient Eastern manuscripts, among which were the poems by Homer, works of Aristotle and Plato, and even books from the Library of Alexandria.

The Russians were wary of Sophia Palaeologue as they were embarrassed by her independent behavior, active participation in public affairs. Such behavior was uncharacteristic both for her predecessors as Grand Duchesses and simply for Russian women. Sophia started a new imperial history of the Muscovite state. The double-headed eagle became the new emblem of the country.

This smart and strong-willed woman played a key role in changing the domestic and foreign policy of the Russian state. Her entire thirty-year life in Russia shows that she was able to set goals and achieve results. And the main goal of the Byzantine princess was the return of the Byzantine Empire on new ground, in a different country, with a different people, with whom she was bound

by a common religion. Unlike previous wives of Russian rulers, she took a very active part in affairs of state, pushing Ivan III to take decisive steps.

An important event was the final liberation of Rus' from the Horde dependence. According to the historian Vasiliy Tatishchev, Sophia persuaded the Grand Duke to make a decisive break with the Horde, although he expected to pay off the Tatars by tribute. “The Grand Duchess Sophia heard that, wept bitterly and said to the Grand Duke, her husband: “My lord, my father and I do not want to give tribute, it’s better to lose our patrimony. And I, not wishing to accept other rich and powerful princes and kings because of my faith, was united to you in marriage. And now you want to make me and my children tributaries. You have a lot of military power and God as your helper. Why do you want to listen to your servants and not stand up for your honor and your faith? Why are you afraid of the multitude of ungodly men, knowing that He is able to give you strength and victory? And as you refused them before, so refuse to give tribute now” [14]. After so-called “Standing on Ugra” in 1480, Russian state has for the last time left from under power of Horde. This was greatly facilitated by the skillful Russian diplomacy, which made it possible to conclude an alliance with the old enemy of Russia — Crimean Khanate.

Sophia brought changes in all aspects of state life, from the grand-ducal receptions, especially the receptions of ambassadors, which by their complexity and pompousness now resembled those of Byzantium (Fig. 4). She was the first to create a secret service in Rus’ on the model of Constantinople, a prototype of the Tsar’s specisl service. This contribution is still recognized by the Russian authorities. Since the sons of Byzantine emperors took the name Caesar, Ivan took the title, which in Russian sounded like “tsar”. He also promoted the Archbishopric of Moscow to patriarchy, making it clear that the first patriarchy is not Constantinople, captured by the Turks, but Moscow [13].

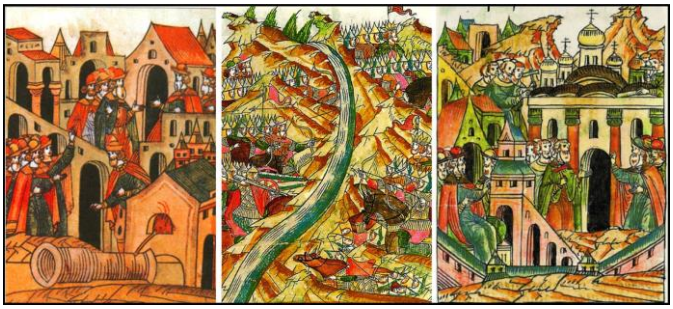

Fig. 4. Casting cannons by Italians in Moscow, Standing on the Ugra, construction of the Uspenskiy Cathedral in Moscow [2].

Ivan III became the first ruler in Russian history, who was called the “Great” for his actions supported by Sophia Palaeologue. Their grandson, Tsar Ivan IV the Terrible, continued to strengthen the state.

Rus' had no ore deposits, copper, tin or iron. In the 15th century, these metals were strategic. This was the raw material for bronze production, from which most of cannons were cast. Ivan

[2] Litsevoy letopisnyy svod. Kniga 17 [Front Chronicle. Book 17]. Moscow, Akteon Publ., 506 p. URL: http://www.akteon-elib.ru/New_Edition/LITsIeVOI-LIeTOPISNYI-SVOD.-Russkaia-lietopisnaia-istoriia.-Knigha-17./ (accessed 19 July 2022).

III had a lot of cannons. Purchases were made abroad. Denmark, Holland, England, the Hanseatic League supplied copper and bronze scrap — old bells, copper utensils, copper and tin ingots. Most of the supplies were contraband. The goods were measured in berkovets, one berkovets is 10 poods, 1 berkovets of copper was 14 rubles. In 1475, Ivan III invited cannon masters from Italy, headed by the engineer Aristotle Fioravanti. The diplomats of Ivan III showed outstanding abilities in the political arena, because by persuasion and rich gifts, they managed to recruit the best European masters and convince them to go to distant Muscovy. The Polish king Casimir IV ordered the masters not to be admitted to Russia and had them arrested. With the help of the Crimean Tatars, Ivan III managed to free the Italians and transport them to Moscow.

Using the Italians and Greeks who came with her, Sophia invited specialists from European countries to work in Russia, bringing new technologies for architects, builders, gunsmiths, and jewelers. With the help of foreign craftsmen, massive stone construction of new temples and fortresses began, in particular, the Moscow Kremlin, the Uspenskiy and Arkhangelskiy Cathedrals, the Faceted Palace and other buildings. Aristotle Fioravanti built Russia's first cannon facility — the Cannon house, where the production of artillery pieces began. He also set up a new production of high quality bricks, which made it possible to carry out grandiose construction plans. Ivan III established diplomatic and trade contacts with Western countries. Military and political position of the Russian state strengthened in the international arena.

Thanks to successful military campaigns and diplomacy, Tsar Ivan III conquered independent republics of Velikiy Novgorod and Vyatka, annexed the principalities of Yaroslavl, Dmitrov, Rostov, Belozersk, Tver, Ryazan and Great Perm. During the Russian-Lithuanian wars, he returned 19 Russian cities from the lands of the Grand Duchy of Lithuania — Chernigov, Novgorod-Severskiy, Starodub, Gomel, Bryansk, Toropets, Mtsensk, Dorogobuzh and others. He expanded the northern territories in the Pechora and Vychegda. During his reign, the territory of the unified Russian state increased from 0.4 to 2.8 million km^2.

Ivan III acted as a reformer of the Russian state. He took a decisive step towards overcoming feudal fragmentation and elimination of the appanage system, laid the economic, political, legal and administrative foundations of a single state. Under his reign, the Code of Laws of the state was adopted; a number of reforms, laying the foundation of the manorial system of landownership, was carried out.

Great significance for strengthening of the Russian state had the annexation of Velikiy Novgorod and its vast possessions to the Moscow principality. In the second half of the 15th century, Moscow increased pressure on the Novgorod Republic. A group of boyars advocated an alliance with the Grand Duchy of Lithuania, which promised help in fighting Moscow's ambitions. Prince Mikhail Olelkovich, sent by the Polish king and the Lithuanian prince Casimir IV, arrived in the city to reign. The Novgorodians sent their candidate for the post of Archbishop not to the metropolitan of Moscow, but to the metropolitan of Kiev, who was in the Grand Duchy of Lithuania.

The actions of the Novgorodians were regarded in Moscow as “a betrayal of Orthodoxy”. Ivan III decided to organize an all-Russian “crusade” against Novgorod. The religious context of this campaign was supposed to rally its participants and force all the princes to send their troops to the “holy cause”. On July 14, 1471, a battle took place on the Shelon River, when the forces of the Grand Duchy of Moscow, headed by Prince Daniil Kholmskiy and Prince Daniyar of Kasimov, having five thousand soldiers, defeated the forty-thousand-strong army of Novgorod, led by mayor Dmitriy Boretskiy. A list of the treaty between Novgorod and the Polish king Casimir IV was found in the captured convoy. The result of the battle was the actual loss of Novgorod’s independence.

In 1478, Moscow Prince Ivan III annexed Velikiy Novgorod to the Muscovite state. The united Russian state included vast northeastern lands which were under the authority of Novgorod. At the end of the 15th century, the Russian state had to conquer the Siberian lands in the north-west of Novgorod which were rich in furs. In 1483, Tsar Ivan III sent the Russian army led by Prince Fyodor Kurbskiy Chernyy and Ivan Saltykov-Travin on a grandiose campaign to Siberia, which defeated the Vogul and Yugra tribes. The final conquest of the Ob lands was the campaign of 1498–1500, when Russian troops crossed the Ural Mountains on skis in hard winter conditions and, having covered 4650 miles, reached the town of Lyapin, where the Yugra and Obdorskiy princes swore allegiance to the Tsar of Moscow (Fig. 5).

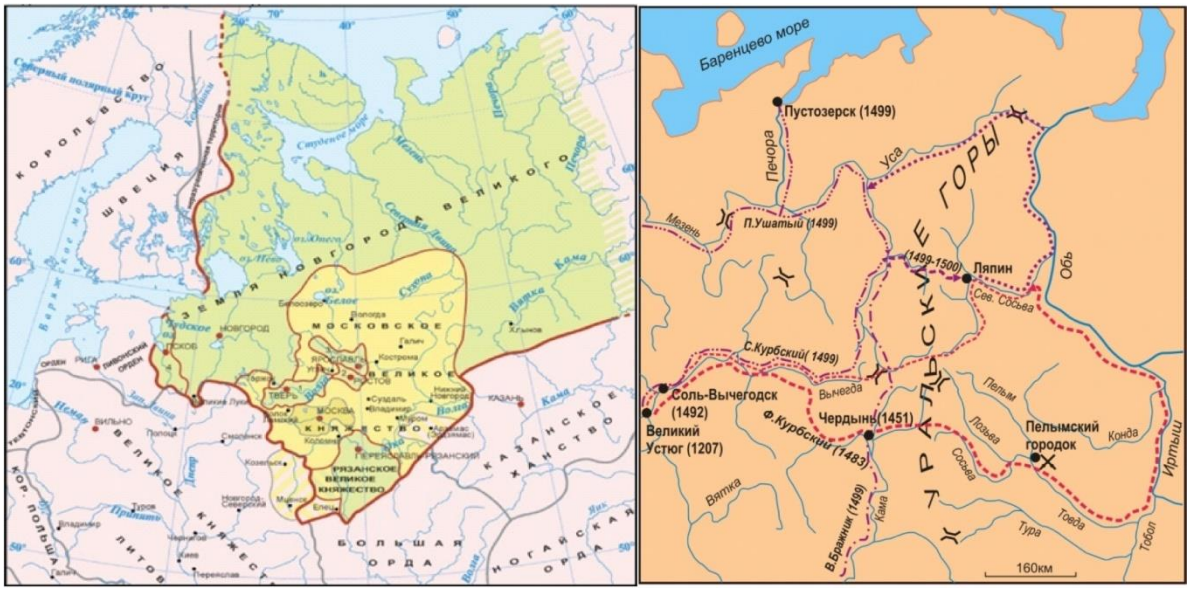

Fig. 5. The lands of Velikiy Novgorod, annexed to the Muscovite state in 1478; campaigns of Russian troops to the Urals and Western Siberia from 1472 to 1500 [2].

The rapid growth and strengthening of the Russian state required large expenditures. Imports of metals, primarily silver, could not satisfy the growing demand and led to dependence on other states. The annexation of these territories dramatically increased the amount of furs harvested for trade. However, Moscow was well aware that it was necessary to find a source of metals on its own territory.

The first mining expedition of the Russian state in the Arctic zone

Purposeful searches for ore deposits, primarily copper, gold and silver, began in the newly annexed north-eastern territories. Now it is difficult to say from what sources Ivan III had known about the deposits of these metals, but the entire subsequent course of events indicates that he had such information.

Herodotus noted that "... in the northern part of Europe there is undoubtedly a lot of gold, but I cannot say anything reliable about the method of its extraction". Obviously, there was some specific evidence of copper and silver ores in these places, since the Novgorodians were actively trading with local tribes. For a long time, the Chud tribes were mining ores and smelting metals in the northern regions, and information about this, probably, reached the Novgorodians.

"Until now, we used precious metals got by trade through Yugra (the current Pechora Territory). But there has long been a rumor that the countries near the Kamennyy Belt (Urals) are rich in metals", wrote N.M. Karamzin [6]. Italians, who actively penetrated Rus' through the southern Genoese colonies, also showed interest in the northern territories and repeatedly visited them. There is a known letter of Grand Duke Dmitriy Ioannovich, granting a certain Andrey Fryazev (obviously Italian) with the gift of Pechora: "Duke Dmitriy Ivanovich granted Ondrej Fryazin Pechora, as was his uncle Mathew Fryazin; to hold carts in Perm, as it was until now: and you, Pecheryans, listen to him and honor him, and he will look after you, and come for the fee, as was with my grandfather under the Prince Great Ivan, and under my uncle at Prince Great Semen, and under my father at Prince Great Ivan, so it was under me" [1].

Aristotle Fioravanti, before starting the construction of the grandiose Uspenskiy Cathedral Church in Moscow, went on a journey across Rus' and visited not only Vladimir, which was reflected in the chronicles, but also the northern possessions of the Russian prince, where he could hear about mining of copper and silver ores in these places. Furthermore, in 1481, a description of the newly annexed northern Novgorod lands was made. This description was carried out in most of the Komi region and became a legislative act that finally secured the entry of this territory into the Russian state.

Wishing to organize the prospecting and exploration of ore deposits, Ivan III was actively looking for mining specialists, sending ambassadors to different countries with instructions to find such people. The text of Ivan III's official parting words to the ambassador of the Hungarian king Matthias I Corvinus, upon his departure from Moscow in 1488, says: "The Great Prince ordered you to say to our brother Matthias, to make friendship, send us masters ... who he knows gold and silver ore, who can separate the ore from the soil; there is gold and silver ore in my land, but nobody knows how to separate it from the soil...".

In 1490, "the Monarch sent a Greek, Yuri Trakhaniot, or Trachonite, to German land who went to us with the Grand Duchess Sophia, instructing him as follows: "... Search in Germany and accept into Russian service useful artists, mining craftsmen, architects and others". Trakhaniot

went (March 22) from Moscow to Revel, to Lübeck and Frankfurt, where he was introduced to the Roman King Maximilian I. Such specialists were apparently found. “We saw that he wrote about that to the King of Hungary; but Trakhaniot seems to be the first to take them out of Germany” [6].

On March 26, 1491, Ivan III sent the first state mining expedition from Moscow in search of silver and copper in the Pechora River basin. The expedition included two “Germans”, Ivan and Victor. The expedition was led by “boyar children” Andrey Petrov and Vasiliy Ivanov Boltin. The miners reached the Northern Dvina, then went along the Vychegda, Vym and its tributary Tetera to the Ukhta, and further along the Ukhta, Izhma and Pechora to Tsilma, arriving there by the summer. Searches on the spurs of the Timan Ridge were successful — on August 8, 1491, silver and copper ore were found on the Tsilma (“not reaching the Kosma River for half a day, and from the Pechora River for seven days”).

Seven months later, on October 20, 1491, they returned to Moscow with the news that on August 8, they found not only silver, but also copper ore on the Tsilma River, 20 miles from the Kosma River, 165 miles from the Pechora River (seven days way from Pechora), 3500 miles (3374 km) from Moscow. The copper fields were found at a considerable distance: “... and the places where they found it were ten versts away”. The success of the expedition was due to the fact that its participants, apparently, had some information about ore deposits. Possibly, the mining masters were guided by the traces of some old workings (Fig. 6).

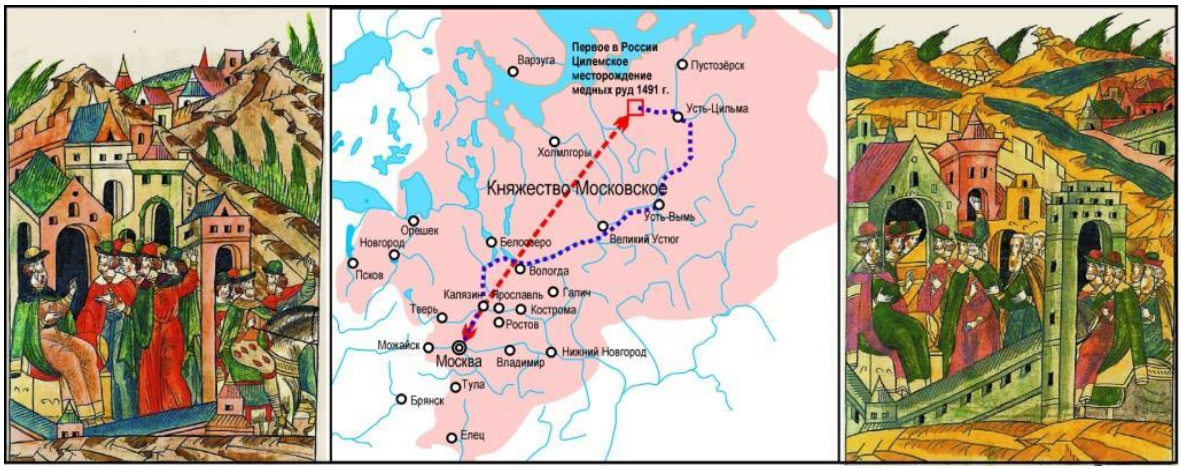

Fig. 6. Departure of the expedition to the Pechora (a) [3], Fig. 6. Departure of the expedition to the Pechora (c) [4].

The year 1491 is considered to be the beginning of the mining industry in the Russian state [6]. The Tsilemskoe deposit was the first developed ore deposit in the history of the Russian state. However, the extreme remoteness from habitable places, the lack of transport routes and the poverty of ores made the mining of silver and copper at the Tsilemskoe deposit unprofitable, and in a few years, it was stopped.

[3] Litsevoy letopisnyy svod. Kniga 17 [Front Chronicle. Book 17]. Moscow, Akteon Publ., 506 p. URL: http://www.akteon-elib.ru/New_Edition/LITsIeVOI-LIeTOPISNYI-SVOD.-Russkaia-lietopisnaia-istoriia.-Knigha-17./ (accessed 19 July 2022).
[4] Ibid.

Copper ores at Tsilma are found in Upper Devonian sediments. They are represented by several types (Fig. 7). The first type is small carbonized plant fragments with copper greens, found in red-brown silty sandstones. The second type is bluish-gray siltstones impregnated with chalcocite and oxidized copper minerals, forming lenses, thin interlayers traceable over several meters, and irregular spotty discharges. The thickness of the lenses does not exceed 50–70 cm; the thickness of the interlayers is 20–30 cm. The copper content is up to 11%. These lenses and interlayers contain rich copper ores, represented by phytomorphoses of chalcosine on plant remains. The copper content is up to 33% [12].

Fig. 7. Tsilemskoe ores: a – first type, b – second type (photos by E.V. Kolonichenko, IG Komi SC UB RAS), c – samples of Tsilemskiy rich copper ores from the collection of the museum of St. Petersburg Mining University, 1911 (photos are provided by Shabalov M.Yu.).

In 1492, as N.M. Karamzin reports in his “History of the Russian State”, Ivan III sent “Manuil Ilairev and the boyar children Vasiliy Boltin and Ondryushka Petrov with masters from Italy to make silver and copper on the river on Tsilma, and 60 workers to dig ore from Ustyug, from the Dvina — 100 people, from Pinega — 80 people, and Permich and Vymych and Vychegzhan and Usolich — 100 people” [6]. This second expedition, which already numbered about 350 workers, founded copper mines on the Tsilma, 7 km upstream of the confluence of the Rudyanka River, and set up smelting furnaces. This place is still called “At the factories”. The remains of ore developments at Tsilma were also found 10 km from the mouth of the Kosma River.

Five years later, a copper smelting plant, powerful for those times, was built there, which smelted not only copper, but also silver and even gold, contained in the ores “in small quantities”. Specialists from Italy participated in the work (Fig. 8).

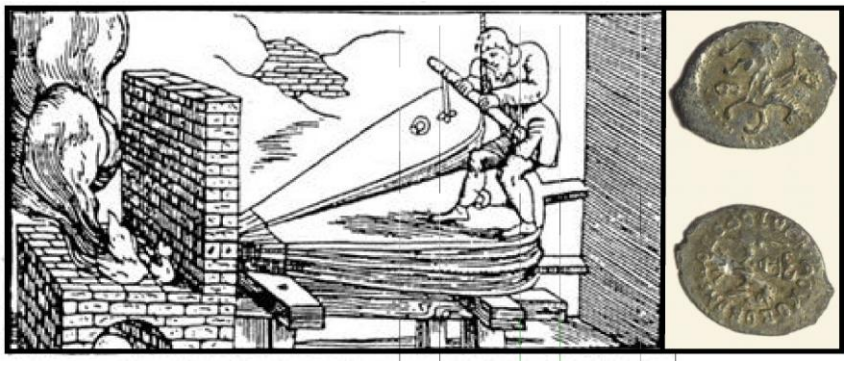

Fig. 8. Smelting furnace in the Middle Ages, silver coins of Ivan III [3].

The smelted metal was sent by rivers to Vologda, and from there to Moscow. The silver ores proved to be too poor to be exploited. Soon, copper mining also ceased — it was too difficult to supply miners and export the mined ore, and the mining season was very short (Fig. 9).

Fig. 9. Traces of mine workings of the Tsilma deposit today. Tsilma River bank with copper sandstones; ancient mine workings; vertical mine workings (photos by E.V. Kolonichenko, IG Komi SC UB RAS).

The Tsilemskoe deposit was the first developed ore deposit in the history of the Russian state. It strengthened the position of Moscow, and the great Moscow princes cherished it, since the Urals and its ore deposits did not yet belong to the Moscow principality.

Because of the exploitation of the Tsilemskoe ore deposits in the lower reaches of the Pechora, in 1499, on the order of Ivan III, the first Russian city beyond the Arctic Circle, Pustozersk, was founded, which played a prominent role in organizing the prospecting and development of ore deposits in the Pechora region (Fig. 10). Pustozersk served as the starting point for mining expeditions to Pechora, Novaya Zemlya and other Arctic islands.

Fig. 10. Pustozersk, 1499 (reconstruction); samples from Pustozersk treasury.

There was a special hut for miners in Pustozersk. The Pustozersk treasury maintained “silver ores weighing a zolotnik, and two pieces of copper ores, and a crystal pebble; and two cornelian pebbles”, sent “as a sample” from the order of the Great Treasury [11].

Development of mining and metallurgy in the northern regions of Russia in the 16th and 17th centuries

In the 16th and 17th centuries, the search for ore deposits continued. In the middle of the 16th century, Tsar Ivan the Terrible sent miners to search for silver ore on Novaya Zemlya, following the example of the Novgorodians, who discovered the islands at the beginning of the 11th century. There were legends that silver came to the surface in the vicinity of Serebryanka Bay, north of the Matochkin Shar Strait, “like incrustation” [11]. At the same time, the monks of the

Pechenga Monastery on the Kola Peninsula were mining polymetallic silver-bearing cores on the coast of the Cold Sea, and also went to the Pechenga River to wash gold [15].

In the 16th century, a new attempt was made to exploit the Tsilma ores. In 1547, Ivan the Terrible invited two mine experts from Saxony to Russia. Perhaps, after their arrival, he sent Ivan Fedorovich Shishkin to the Northern Dvina and ordered him “to take people here, go to Tsilma to dig ore”. Shishkin “dug ore”, but it “was not good” (Fig. 11).

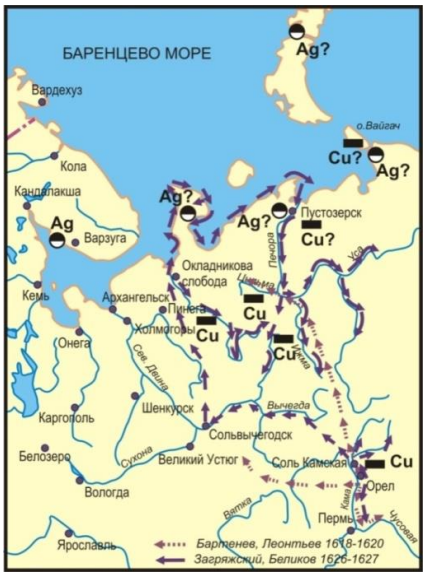

Fig. 11. Routes of mining expeditions in 1618–1620 and 1625–1627 [7].

In 1618–1620, the expedition of Ch. Bartenev and G. Leontiev searched for silver and copper ore in the Kama and Pechora regions. The expedition was sent to the Kama region after the reports of 1617 by Yakov Litvinov, who was in the service of the Stroganovs, that there were outcrops of copper ore in many places of Great Perm. The expedition also worked in the Pechora region, but found only abandoned mining areas of the Tsilemskoe deposit and took samples of ores. In 1626–1627, G. Zagryazhskiy and S. Belikov also searched for silver ores in the basins of the Mezen, Pinega, Kevrola, Pechora and its tributaries on the Kanin Peninsula. But there were no positive results.

In 1633, an expedition headed by V.I. Streshnev and V. Sergeev was sent to Perm Velikaya to search for gold ores. The expedition failed to find gold, but industrial deposits of copper ores were discovered in the Solikamsk and Cherdyn uyezds. In 1636, the Pyskorskiy (Grigorovskiy) copper-smelting plant was built here (Fig. 12) [10].

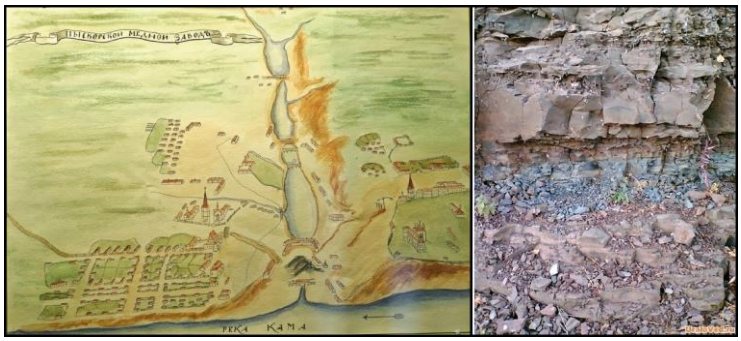

Fig. 12. Pyskorskiy copper-smelting plant (from the album of V. de Gennin, 1735); copper sandstones.

In 1651 and 1652, Tsar Alexey Romanov sent ore-searching expeditions to Novaya Zemlya "to search for silver and copper ores, precious stones and pearls", as well as "all sorts of useful places", led by the former Pustozersk governor Neplyuev, which ended tragically [11].

In the late 1640s – 1650s, Moscow began to receive information about searches of silver ores by miners in north-eastern regions of European Russia. In 1653, the Pustozersk ore prospector Ya. Sharapov spoke about the silver ore found on the coast of the Yugorskiy Shar Strait. Silver ore was discovered at Cape Kanin Nos by the Mezen ore prospector A. Mashukov. This information prompted a search expedition from Moscow in 1661 by the explorer V. Shpilkin, which included reconnaissance work on the Kevrol, Mezen, Tsilma and Pechora rivers, on Cape Kanin Nos and on the island of Novaya Zemlya. During three years (1661–1663), the expedition members discovered silver ore on the rivers Volosov, Kambelnitsa and others in the mouth and lower reaches of the Pechora [4].

In 1667, the expedition headed by the Pustozersk governor I. Neelov and the Mezen ore prospectors F. Kyrkalov and G. Ikonnik made another attempt to develop copper ores on the Tsilma River for "exploration and experiment". In 1668, the area of the Tsilma River and the coast of the Barents and Kara Seas were surveyed and samples of discovered copper ores from the rivers Tsilma, Krasnaya, Izhma and Vybor from Pustoozero and Vaygach Island were delivered to Moscow [11].

Later, the Moscow authorities became aware of discoveries of silver on Medvezhiy Island in the White Sea, from which the masters of the Kirillo-Belozerskiy Monastery produced various silver items. To verify this information, several expeditions were sent to the island (Major A. Mamkeev in 1671, clerk of the Novgorod prikaz A. Zinoviev in 1673, attorney L. Narykov in 1676 and Belozersk nobleman P. Malozheninov in 1680). But none of them could discover ore deposits, hidden by the local population. The deposit was found only in 1732 [9].

In 1675, an expedition was sent to Tsilma under the leadership of Yeremey Tradel and ore explorer Lavrentiy Nitart, which found that "although there was copper ore in these places, it was impossible to find it with little money" [7].

Conclusion

Ivan III, Prince of Moscow sovereign of all Rus', whose reign resulted in the union of a large part of the Russian lands around Moscow, which led to its transformation into the center of the Russian state, received the nickname "collector of Russian land". The unification of these lands under Moscow led to the creation of the largest state in Europe. He laid the economic, political, legal and administrative foundations of the unified state and became the first Russian emperor. The Russian Empire was created.

Ivan III acted as a reformer of the Russian state. He established trade relations with European countries and invited specialists from these countries to work, who brought new production technologies. A large-scale stone construction of new temples and fortresses was launched, in-

cluding the assistance of Italian masters, as well as the production of artillery pieces. During his reign, the search for minerals, necessary for the development of the state, began.

One of the key roles in reforming the domestic and foreign policy of the Russian state was played by the second wife of Ivan III, Sophia Palaeologue. She consistently implemented the idea of complete liberation from the Horde dependence, transforming Russia into a powerful state. The country received a new emblem in the form of a double-headed eagle, the idea of inheriting the Byzantine Empire, formulated as “Moscow — the Third Rome”, was established.

1491 was the year of the first state ore-searching expedition, which was carried out in the Arctic zone of Russia, and the year of the beginning of the mining and metallurgical industry in the Russian state. The main reason for that was the attention to this issue of Grand Duke Ivan III, who carried out a great preparatory work to collect the necessary information, search for relevant specialists and find the required financial resources.

Silver and copper ore was found on the Tsilma River, a tributary of the Pechora River. Copper was found at a considerable distance. The rapid success of this expedition clearly demonstrates that it had specific information about ore deposits. The year 1491 is considered to be the beginning of the mining and metallurgical industry in the Russian state, and the Tsilemskoe deposit became the first developed ore deposit in the history of the Russian state.

In the 16th–17th centuries, the state continued its efforts to search for new deposits of metallic minerals, including in the newly annexed territories of the Urals and Siberia. State money was used to organize new expeditions, including those involving domestic geologists-miners. The foundations of geological prospecting, exploration and mining were laid. Methods and forms of state participation in the development of domestic mining industry were developed and improved. The development of mining and metallurgical industry in Russia was started for many years to come.

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The article was submitted 19.07.2022; accepted for publication 07.10.2022.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

Arctic and North. 2022. No. 49. Pp. 239–244.
Original article
UDC 332.14(470.21)(045)
doi: 10.37482/issn2221-2698.2022.49.281

Between Ocean and Mainland: Versions and Diversifications in Industrial Development of the Kola Peninsula

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Abstract. The article deals with the economic specifics of the peninsula's territory, which is closely related to the resources of both the mainland and the ocean. Using the example of the Murmansk Oblast, an approach is proposed to study the industrial development of the peninsular region in the Soviet period, taking into account the competition of two versions. One of them was aimed at creating an "oceanic" economy – the fishing industry and marine transport. Another version served the "mainland" economy, represented mainly by mining industry. Specific historical materials are used to examine the pendulum effect, i.e. the fluctuations between these two versions and the formation of prerequisites for diversification. Of particular interest is the experience of combining two versions, which appeared in 1923, when an industrial transport and colonization combine was created on the basis of the Murmansk railway, and later, during the industrialization of the 1930s. It is debatable whether the two old versions were successfully transformed into the third "ocean-mainland" one, based on the idea of the integrated development of the resources of the Kola Peninsula and the seas surrounding it, which was most noticeably manifested during the Soviet economic reform of 1957. The prospects for studying this issue may be related to the use of methods of historical and economic analysis.

Keywords: *economy, industry, Arctic, strategy, politics, natural resources, sea, ocean, continent, subsoil, Barents Sea*

Introduction

If we recognize the influence of geographical conditions on history, we should accept that life on the peninsulas differs from other places on the continent. Any peninsula is contiguous with the sea or the ocean, which gives the history of the people living on its territory a specific identity. A peninsular community cannot exist without a fleet and migrations, without trade and travelers. On the other hand, peninsula is an unconditional continuation of the mainland. Its dualism of ocean and land is an interesting phenomenon, manifesting itself not only in socio-cultural, but also in economic dimensions.

P.N. Savitskiy raised the question of the existence of countries with a continental type of economy and countries whose economic life is integrated with the ocean. Taking into account the large area of land territories in Russia, the author neglected the importance of coastal outskirts and referred Russia to the first group [1]. At the same time, the historical experience of the Rus-

For citation: Fedorov P.V. Between Ocean and Mainland: Versions and Diversifications in Industrial Development of the Kola Peninsula. *Arktika i Sever* [Arctic and North], 2022, no. 49, pp. 281–288. DOI: 10.37482/issn2221-2698.2022.49.281

sian peninsulas reveals a different nature of the Russian economy, tied both to the mainland and to the ocean.

In Soviet times, the Kola Peninsula became one of the most populated and urbanized regions of the Arctic. Through the prism of Lenin's theory of building socialism, the industrial development of this region has traditionally been seen as a progressive, planned and linear process: from construction of socialism to full-scale building of communism.

The apogee of such approach can be found in the works of V.P. Pyatovskiy, who presented the development of productive forces of the European North as the realization of the plan proposed by V.I. Lenin. Although such a plan does not exist in nature, V.P. Pyatovskiy found in Lenin's works a significant number of references to the development of the productive forces of the European North, brought these quotes together and saw in this nothing more than a program [2]. This was one of the approaches of Soviet historiography on this issue.

However, if we abandon the strict adherence to the ideological and theoretical heritage of V.I. Lenin, it will hardly be possible to understand the development of Soviet industry in general and the industry of the North in particular as a systematic and linear process. Researchers who have studied the history of the Soviet economy know that the dynamics were often uneven and rather "nervous".

On the Kola Peninsula, during the entire Soviet period, industry developed between two perspectives, alternatives, versions. The first one is so-called arctic or "oceanic" version, associated with the transformation of the Kola Arctic into a base for the development of the Northern Sea Route and the Arctic Ocean and, consequently, with the development of the railway, the port, the entire port and fleet infrastructure, as well as establishment of the fishing industry. The second version — "Eurasian", or "mainland" — provided for the extraction of minerals in the depth of the Kola North. It is clear that the "oceanic" and the "mainland" versions had little in common, since both required training of completely different staff, application of different fields of scientific knowledge, use of different technologies.

Although the "oceanic" version itself was ultimately aimed at serving the mainland — the territory of the Soviet Union, for the coast, it meant just the creation of a certain base for the development of the ocean. Within the peninsular territory, the "oceanic" version differed greatly from the "mainland".

Hence, the creation of a regional model of industrial development required a determination of which version to follow. If both versions were to be used, which should be prioritized and which should be subordinated? Considering that the development itself proceeded under conditions of a constant lack of resources, was determined by changing ideological and political views of the authorities, and to some extent depended on the global situation, it is easy to understand why the process of industrial development of the Kola North represented certain fluctuations between these two versions, which usually ended in transition or redistribution between them, causing periodic diversification in the development process.

At the origins of the peninsular industry

The emergence of industry in the Kola North dates back to the end of the 19th century and is associated with the appearance of sawmills, which was a reflection of the "mainland" version of industrial development [3, Ushakov I.F., p. 423–426].

The construction of the Murmansk railway in 1916 created the basis for the development of the "oceanic" version and the first industrial diversification in the history of the peninsula appeared. During the World War I, this road became an important transport corridor for communication with the allies [4, Bykov P.D., p. 6]. However, during the Civil War, it was cut off from the center of the country by a turbulent cycle of political decentralization and regional separatism.

For almost the entire 1920s, when the Soviet state experienced an acute shortage of resources, it tried to develop an "oceanic" version of the industry in the Kola North as the easiest and cheapest way to satisfy economic hunger. Already in the early 1920s, the Murmansk Railway, linking the center of Russia with the ice-free coast of the Barents Sea, has become a national transport corridor for the delivery of goods. The inertia of the World War I and the consequences of the diplomatic isolation of Soviet Russia were still in effect. During these years, the image of the "Second Dardanelles" was recalled, which was attached to the Murmansk railway back in wartime, when it provided an open access to the World Ocean bypassing the Mediterranean straits blocked by the enemy [5, Arnoldov A.M.].

In the 1920s, the development of the "oceanic" trend was not proceeding systematically either. In 1922, in the center, where the entire shortage of resources was realized, the prospects for closing the Murmansk railway due to its unprofitability were discussed [1]. If the project of turning this highway into an industrial-transport and colonization complex had not appeared in 1923, it is difficult to say how this crisis could have ended for the Murmansk direction. The 1923 project was based on the Canadian experience of using railways in the development of sparsely populated territories and assumed that the railway would not only carry goods, but would also settle the adjacent territory, develop agriculture, build industrial plants and even prospect and extract minerals. In fact, the 1923 project shows an emerging diversification, and not so much from the "oceanic" to the "mainland" version, but to an attempt to link them together. Taking into account that it was an impossible task and the project itself was not provided with sufficient funds, not only the integration of these two directions failed, but the diversification itself was practically disrupted in the 1920s [6, Fedorov P.V., p. 324–336, 339–345].

A new attempt to diversify the industrial development of the Kola North began with full-scale industrialization, i.e. in the late 1920s. The Apatit plant and the city of Khibinogorsk (now Kirovsk) began to be built in Khibiny. Thus, the Kola Peninsula begins to acquire a segment of its industrial development independent of the "oceanic" direction. After the Khibiny, during the second five-year plan, construction began in Monche-tundra, where the Severonickel plant and the city of

[1] Polyarnaya pravda. 1922. September 20.

Monchegorsk appeared. Before the Great Patriotic War, the development of two iron ore deposits (Olenye and Yonskoye) and a rare earth deposit (Alluyavstroy) was also started; infrastructure construction here would be completed after the war [6, Fedorov P.V., p. 348–352].

In the 1930s, in parallel with the rapid construction of the mining industry, the "oceanic" version of the industry developed at the same rapid pace. As early as 1926, a trawl fleet was transferred from Arkhangelsk to Murmansk, and the city began to transform from artisanal industry into a base for industrial polar fishing. In the late 1930s, two shipping companies were set up in Murmansk: Marine and Arctic (later combined into one), which became the basis for the Murmansk transport fleet base [6, Fedorov P.V., p. 337–339, 352–361].

Thus, the "oceanic" and "mainland" directions coexist with each other in the 1930s. It is possible to discuss the issue of their interconnection and correlation, but it is indisputable that the industrial model of the Kola North in this form took a complex form of multidirectionality.

The pendulum effect: oscillation as development

Subsequent changes confirmed that the emergence of a simple economic model on the Kola Peninsula is denied by practice itself. In the industrial era, development here was set by the pendulum effect, i.e., oscillations between the "oceanic" and the "mainland" models.

During the Great Patriotic War, there was a sharp shift to the "oceanic" version of the industry, which was associated with the need to serve the Murmansk transport corridor for communication with the allies [6, Fedorov P.V., p. 427–433].

After the war in the Murmansk Oblast, there was a return to the development model that existed in the pre-war period. Therefore, the "mainland" version received a new impetus. In the mining industry, the enterprises that had not been built because of the war were being completed. New industries were established, specializing in the extraction and processing of minerals. In particular, on the territory of the Pechenga region attached to the Murmansk Oblast, the Zhdanovskiy MPP ("Pechenganickel") was built.

During the period of the Soviet economic reform in 1957, the transition from a sectoral to a territorial management model led to the creation of the Murmansk economic region, coinciding with the borders of the Murmansk Oblast. These measures represented an experiment in the creation of a peninsular economic cluster, raising the question of the possible limits of synthesis between the "oceanic" and "mainland" versions. One can even talk about the appearance of the prospect of a new, third version of industrial development — the "oceanic–mainland", based on the idea of integrated development of the resources of the Kola Peninsula and the seas surrounding it [6, Fedorov P.V., p. 454–456; 7, Demichev E.V.; 8, Mertsalov V.I.].

However, since the 1960s the development of the mining base in the Kola North was slowed down. The authorities invested in existing mining facilities, but did not develop new territories. First Secretary of the Murmansk regional committee of the CPSU, V.A. Prokofiev, associated it with the attitude to the Kola raw materials as expensive and economically unprofitable raw ma-

terials [2]. Ten years later, another First Secretary of the Murmansk regional committee of the CPSU, N.L. Konovalov, speaking at a session of the RSFSR Supreme Soviet, tried to return attention to the idea of development of the central part of the Kola Peninsula, where mineral deposits were discovered, but was not heard [3].

Meanwhile, huge funds began to be invested in the "oceanic" direction of the industry. Thus, since the late 1950s, a nuclear icebreaker fleet was created with a maintenance base for nuclear icebreakers in Murmansk. Since the late 1970s, infrastructure for oil and gas exploration on the Arctic shelf (Murmansk Marine Geological and Geophysical Oil and Gas Expedition, Soyuzmorgeo, Arktikmorneftegazrazvedka, etc.) was developed in Murmansk Oblast. Through its efforts, large reserves of strategic fuel were discovered. Another diversification of the industrial development of the Kola North began to be prepared, this time — from the mainland to the Arctic Ocean.

Despite the fact that the development of reserves of the Arctic shelf is a matter of the future, the "oceanic" version of industry continues to be regarded today as a priority for the Kola Peninsula. Taking into account the convenient geographical location of the region, Russia is implementing a project for the integrated development of the Murmansk transport hub. The territory of advanced socio-economic development "Capital of the Arctic" was created in the Murmansk Oblast by the Decree of the Government of the Russian Federation of May 12, 2020 [4].

Conclusion

The historical experience of the industrial development of the Kola Peninsula emphasizes an important feature of regional genesis. The Murmansk Oblast does not resemble agrarian regions, quite centralized in their infrastructure, the model of which consists of a main city and a group of small, subordinate cities with an agrarian landscape around. In the Kola North, the multidirectional development of the industrial base has resulted in a more complex, polycentric landscape (let us recall military cities). Despite the fact that the Murmansk Oblast organically coincides with the peninsula borders and in this sense seems to be an integral, compact and "natural" region, in reality it consists of different industrial segments, one of which is tied to the ocean, and the other — to the mainland. In modern literature, this dichotomy is considered an important factor of regional development [9, Bezrukov L.A.].

This dualism is also noticeable in the brands that were assigned to Murmansk. Until the beginning of the 21st century, the city was often called the "capital of the Soviet Polar region". One hears more land than sea in it, so in the brand itself one can notice, therefore the brand itself

[2] Polyarnaya pravda. 1958. March 17.
[3] Zasedaniya Verkhovnogo Soveta RSFSR sed'mogo sozyva: Vtoraya sessiya (17-18 oktyabrya 1967 g.): Stenograficheskiy otchet [Meetings of the Supreme Soviet of the RSFSR of the seventh convocation: Second session (October 17-18, 1967): Verbatim record]. Moscow, 1968, 196 p.
[4] O sozdanii territorii operezhayushchego sotsial'no-ekonomicheskogo razvitiya "Stolitsa Arktiki": postanovlenie Pravitel'stva RF ot 12 maya 2020 g. № 656 [On the creation of the territory of advanced socio-economic development "Capital of the Arctic": Decree of the Government of the Russian Federation of May 12, 2020 No. 656]. URL: https://docs.cntd.ru/document/564882573 (accessed 06 June 2022).

shows if not the dominance of the “mainland” version over the “oceanic” one, at least an attempt of a compromise between them. In modern conditions, this brand has been replaced by a new image — the “capital of the Arctic”, which to a greater extent connects Murmansk with the Arctic, maritime direction of development, and not with the “mainland”. A balanced use of this image seems to be possible if the semantic boundaries of the Arctic itself are extended to include the northern edge of the mainland.

To summarize the arguments presented, it can be said that oscillations between the “oceanic” and “mainland” versions (pendulum effect) were a distinctive form of the peninsular region’s industrial development in the Soviet period. The attempts of the Soviet state to comprehensively use the productive forces of the Murmansk Oblast, which became most noticeable during the economic reform of 1957, were directed towards the synthesis of the “oceanic” and “mainland” versions. However, the success of this experience is a debatable issue that should be resolved using methods historical and economic analysis.

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The article was submitted 06.06.2022; accepted for publication 11.06.2022.

The author declares no conflicts of interests.

Editorial Board of the “Arctic and North” journal

Order on approval of the Editorial Board of the online scientific journal
“Arctic and North” No. 266 dated April 08, 2021,
“On Amendments to Order No. 266 dated April 8, 2021” dated November 02, 2022

Online: http://www.arcticandnorth.ru/DOCS/redsovet.php

Acknowledgments

The editorial staff of the online scientific journal “Arctic and North” expresses gratitude to scientists, colleagues, consultants who made a significant contribution to the development of the journal in 2022:

1. Sergey V. Baranov, Luzin Institute for Economic Studies — Subdivision of the Federal Research Centre “Kola Science Centre RAS”
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41. Lyudmila A. Chizhova, Laverov Federal Centre for Integrated Arctic Research, Ural Branch RAS
42. Anna S. Shcherbakova, Institute of Socio-Economic and Energy Problems of the North, Komi Science Centre, Ural Branch RAS

Output data

ARCTIC and NORTH, 2022, no. 49
DOI: 10.37482/issn2221-2698.2022.49

Registration certificate Эл No. ФС77-78458 dated June 8, 2020
Founder, publisher — Northern (Arctic) Federal University named after M.V. Lomonosov
Address of the founder and publisher: Naberezhnaya Severnoy Dviny, 17, Arkhangelsk, 163002, Russia
Address for correspondence: “Arctic and North” journal, Naberezhnaya Severnoy Dviny, 17, Arkhangelsk, 163002, Russia
E-mail address of the editorial office: **aan@narfu.ru**

Signed for placement on the webpage http://www.arcticandnorth.ru/ on 22.12.2022