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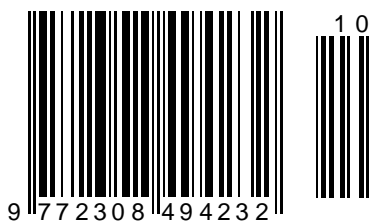
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Issue

Article



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THE EFFECTIVENESS OF STRATEGIC HUMAN RESOURCE MANAGEMENT FOR THE SUCCESSFUL SALE OF DEVELOPMENT PRODUCTS IN THE ARCTIC ZONE OF THE RUSSIAN FEDERATION. MESSAGE 2

Abstract: *in the article, the authors analyze the need to manage labor resources for the development of the Arctic zone, since. The Russian Arctic is a strategically significant macro-region of the Russian Federation for a number of reasons, the most significant of which are colossal proven hydrocarbon reserves that can provide the country with fuel, energy and mineral resources for many years; the economic and geopolitical significance of the Northern Sea Route as potentially one of the largest transport arteries for maritime transport; as well as the significant length of the maritime border of the Russian Federation and the need to ensure its security. In the 1990s. The development of the Arctic has taken a back seat among Russian government priorities. However, since the beginning of the 21st century, regulatory legal acts regulating Russia's policy in the Arctic have allow us to talk about an ever-increasing awareness of the critical importance of this region for achieving the goals and objectives of the development of our country as a whole. Currently, we can talk about a large-scale multi-purpose mega project for the development of the Arctic - perhaps the term "redevelopment" would be more accurate.*

The largest projects included in the modern Arctic mega-project are the exploration and development of oil and gas fields (both on land Arctic territories and on the Arctic shelf), as well as the development of the Northern Sea Route. Both of these projects require a significant amount of qualified human resources - this means that the human resources of enterprises and organizations operating in the Arctic territories play an important role in the development of the Russian Arctic. However, for state corporations of the mineral resource complex, transport companies, scientific and educational institutions of the Arctic zone of the Russian Federation (AZ RF), as well as state executive authorities, there is a significant problem of a shortage of highly qualified specialists, capable of

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living and working effectively in the extreme natural and climatic conditions of the Arctic. At the same time, there is a clearly expressed need not only for specialists with higher education, but also for workers with secondary specialized education in working specialties.

For 2024, the annual need for specialists was estimated at almost 74 thousand people for the entire Arctic zone of the Russian Federation. The possibilities of meeting the existing demand for personnel "on our own" vary from one Arctic region to another, however, it is obvious that this demand cannot be satisfied only by graduates of universities located in the Arctic Zone of the Russian Federation; Additional resources are required, especially if we are talking about narrow-profile specialists in those specialties for which the universities of the Russian Federation do not provide training at all. The problem remains of the migration outflow of youth from the northern regions to study at universities outside the Arctic Zone of the Russian Federation (after which a significant proportion of young people no longer return to the Arctic, but find employment outside of it), as well as the migration outflow of graduates from northern universities, seeking employment opportunities in other regions of the country. The underdeveloped intellectual infrastructure of the Arctic regions provokes an outflow of population.

Key words: forecasting, strategizing, additional resources, Arctic zone, Northern Sea Route, personnel, training, need, graduates, specialists, reproduction, profiles, redevelopment, demand.

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Introduction

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Main part

Strategic management of the development of the Russian Arctic is an important state task, one of the necessary conditions for the solution of which is work on long-term planning of staffing for this process. The Arctic is being developed both traditionally, through the development of permanent settlements, large and small cities, their social, scientific, educational, transport and other infrastructure, and through shifts, locally, using only the most profitable areas of management over a vast territory. The predominance of the second path is associated with the strategic lack of development of the Arctic; the first requires large and constant capital investments. In modern conditions of intensified international competition, the Arctic is becoming a zone of strategic interests of the economically (and militarily) leading countries of the world. This circumstance exacerbates the need to solve the problem of accurately forecasting the socio-economic situation as the basis for national and regional security. In turn, in goal-setting socio-economic development, the key role begins to be played not by economic growth, but by a steady increase in the level of a complex indicator - quality of life. The main goal of Arctic development, therefore, is not maximizing profits from energy sales, but "ensuring human well-being in a sustainable and a safe Arctic." The central document of strategic planning for Arctic development is 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 until 2035,"

however, Not all documents at the regional level are brought into compliance with it. In the Murmansk region, the "capital" for the Arctic, as amended in 2017, the Regional Government Decree of December 25, 2013 N 768-PP/20 "On the Strategy for the socio-economic development of the Murmansk region until 2020 and for the period until 2025" is in force, adopted long ago before the current Arctic strategy. As a result, there is a certain disunity in goal-setting of actions at the federal and regional levels. A similar situation occurs with regard to the coupling of sectoral strategies at the level of all of Russia and the Arctic regions; in this regard, we are talking primarily about the Energy Strategy of the Russian Federation for the period until 2035, which largely links the fate of the development of the gas industry with the Arctic. In general, as part of the development of human resources in the Arctic zone of the Russian Federation, it is planned to create more than 182 thousand jobs in 64 specialties by 2035, 140 thousand of them are formed within the framework of almost 200 investment projects, 42 thousand - in accordance with the needs of key employers. However, due to the peculiarities of the current situation with a shortage of personnel throughout the country, even a successful solution to this problem may cause a shortage of personnel in other regions. Traditionally high wages in the Arctic, it turns out, may also be insufficient to retain specialists in the region. Thus, if from 2010 to 2020 average wages in the northern, including the Arctic, regions increased by 2–2.5 times, then on average in Russia their growth was threefold. "Northern surcharge", known since the times of the USSR, no longer "works" as effectively as during the Soviet period. IN USSR activea network of research organizations and universities in the regions was

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created and developed. It is interesting that this principle of regional development is actively used in the foreign Arctic. Thus, the author’s calculations showed that scientific activity (the number of scientific publications per capita) in Alaska is not inferior to the average level of such activity in the United States. In Russia (also in accordance with the data obtained by the author through a search in the Scopus database), there are only two regions with Arctic territories - the Komi Republic and the Republic of Karelia - that demonstrate a level of scientific activity, expressed in internationally presented publications, above the Russian average. In

Russia, the bulk of Arctic research is not carried out in the Arctic itself, which, of course, has and is actively developing its own scientific centers - universities and institutes - especially in the Murmansk and Arkhangelsk regions, Krasnoyarsk Territory, Yakutia. However, a significant proportion of work on the study of the Arctic is carried out in leading Russian scientific centers - Moscow, St. Petersburg, Yekaterinburg, Novosibirsk. However, it is unclear whether such “remote” exploration of the Arctic can strategically provide an effective outcome.

Table 1. Shares of publications by scientists in the Arctic regions of the Russian Federation, joint with scientists from Moscow and St. Petersburg

	2019	2020	2021	2022	4 year average	The same for 2009 - 2012.
N-SPb	67	100	-	50	56	-
N-Moscow	50	100	-	50	50	100
YAN-Moscow	36	40	34	47	39	17
Ch-Moscow	11	56	27	21	28	47
M-SPb	23	27	24	26	25	11
A-Moscow	24	25	23	26	25	16
M-Moscow	18	19	23	34	23	17
Ch-SPb	22	33	9	28	23	13
Kar-Moscow	19	20	18	26	21	15
Kar-St. Petersburg	20	20	18	18	19	14
Co-Moscow	17	18	19	18	18	17
YAN-SPb	13	19	20	10	16	0
I am Moscow	11	15	16	17	15	12
A-SPb	10	14	15	14	13	6
Ko-SPb	12	13	15	13	13	5
Kr-Moscow	10	9	12	15	11	9
Ya-SPb	8	9	11	9	9	6
Kr-SPb	4	4	6	6	5	2

As can be seen from the data presented in Table 1, the level of involvement of scientists from Moscow and St. Petersburg in Arctic research has increased significantly in recent years, which compensates for the “compression” of the scientific and educational potential of the Arctic itself. However, this cannot fully compensate for the training of personnel directly for the Arctic regions. Currently, not only developed, but also many developing countries are beginning to experience an acute shortage of personnel in a unique situation in global history, when there are fewer young people entering professional life than those retiring (a phenomenon that in Russian scientific research

literature is called the “personnel blow”). It should be noted that in countries such as Germany, Japan, Italy and others, this phenomenon is expressed even more acutely than in Russia. As a result, measures to attract foreign workers have to be expanded. Although Russia has had a positive balance of foreign migration throughout the post-Soviet years, these are migrants from the CIS countries, mainly from Central Asia and Transcaucasia, mostly with a low level of education and qualifications.

Currently, a transition is ripe from the creation of strategies solely through an agreed vision of the future by experts and responsible government

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officials to a pre-calculated system of measures and activities implemented depending on a particular development scenario of the external (primarily) for the managed region (or industry) environment. Strategic management of Arctic development can become a testing ground for testing modern strategizing technologies. Currently, the digitalization of public administration is actively developing at various levels (situational analytical centers, control centers united in a single network). Such management implies the formation of a digital twin of the managed system, the widespread use of mathematical modeling of socio-economic and socio-natural, as well as socio-political processes in the managed region (macro region) and communication models, participants in economic activity. Expanding on the topic of the paragraph, we can conclude that strategizing Arctic development is a challenge for Russian science, while the scientific development of the Arctic macroregion is the key to the successful solution of its strategic tasks.

The state and problems of personnel development in the Arctic need to be clarified both in the context of personnel problems of the entire country, and in the light of global trends and processes, as well as in the light of socio-economic problems of the Arctic macroregion itself. The main content of the problem field is that there is not enough personnel to implement existing and planned Arctic development projects, which can naturally lead to their slowdown.

Table 2 and Figure 1 present data on the dynamics of the absolute population of some constituent entities of the Russian Federation and its percentage change since 2005. As can be seen from Figure 1, if in Russia as a whole there was growth due to an increase in the birth rate, the acquisition of Crimea and traditionally high migration growth, then in a number of federal districts, Arctic regions and regions containing Arctic territories, mixed dynamics are observed - such as a decrease in population, and its rather rapid increase.

Table 2. Population of Russia, some federal districts and regions, including the Arctic and Arctic regions, 2005-2020, thousand people.

	2005	2010	2015	2018	2019	2020
Российская Федерация	143236	142865	146545	146781	146749	146 171
г. Москва	10924	11541	12330	12615	12678	12 655
г. Санкт-Петербург	4713	4899	5226	5384	5398	5 384
Северо-Западный федеральный округ	13716	13626	13854	13972	13982	13942
Уральский федеральный округ	12129	12087	12308	12350	12361	12330
Сибирский федеральный округ	17404	17174	17259	17173	17118	17004
Дальневосточный федеральный округ	8551	8363	8260	8189	8169	8124
Мурманская область	839	794	762	748	741	733
Республика Карелия	676	643	630	618	614	609
Республика Коми	963	899	857	830	821	814
Ненецкий автономный округ	42	42	44	44	44	44
Архангельская область	1240	1183	1130	1100	1092	1083
Ханты-Мансийский автономный округ – Югра	1468	1537	1626	1664	1675	1688
Ямало-Ненецкий автономный округ	517	525	534	541	544	547
Тюменская область без автономных округов	1309	1343	1455	1518	1538	1543
Красноярский край	2869	2829	2866	2874	2866	2856
Республика Саха (Якутия)	954	958	960	967	972	982
Чукотский автономный округ	52	51	50	50	50	49

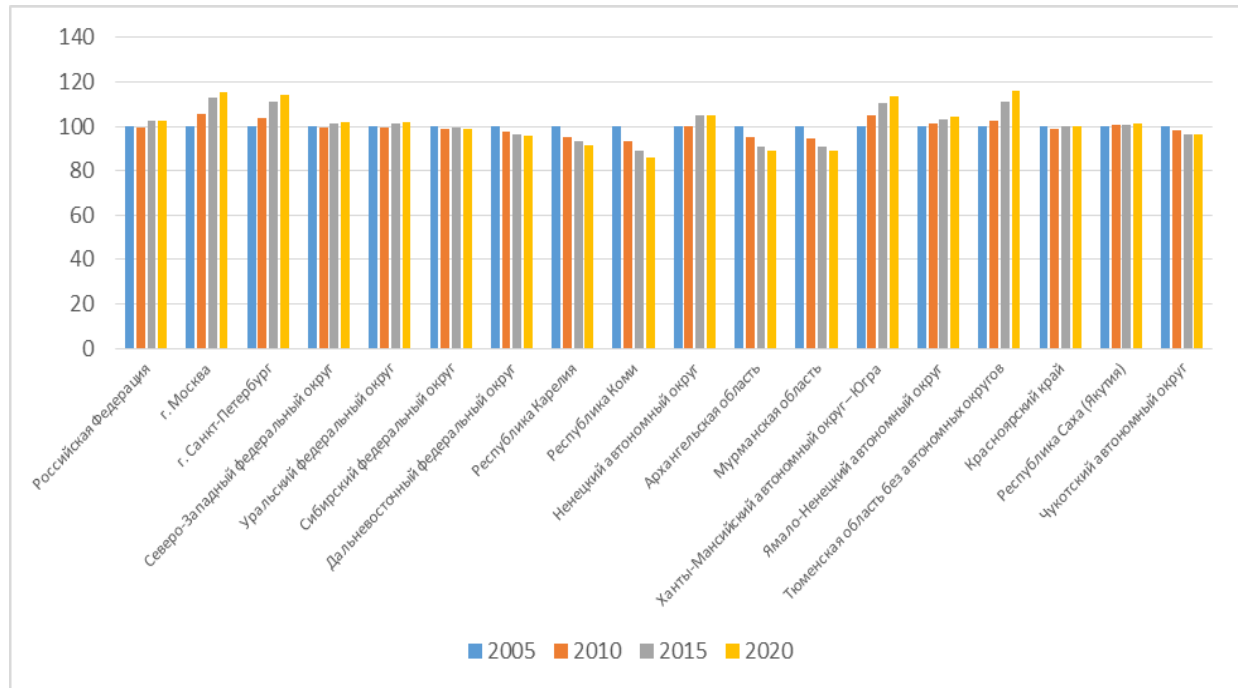
In Russia, “regions have emerged that form a labor core, attracting migration and investment resources, and periphery regions.” Among the demographically shrinking regions are the Komi Republic, Murmansk, Arkhangelsk regions and the Republic of Karelia (the first three regions are in the top 10 in terms of population decline over 15 years), Karelia is 19th in terms of this indicator. The

population in the Chukotka Autonomous Okrug decreased by 6%. Among the successful ones in demographic terms are the Yamal-Nenets Autonomous Okrug and the Nenets Autonomous Okrug, which are among the most successful in population growth, second only to the constituent entities of the South of Russia, the capitals, as well as

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the Khanty-Mansi Autonomous Okrug and the Tyumen region.



Picture 1. Relative dynamics of the population of Russia, some federal districts and regions, including the Arctic and sub-arctic, 2005–2020, % (the 2005 level is taken as 100%)

As can be seen from Figure 2, over 10 years, only the Yamalo-Nenets Autonomous Okrug (among the Arctic and sub-Arctic regions) quite significantly increased the number of employed: from 388 to 471

thousand. In the European regions of the North, there was a significant decrease in the number of employed (up to 20%) from 2010.

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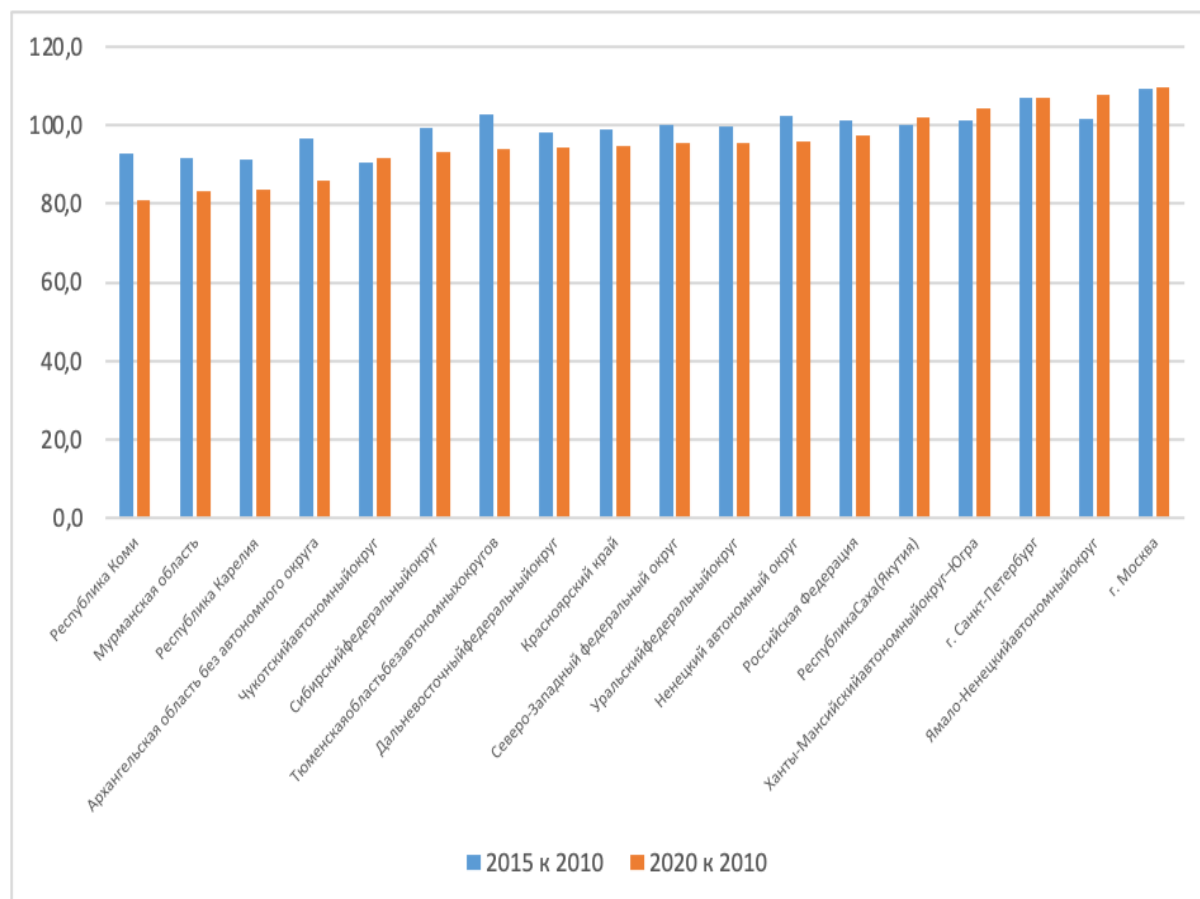


Figure 2. Changes in the number of employed in the Russian Federation and some, including Arctic, regions from 2010 to 2015 and from 2010 to 2020. (2010 level – 100%).

As can be seen from Figure 3, the Arctic regions differ greatly from each other in terms of the level of population involvement in the economy. At the same time, in the past decade, processes of both population aging and an increase in the birth rate obviously occurred, which led to an almost universal decrease in the share of employed people in the population. This

process did not manifest itself only in the actively developing Yamalo-Nenets Okrug. The most important indicator of quality of life is the mortality rate of the working age population, which largely determines the real standard of living in the region.

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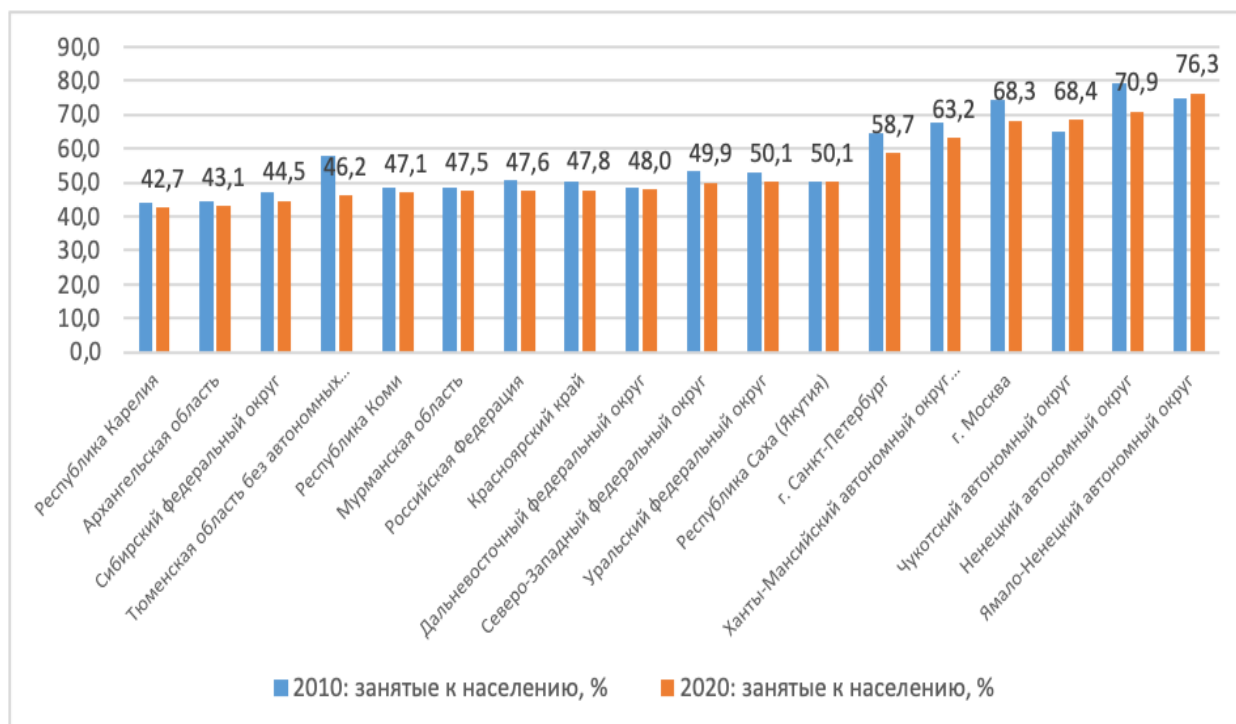


Figure 3. The ratio of the number of people employed in the economy to the population in Russia and some regions, including the northern Arctic and Arctic regions, %, in 2010 and 2020.

As can be seen from the data presented in Table 3, most Arctic and sub-Arctic regions have a mortality rate in working age that is higher than the Russian average, however, Yakutia and the Yamal-Nenets Autonomous Okrug have a significantly lower level. At the same time, the position of the regions relative to the Russian average has remained virtually unchanged since 2005: those regions that had a higher

mortality rate compared to the Russian average generally retained unfavorable positions in the ranking for this indicator. This circumstance is largely determined by the lower quality of life in most of the Arctic regions. It is a marker of the general unattractiveness of the conditions for working and living in them.

Table 3. Mortality of the population of working age (per 100 thousand population of the corresponding age)

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	2005	2010	2015	2018	2019	2020	Изменение в % к 2005 году
Чукотский автономный округ	1030,1	1328,4	865,8	954,6	801,3	853,2	17,2
Республика Карелия	1191,9	908	749,7	677,8	618,7	744,2	37,6
Мурманская область	927,9	689,6	635,4	547,8	556,2	664,1	28,4
Республика Коми	1069,3	796,6	701,1	607,7	608,3	658,3	38,4
Дальневосточный федеральный округ	1014,2	809,3	659,5	589,7	593	649,3	36,0
Сибирский федеральный округ	990,2	733,7	652,6	585,2	568,8	639,8	35,4
Архангельская область без автономного округа	1057	761,7	642,3	570,9	560,7	630,1	40,4
Ненецкий автономный округ	893,9	908,1	590	528,9	578,3	629,2	29,6
Красноярский край	970,7	699,6	621,6	583,4	550,8	624,4	35,7
Уральский федеральный округ	818,2	633,2	598,7	519,8	503,1	579,8	29,1
Северо-Западный федеральный округ	977,3	682,5	558,2	489	476,5	555,4	43,2
Российская Федерация	827,8	634	546,7	482,2	470	548,2	33,8
Тюменская область без автономных округов	795,7	654	559,4	495	463,9	538,5	32,3
Республика Саха (Якутия)	773,6	725,5	552,8	468,8	465,2	538,4	30,4
Ямало-Ненецкий автономный округ	555,2	461,7	427,7	359,9	336	441	20,6
г. Санкт-Петербург	731,8	488,8	414,2	364,5	358,3	440,4	39,8
Ханты-Мансийский автономный округ – Югра	571,5	510,3	432,3	380	360,9	432,1	24,4
г. Москва	485,4	389,3	340,7	317,4	313,5	374	23,0

At the same time, there may be a transformation of employment in the Arctic, a restructuring of the ratio of personnel needs in various sectors of the economy, which, for example, may be associated with the general transformation of the economy in the context of digitalization or with a change in the structure of the regional economies themselves, in conditions of, for example, an increased role mining industry in the GRP of the Arctic and Arctic regions.

Thus, in 2019, the mining industry accounts for 13.5% of gross value added in the Russian Federation as a whole. The Murmansk region for this year had 10.3%, the Republic of Karelia 18.8%, the Arkhangelsk region - 4.4%, the Komi Republic - 43.8%, the Nenets Autonomous Okrug - 79.2%, the Yamal-Nenets Autonomous Okrug - 71.3%, Krasnoyarsk region - 22.4%, Republic of Sakha (Yakutia) 50.8%, Chukotka Autonomous Okrug - 39.6%. At the same time, in 2010, the share of the mining industry in gross value added in the Russian Federation as a whole was 10.4%, in the Republic of Karelia - 12.8%, in the Komi Republic - 34.3%, in the Nenets Autonomous Okrug - 74.3%, in Murmansk region - 10.8%, in the Yamal-Nenets Autonomous Okrug - 61.4%, in the Krasnoyarsk Territory - 3.9%, in the Republic of Sakha (Yakutia) - 39.5%, in the Chukotka Autonomous Okrug - 7.5%. As for the

changes in the economy of the Chukotka Autonomous Okrug, they have occurred in the last decade due to the growth of the mining industry, primarily gold mining sector. The sharp rise in the mining sector in the Krasnoyarsk Territory is associated with the development of the oil and gas industry. Another important area for the Arctic macro region is the transport sector. The transport and communications industry in the Russian Federation accounted for 10.5% of gross value added in 2010, while in the Murmansk region this value was 10.1%, in the Republic of Karelia - 8.5%, in the Komi Republic - 9.8%, in the Arkhangelsk region (with the Nenets Autonomous Okrug) - 13.6%, in the Nenets Autonomous Okrug - 7%, in the Yamal-Nenets Autonomous Okrug - 8.4%, in the Krasnoyarsk Territory - 8.5%, in the Republic of Sakha (Yakutia) - 11.1 %, in ChAO – 5.4%. In 2019, in Russia as a whole, the industries “transportation and storage”, as well as “activities in the field of information and communications” accounted for a total of 10.3% of added value (7.3 and 3.0%, respectively). Wherein, similar values for the Murmansk region were as follows: 8.4 and 1.1% (total - 9.6%), for the Republic of Karelia - 9.4 and 1.6% (total - 11%), in the Komi Republic - 6.6 and 1.1% (total - 7.7%), in the Arkhangelsk region (with Nenets Autonomous

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Okrug) - 9.4 and 0.9% (total - 10.3%), in the Arkhangelsk region (without Nenets Autonomous Okrug) - 11.4 and 1.4% (total - 12.8%), in the Nenets Autonomous Okrug - 5.3 and 0.2% (5.5%, respectively), in the Yamalo-Nenets Autonomous Okrug - 4.1 and 0.4% (4.6% in total), in the Krasnoyarsk Territory - 5.2 and 1.0% (in total - 6.2%), in the Republic of Sakha (Yakutia) - 6.2 and 1.1% (in total - 7.3%), in the Chukotka Autonomous Okrug - 3.9 and 0.6% (total 4.5%). Thus, the transport component of the economies of the Arctic and sub-Arctic regions has decreased slightly overall in percentage terms over the past decade, which may be due both to the general growth of the mining industry, as well as with the lag of transport infrastructure from the development of industry as a whole. The role of the Arctic in the country's economy has grown significantly over the decade, but this has not led to a significant increase in the workforce of the mining industry in the macroregion. Thus, in the leading region of the country in terms of gas production (80% of domestic and 20% of world production in 2020) - the Yamalo-Nenets Autonomous Okrug - from 2015 to 2020, the number of workers in the extractive industry increased slightly - from 86 to 91 thousand people. Due to changes in the division of the economy into industries in domestic statistics, it is correct to compare those periods that are characterized by the same information collection methodology used, which is implemented in the Rosstat regional statistics system for the period from 2018 to 2020. The image of a successful region with a high quality of life in the Russian Federation is personified primarily by Moscow. However, as can be seen from the data presented in the table, in Moscow the share of those employed in education, social sphere and health care is lower than the Russian average, as is the share of energy workers. However, the proportion of those employed in the field of information and communications, as well as in "other" areas, is very high, which means the development of the service sector. At the same time, the service sector in the Arctic and near-Arctic regions is less staffed than the Russian average. In the western Arctic regions of Russia, the share of people employed in education, health care and social services is higher than the national average. In the Yamal-Nenets Autonomous Okrug, on the contrary, it is approaching that in Moscow. In the actively developing Arctic regions - first of all.

Over two years, on average in Russia and in most of the regions shown in Tables 5.1–5.3, the level of employment in trade has decreased (obviously, this is the influence of the pandemic), in addition, the level of employment in agriculture, forestry and fishing has fallen almost everywhere (except for the Republic of Karelia, ChAO). It is interesting that in the Yamal-Nenets Autonomous Okrug, despite the pandemic, the

share of people employed in "other" industries has increased slightly, which is obviously related to the development of the service sector. The share of people employed in ICT increased in many regions, but the greatest growth took place in Moscow, and in a number of Arctic regions, such as the Arkhangelsk region, the Republic of Sakha (Yakutia) and the Chukotka Autonomous Okrug, there was even a slight decrease in the share of workers employed in ICT. In general, therefore, the Arctic and sub-Arctic regions have very different character of personnel development, due to the structure of their economy. However, the western Russian regions and Arctic territories with large cities and relatively large populations are experiencing the opposite trends compared to the progressively developing Moscow. On the contrary, personnel trends in the Yamal-Nenets Autonomous Okrug are often similar to those in Moscow. In general, the key problems of Arctic staffing are discussed in many works and studies usually talk about, namely:

- 1) about the high level of migration from the region of the economically active population;
- 2) about the harsh climate;
- 3) more acute than in other regions of Russia;
- 4) about the general demographic crisis;
- 5) about the lack of personnel trained directly for the Arctic, including those trained at Arctic universities (which are also not enough to provide the macroregion with its own needs for specialists);
- 6) about a decrease (lack) of the optimal level of health care to ensure a high quality of life;
- 7) about the low attractiveness of the macro region for educated and competent youth, etc.

Assessing the socio-economic policy of the Arctic region, the authors include "a high level of morbidity, a decrease in the number of hospitals, small living spaces, high unemployment, and negative migration growth" in the identified imbalances in the region. The Arctic regions differ in their economic functionality, as well as in their mission to ensure the national security of the country, in their natural conditions and opportunities for integration into the life of the country. However, the general personnel situation in the region can be assessed by its migration attractiveness. This may form the basis for strategic monitoring of the personnel situation in the Arctic Zone of the Russian Federation, individual Arctic regions and territories. Of course, the measures taken in recent years have a beneficial effect on the personnel situation in the Arctic. They appeared, including in the process of economic recovery from the pandemic. Thus, in May 2021 (according to HeadHunter), compared to the same "quarantine" period in 2020, the number of vacancies in the Arctic regions increased by 65–141%. The current basis for the implementation of personnel policy in the Arctic are the results of a study by the Russian Ministry of

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Eastern Development, conducted together with Petrozavodsk State University and the Northern (Arctic) Federal University named after M.V. Lomonosov, which showed the need for labor in the Arctic until 2035 in the amount of 182.4 thousand new workers (140 thousand – within the framework of about 200 investment projects and another 42 thousand – from the surveyed 627 Arctic employers). At the same time, we note that taking into account the fact that currently in total about 1 million people work in the organizations of the Russian Federation, that in 10-15 years at least a quarter of them should be naturally renewed. 140 thousand jobs will be created as part of 198 investment projects, and another 42 thousand - within existing production facilities from 627 employers. Thus, the goal can be set not to attract almost 200 thousand new personnel, but to train about half a million workers for the Russian Arctic in the next decade. Obviously, for this it is necessary to ensure a high quality of life in the AZ of the Russian Federation. It is no coincidence that at a meeting on Arctic development in April 2022, the President of the Russian Federation emphasized the importance and priority of “solving social, economic, and infrastructure problems in this most important region” along with the implementation of large-scale investment projects in it. A special specificity of the AZ of the Russian Federation is the high “concentration” of small indigenous peoples in the macroregion. As of 2016, 82.5 thousand representatives of this category lived in the AZ of the Russian Federation (the total number of small indigenous peoples of the North was estimated at that time at 250 thousand people). However, their contribution to the economy is relatively minimal, the share of workers employed in agriculture and fishing in the Arctic and sub-Arctic regions is minimal, and it is lower than the Russian average. Let us repeat that the basis of the Arctic economy is the extraction of minerals, their primary processing, as well as the transport sector. The AZ of the Russian Federation provides a high share of the country's mineral production - 97% of diamonds, 80% of gas, 60% of oil, 90% of nickel and cobalt, 60% of copper are produced there. The Russian Arctic dominates the Arctic world in terms of its share in the total length of the coast - Russia accounts for two-thirds of it. The Northern Sea Route is extremely promising as a new global transport corridor. Since 2019, the Russian Ministry of Eastern Development has been managing the development of the Arctic. Over the past 7 years, investors have invested 2 trillion in projects in the Far East and the Arctic. rubles, created more than 104 thousand jobs. In the AZ of the Russian Federation, starting from 2021, 3 thousand people were allocated free land, and in the Far East, 103 thousand people have already received hectares. An analogue of the Far Eastern Quarter project (quality housing at an

affordable price) could be implemented in the Arctic. Within the framework of the “Children of the Arctic” program, children's holidays were paid for 6 thousand children from the Arctic regions of the Russian Federation. The Far East and Arctic Development Corporation disseminates information about work in the macroregion among applicants and students, showing the trajectory of work in the Russian North. The “Arctic Call” project is being implemented with the Ministry of Defense of the Russian Federation (attracting young people to work in the Arctic after military service). The pilot project in 2021 was implemented together with Norilsk Nickel; 3.5 thousand guys whose service life was expiring received an offer to live and work in the Arctic zone of the Russian Federation, and 40% of them confirmed their interest. In 2022, the project was expanded to cover 25 thousand people, and several dozen employers joined it. In the Murmansk region, the strategic plan “To the North!” is being implemented, formed on the basis of proposals from residents of the region. The main task is to reverse the trend of people leaving the Murmansk region. It is planned that in 2020–2023 the rate of population decline will slow down, in 2024 the situation will stabilize, and from 2025 it is expected that a gradual increase in the region’s population will begin. As part of the “Zemsky Doctor” program, 270 doctors have been attracted to the region, and the “Hectare of the Arctic” and “Governor’s Startup” programs are being implemented. In 2021, the formal migration loss decreased by 1.8 times compared to 2020. In the Murmansk region, the only territory of advanced socio-economic development in the Arctic has been created - the “Capital of the Arctic” (with preferences similar to those in the Far East - the ASEZ was created in accordance with Decree of the Government of the Russian Federation dated May 12, 2020 No. 656). By the beginning of 2022, the region had gained 3 thousand jobs thanks to this, an increase in investment was ensured by 30% (600 billion rubles), an increase in industrial production by 17%, GRP by 16%, and an increase in average wages by 29% (13% real income). Currently, the Murmansk region is among the top 10 subjects in terms of family income; the region plans to strengthen support for youth. In 2020, the region immediately began to provide an additional increase to newly arrived specialists under 35 years of age in the amount of 80% of wages. The regional project “Mom’s Salary” began to be implemented. At the same time, it should be noted that the population size of the Northern regions registered by Rosstat may differ significantly from that in reality. Thus, according to the 2021 population census, the population of the Murmansk region was 668 thousand people, which is 60 thousand less than Murmanskstat data for this year. In Karelia, as of January 1, 2022, the regional statistics body registered 603 thousand

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inhabitants, while according to the census, 533 thousand people permanently reside there. In the Komi Republic, a similar discrepancy between the census and regional statistical office data for 2021 amounted to 803 and 738 thousand inhabitants, respectively. The situation is similar in the Arkhangelsk region. In general, compared with the results of the 2010 census, the republics of Komi and Karelia, as well as the Murmansk and Arkhangelsk regions showed a population decline from 16.1 to 18.1%, becoming the country’s “anti-leaders” in this indicator. Perhaps this difference is explained by the fact that many pensioners, moving to more southern regions, remain registered in the North, despite the fact that the state has actively supported such a move in recent decades. The “Leaders of Russia” competition is also aimed at attracting personnel to the Arctic. Since 2021, the “Russia – Country of Opportunities” platform, together with the Ministry of Science and Higher Education of the Russian Federation, has been implementing the project “Centers for the Assessment and Development of

Management Competencies” to develop professional competencies (soft skills) and develop individual development trajectories. During the year, 42 Competence Centers were created in 22 regions of the country. There are centers in every federal district; their work has already covered more than 60 universities and 120 thousand students. In 2022, Rosmolodezh launched the “More than Work” project, uniting 29 constituent entities, 4 of which are Arctic territories. The project is aimed at developing industrial tourism, internships for young people at enterprises; it was planned that up to 10 thousand people would take part in it in 2022. The project “More, than travel” (together with the platform “Russia - the Land of Opportunities” and Rostourism) on more than three hundred special tourist routes. Currently, Russia and a number of other developed and developing countries are experiencing a personnel challenge, which in the domestic literature is called a “personnel blow.”

Table 4. Shares of the population of young, pension and pre-retirement age groups and assessment of the “personnel blow” to the economy in the coming decades

	20-24	25-29	55-59	60-64	20-24 / 55-59	25-29 / 60-65
2010	8,7	8,4	7,1	4,8	122,5	175,0
2020	4,5	6,1	7,1	6,9	63,4	88,4
2025	4,9	4,6	5,6	7,7	87,5	59,7
2035	6,7	5,9	6,8	6,9	98,5	85,5

Table 5. Shares of residents of different age groups in the population of the Arctic and sub-Arctic regions and the magnitude of the current and upcoming “personnel blow” to the economy

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	20-24	25-29	55-59	60-64	20-24 / 55-59	25-29 / 60-64
Россия	4,7	6,4	7,1	6,9	0,66	0,93
НАО	5,4	5,1	6,9	6,3	0,78	0,81
Архангельская область	4,6	5,3	7,3	7,5	0,63	0,71
Мурманская область	5,2	6	7,1	6,6	0,73	0,91
ЯНАО	5,2	5,9	7,4	5,2	0,70	1,13
Красноярский край	4,8	6,8	6,8	6,5	0,71	1,05
Республика Саха (Якутия)	5,9	7,7	6,8	6,5	0,87	1,18
Чукотский АО	5,6	5,7	7,8	5,9	0,72	0,97

The demands of Arctic workers are broad, they cover an increasingly wide range of problems of ensuring quality of life, which, in turn, requires personnel who will ensure this quality - workers in the public utilities sector, social sphere, education, culture and, of course, healthcare. The level of alcohol consumption by the population plays an important indicative role in assessing the quality of life. In the National Sobriety Rating (2020), most northern and Arctic regions are in the second half or at the end of the list: (28th place - Krasnoyarsk Territory, 32nd - Murmansk Region, 60th place - Republic of Karelia, 63rd place - Republic of Sakha (Yakutia), 65th - Arkhangelsk Region, 75th - Yamal-Nenets Autonomous Okrug, 80th - Nenets Autonomous Okrug, 84th - Chukotka Autonomous Okrug, 85th - Komi Republic. Thus, the personnel blow in Russia as a whole is significantly degree more pronounced (note that its greatest values occur in the central and capital regions of Russia). This leads to the fact that the Arctic regions may in the near future retain their status as a "donor" of personnel for the rest of Russia, which will further complicate the personnel situation in them. Education should be highlighted as the most important component of all categories related to human resources (primarily human resources potential). The 2004 Arctic Human Development Report emphasizes the importance of education for human development in the Arctic, but notes that circumpolar education issues have been under-researched. This paragraph makes an attempt to systematize approaches to the study of human capital in the Arctic, available in domestic and foreign scientific literature, from the point of view of the representation of the educational component in them. Problems of human resources in the Arctic attract considerable attention from researchers. These problems become especially relevant given the

prospects for the implementation of mega projects planned in strategic regulatory documents for the development of the Russian Arctic. Some researchers especially note the problem of staffing the implementation of projects for the development of the Russian Arctic shelf, and this complex task will require a significant number of specialists with both higher and secondary specialized education in working specialties. Workers with secondary specialized education are widely in demand in the Arctic regions, not only in shelf development projects, but also in solving many other problems - for example, I.S. Stephan, having analyzed the pool of vacancies, represented in the employment services of the Arctic regions of Russia, calculated that skilled workers are required for employment in more than 60% of vacancies. Moreover, the share of skilled workers in the personnel needs of the Arctic zone of the Russian Federation will only increase as the projects planned in regulatory strategic documents for the development of the Arctic territories of Russia are deployed - already now "in the forecast of additional personnel needs, 80% of the places are occupied by workers and mid-level specialists." Of significant interest is the work performed by I.S. Stepus forecast the supply of qualified workers for all constituent entities of the Russian Federation, wholly or partially included in the Arctic zone of the Russian Federation - a comparison of the personnel needs stated in strategic documents for planned Arctic development projects, on the one hand, and the projected number of graduates of secondary vocational education institutions, on the other hand, revealed significant differentiation in the projected provision of regions with personnel with secondary vocational education - from 30% in the Yamal-Nenets Autonomous Okrug to 100% in the Chukotka Autonomous Okrug. It should be emphasized, however, that the system of secondary

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vocational education in the Arctic regions is the largest, but not the only supplier of qualified workers - their number can increase due to rotational workers, migrants from other regions of Russia, migrants from abroad, etc. The distribution structure of graduates of secondary vocational education institutions as of 2021 generally corresponded to the priority sectors of development of the Russian Arctic, however, there was a disproportionately high share of humanities and pedagogical specialties, as well as insufficient (only 20–60%) coverage of the personnel needs of the strategic development priorities of the Arctic by graduates of the relevant specialties. Moreover, in some specialties important for the Arctic, institutions of secondary vocational education located in the Arctic Zone of the Russian Federation did not train specialists at all. As the main mechanisms for developing the personnel potential of the Russian Arctic in terms of skilled workers with secondary vocational education, Stepus notes “bringing the professional qualification structure of personnel training in accordance with the forecast of personnel needs of the economy, taking into account the priorities of the strategic development of the territories of the Arctic zone of the Russian Federation” and “the creation of effective mechanisms for transmitting this information, including about professions in demand in the macroregion, for all interested participants in the labor market - applicants and their parents, graduates, businesses, employers, representatives of executive authorities” The method of forecasting the level of satisfaction of future personnel needs based on a comparison of the personnel needs stated in strategic documents, on the one hand, and the projected number of graduates of educational institutions, on the other hand, was used by the authors for personnel with higher education. The results of the study showed that due to full-time graduates, the maximum value of covering the needs of the Russian Arctic for personnel with higher education will be only 30% (with a colossal range of values across regions, from 80% in the Arkhangelsk region to 5% in the Yamal-Nenets Autonomous Okrug), due to graduates of full-time and evening education – up to 65% on average in the Russian Federation. According to data for 2021, there was a significant overproduction of university graduates in economics and law in the Russian Federation. A later study by the authors found that this disproportion persisted - “with a shortage of engineering personnel and an overabundance of specialists in the field of management and services,” the Ministry of Education and Science of the Russian Federation began to reduce the target numbers for admission to universities in the region in the areas of training “Management”, “Management” and increased enrollment by technical (engineering) and natural scientific areas of training. A number of researchers have examined the state and

problems of human resources in individual Arctic regions of Russia. For example, the authors’ study in the Arkhangelsk region revealed the problematic state of such indicators as the staff replacement rate and the staff turnover rate. In another work dedicated to the city of Arkhangelsk, a conclusion was formulated about student practice as the main way to form a personnel reserve in the scientific field, as well as a way to overcome the lack of practical skills among young specialists. For Yakutia, in the early 2010s, a decrease in potential in general and a deterioration in all its most important components (in particular, the size of the economically active population and unemployment rates, including hidden unemployment) were revealed. The proposed measures to combat these negative phenomena mainly included increasing the competencies of the unemployed population (training, retraining), combining the vacancy databases of all employment centers of individual uluses, as well as reducing various barriers to firms creating new jobs. Another study on Yakutia at the same time notes that “The main reason for the lack of demand for local labor is the shortage of workers and specialized specialists in the regional labor market.” However, a later study made it possible to make significant adjustments to this statement - the Arctic regions needed mainly workers in engineering, healthcare and education, while these needs were quantitatively fully covered by applicants from these regions, enrolling in these specialties at the North-Eastern Federal University named after M.K. Ammosova. Thus, on the scale of the Sakha Republic, the problem was not the absence or shortage of specialists in these areas, but the reluctance of newly trained specialists to take jobs in the Arctic regions of the republic. Accordingly, the solution to these problems lay, first of all, in increasing the attractiveness of these regions for work. In other regions of the Russian Arctic (with the exception of the Arkhangelsk region and the Republic of Karelia), the incoming flow of university graduates as of 2021 exceeded the outgoing one, and the level of outgoing migration among university graduates generally corresponded to the all-Russian value of this indicator (30–33%). Analysis of existing interpretations of the concept of “human capital” showed that historically education is the main and decisive element in the structure of human capital. Education is the basis for the formation of knowledge and skills - human competencies - for further implementation in the labor market. Elements such as quality of life, culture and health are considered by researchers as auxiliary elements in the formation of human capital. Living in the northern territories greatly affects health, while in other territories this factor is not critical. Russian scientists, in relation to the study of the Arctic, use the concept of human capital in a number of studies and, as a rule, touches

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on such issues as the provision of qualified labor, unemployment and life expectancy of the population of the Arctic territories (note that that some works equate the concepts of human capital and human potential of the Arctic regions). The authors point out that the current goal of increasing the efficiency of using human capital in the Russian Arctic is to smooth out imbalances in territorial labor markets; socio-demographic, professional-qualification and territorial-sectoral imbalances are highlighted, as well as counteracting the negative impact of the outflow of qualified personnel. The authors also point out that the implementation of economic and infrastructure projects in the Arctic at the new stage of its development will be determined by the potential of domestic science and industry, their ability to create competitive products. The use of all other development resources depends on human capital. Continuing the analysis, the authors emphasize that “during the period of new development of the Russian Arctic, a central place in the formation of human capital will be played by the system of secondary, higher and additional education for adults, allowing future specialists to master working professions at an intermediate stage of training.

The authors note that, despite the high level of economic activity and employment, there are two serious threats to the development of human resources in the Russian Arctic territories. This is high migration and imbalance of demand and supply of labor in the regional and professional context (both in quantitative and qualitative parameters). Based on a comparative analysis and structure of teaching specialties, vocational training programs, professions based on statistics from the Arctic territories of Russia, a basic list of in-demand professions has been developed. The designated list of professions for the Arctic is the basis for adjusting the structure of personnel training, opening new specialties and areas of training, educational resources in other regions of Russia and interregional attraction of foreign and labor migrants. The authors also note that the demand for human capital in the labor market characterizes the level of employment of the population. In the Arctic regions, this indicator exceeds the national level and shows positive dynamics. The highest level of employment is in the Chukotka Autonomous Okrug (75.4%) and the Yamalo-Nenets Autonomous Okrug (74.5%), as well as in the Murmansk region (63.2%). The lowest employment rate is in the Arkhangelsk region (56.1%) as of 2018. An important aspect of studying the demand for the regional population in the labor market is the structure of employment by level of education. Thus, in 2000, the most in demand on the labor market in all regions under consideration were workers with secondary general and secondary vocational education. The structure of the employed population is completely different in 2018 - the largest share of

the labor market is occupied by workers with secondary vocational education (45%) and higher education (34.2%). On the contrary, among the unemployed, workers with secondary general education (29.4%) and secondary vocational education (39.4%) predominate. The most educated workers live in the Yamalo-Nenets Autonomous Okrug (45.8% of employed and 25.9% of unemployed), which belongs to the regions of new industrial development and is relatively more attractive for people to live in. An unemployment rate that exceeds the employment rate is typical for the population of the Arctic regions who have a lower level of education (basic general and secondary general education), as well as those who have no education.

It should be noted that although the Arctic economies are constantly dependent on resources and the public sector, globalization has brought new opportunities and challenges to Arctic communities in the new knowledge-based global economy. Northern regions can become “learning” regions that adopt and adapt innovations while developing their own economically relevant knowledge and skills based on local experience and traditions. In this regard, a development strategy based on empowering local human potential to contribute to economic development is attractive. However, the Arctic faces enormous challenges to become such a region: domestic growth is constrained by limited local capabilities (institutional, financial and infrastructural) and, most importantly, a lack of human capital. There is a conceptual argument for why human capital plays a central role in achieving sustainable economic development in the Arctic and other peripheral regions of the world. This is typical of peripheral regions that rely heavily on resources or the public sector, developing a culture of dependency that discourages local entrepreneurship and innovation, and regions are forced to follow rigid techno-economic trajectories. All of these structural conditions impede the acquisition of knowledge and capabilities necessary to achieve sustainable development in the face of the knowledge-based, hyper-competitive, globalized economy of the present (and future). The authors claim that at present, the development of intellectual capital through the creation of classical universities in Arctic cities is futile, since it requires large expenditures both in capital costs and in operating costs associated with the formation and retention of a talented team of scientific and pedagogical personnel. It seems more promising to consider the evolutionary development of vocational education institutions in the Arctic regions, the qualitative improvement of their level based on network, remote and online technologies, the development of a research base for the formation of new generation colleges “College 3.0”, which

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assumes the continuity of increasing competencies through education - research - implementation. The organization of regional innovation and technology centers based on colleges in cooperation with small and medium-sized businesses will form a favorable innovation ecosystem and will allow the use of new technologies in the interests of business and society. The undeveloped intellectual infrastructure of the Arctic regions provokes an outflow of population. On the one hand, young people who have lost contact with their small homeland prefer to stay in big cities, even having problems with employment; on the other hand, specialists from the central and southern regions come to the Arctic region on a temporary basis; they are not adapted to local climatic conditions, which entails negative social, environmental and economic consequences for the recipient region. At the same time, transaction costs associated with moving and living in a new place are increasing for both categories of the population (migrants and immigrants). To date, no studies have been conducted on the costs that organizations incur to attract specialists from other regions and the level of qualifications of these specialists. The question remains whether the attracted specialists will become patriots of the region, whether they will work with full dedication for its development or will be guided only by economic interests. A significant negative consequence of young people leaving their small homeland is the subsequent departure of their parents, which leads to the withdrawal of both human and property capital accumulated over all the years of living in the North, which reduces the economic potential of the region. So, the analyzed body of research devoted to personnel potential and human capital of the Russian Arctic, convincingly shows that the most controversial issues on the agenda in these two paradigms are very close, and some even completely coincide. The main and most discussed problems in the scientific debate for the development of personnel potential and human capital remain the disproportions between the distribution of graduates of the education system in educational specialties, on the one hand, and the structure of the labor market's needs for specialists; as well as the loss of valuable personnel and their human capital due to migration outflow. The proposed measures to combat these negative phenomena are quite diverse, however, in the context of developing personnel potential and human capital in the Arctic regions, the issues of the "northern wage gradient" and any more effective mechanisms that can replace it are practically not considered. Human resource management in the context of the socio-economic development of the Russian Arctic is objectively connected with improving the quality of human capital, which is determined by the system of higher and secondary vocational education, attention to representatives of the indigenous population and

the preservation of the unique natural complex of the Arctic with the careful development of natural resources and the creation of new transport infrastructure. Such factors can create a strategic mechanism for achieving a synergistic effect in the implementation of development priorities of the Russian Arctic. One of the elements of such a mechanism is the system of personnel training in the higher education system, which is the object of constant scientific research by Russian scientists and specialists who affirm the importance of matching the education system with the tasks of industrial development of the region, as well as the expert community - for example, the Arctic Council annually publishes a report on the state, socio-economic and demographic characteristics of human capital in the Arctic. As shown above, the shortage of personnel is most acutely manifested in the Arctic agenda, which becomes a real threat to the implementation of mega projects and national projects in the AZ of the Russian Federation, and it is this that hinders the sustainable socio-economic development of not only the Far North and the Arctic, but also the entire state. State corporations in the mining industry, transport companies, scientific and educational organizations, as well as government bodies in the Arctic regions face a shortage of personnel. It is noteworthy that, taking into account the complex and sometimes climatically extreme conditions of the Arctic and the corresponding living conditions, requiring not only to be qualified, but also psychologically and physically stable, the problem of personnel shortage cannot be unambiguously solved through the influx of specialists from other regions of the country and from foreign countries. For example, N.G. Lesser states the existence of two groups of tasks necessary to solve the problem associated with training in the interests of the Russian Federation: "The first group is ensuring the innovative nature of basic education, updating the structure of the network of educational institutions, the formation of integrated scientific and educational structures; ensuring a competency-based approach, understood through strengthening the relationship between theoretical knowledge and practical skills; development of variability of educational programs, including the creation of a system of applied bachelor's degrees. The second group of tasks is the creation of a system of continuous education, training and retraining of personnel, including: the creation of a support system for consumers of continuing professional education services; support for corporate training and retraining programs for professional personnel; creation of a support system for organizations providing continuous professional services. Analyzing the features of the Arctic labor market and training specialists in the interests of developing cargo transportation along the Northern Sea Route, the authors emphasize that training in the

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AZ RF subjects is in demand taking into account the activities of Russia and foreign countries in the extraction of resources on the shelves of the Arctic Ocean, construction of infrastructure, development SMP. The authors provide examples of partnerships at the national and international levels in the field of staffing sustainable socio-economic development of the northern territories; There is also a reasonable approach to organizing a network form of training to achieve special competencies according to professional standards.

At the same time, there are opinions about the introduction of “a training program in two specialized specialties, one of which will be in demand in the Arctic,” proposed by the authors, as well as the importance of having “the ability to perform work at the intersection of professions,” which, according to the authors, is especially relevant in the digital economy. In general, as noted, the gap between the content of training at the university and the future personnel needs of the economy should be reduced as much as possible. For the effective development of the education system in the Arctic, it is objectively necessary to both analyze the potential of educational institutions capable of training specialists to solve the problems facing the development projects of the Russian Arctic, as well as the requests of potential

employers - state corporations in the mining industry, transport companies, service organizations. So, based on the research results of A.V. Simakov, I.S. Stepus, E.A. Pitukhin compiled a list of professions, the value of which lies in its focus on professions obtained in the system of secondary vocational education, which are in demand for the general directions of development of the Russian Arctic. A significant drawback has been identified that many of these professions are not adequately trained. Researchers propose organizing international cooperation programs between universities and enterprises of the Republic of Karelia within the Barents Euro-Arctic region in order to develop advanced professional competencies among Russian graduates. The authors consider the relationship of higher education with the possibilities of implementing public policy in the North and AZ of the Russian Federation at the present stage. Among the factors preventing effective training of personnel in the Arctic regions, there is an imbalance between supply and demand in territorial and professional terms.

Let us turn to the statistical indicators characterizing the scientific, educational and innovative development of the Russian Arctic (Tables 6 and 7).

Table 6. Indicators of development of postgraduate studies in the AZ of the Russian Federation, people

	Graduation from graduate school		Graduation from graduate school with the defense of a dissertation		Admission to graduate school		Number of graduate students at the end of the year	
	2020	2019	2020	2019	2020	2019	2020	2019
Arctic zone of the Russian Federation	79	81	-	-	183	162	664	624
For reference: Russian Federation	13,957	15453	1 245	1629	27 710	24912	87 751	84265

Table 7. Indicators of development of doctoral studies in the AZ of the Russian Federation, people

	Graduation from doctoral studies		Admission to doctoral studies		Number of doctoral students at the end of the year	
	2020	2019	2020	2019	2020	2019
Arctic zone of the Russian Federation	3	2	-	1	1	4
For reference: Russian Federation	339	356	351	386	979	955

From a relative perspective, let us take into account that the population of the Arctic zone of the

Russian Federation makes up 1.67% of the population of Russia as a whole. Accordingly, the situation with

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the development of postgraduate and doctoral studies in the AZ of the Russian Federation could be characterized as positive if the indicators of the number of postgraduate and doctoral students, admission and graduation were at least not lower than this level. However, graduate school graduation rates in 2019 and 2020 did not reach even 1% of the all-Russian number of postgraduate graduates; admission rates and the number of graduate students were 2–2.5 times lower than the share of the population of the AZ RF in the population of Russia as a whole. This situation indicates a critical lag in the educational and scientific sphere of the AZ of the Russian Federation from the all-Russian one, and records the existing imbalances (which, according to the authors, must be leveled to ensure the required quality of labor resources) and dictates the need to intensify educational and research policies in the Arctic space. In particular, joint research and scientific events,

exchange of students, graduate students and doctoral students with leading Russian universities located outside the AZ of the Russian Federation seem promising. As for priority scientific areas, we agree with other authors who emphasize the expediency of the priority development of the “Arctic intellectual service.” It covers economic activities including polar hydrography, monitoring climate change and ice conditions, modernization and development of a network of ground-based and space-based satellite observations of climate and the state of Arctic ecosystems.” However, these measures may not be enough if the scientific sphere of the RF AZ is not radically restructured, its connection with various sectors of the economy is strengthened and, in particular, the demand for research results by RF AZ enterprises is not strengthened.

Table 8. Internal costs for research and development, million rubles.

	2018	2019	2020	2021
Arctic zone of the Russian Federation	4,396.2	3,545.2	4,749.6	4,896.5
<u>For information:</u> Russian Federation	943,815.2	1,019,152.4	1,028,226.1	1,134,786.7

Above, we noted the need for a qualitative intensification of scientific and educational activities in the AZ of the Russian Federation. However, qualitative measures must go simultaneously with measures aimed at increasing the quantitative indicators of the scientific sphere of the Russian Arctic - first of all, the actual number of workers

performing scientific research and development. As of 2019, the share of such workers in the AZ RF in the total number of such workers in Russia as a whole did not even reach 0.5%, that is, it was more than 3 times lower than the share of the population of the AZ RF in the population of Russia (Table 9).

Table 9. Number of employees performing scientific research and development (excluding part-time workers and persons working under civil contracts), people.

	2018	2019	2020	2021
Arctic zone of the Russian Federation	3 615	3,023	3 291	3 302
For reference: Russian Federation	722 291	707 887	682 541	682 464

It should be noted that the per capita volume of internal expenditures on scientific research and development relative to the number of workers performing such research and development was relatively lower in the Russian Federation than in Russia as a whole - 1.48 ml. versus 1.66 million. This difference does not seem to be as critical in size as the differences in other indicators characterizing the scientific sphere of the Russian Federation in comparison with Russian science as a whole. However, the fact that, with approximately

comparable per capita costs in the AZ of the Russian Federation and Russia as a whole, the Russian Arctic was able to attract only 3 times fewer workers to science than expected based on the proportional population size, indicates some inefficiency in spending these funds. On the other hand, the fact that the per capita volume of internal costs for scientific research and development relative to the number of workers who performed them was relatively lower in the Arctic Zone of the Russian Federation than in Russia as a whole, suggests that in the scientific

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sphere of the Russian Arctic the role of “northern allowances”, most likely, is very large, if it occurs at all. Let us now turn to the indicators of innovation

activity in the AZ of the Russian Federation (Tables 10 – 11).

Table 10. Share of added value of high-tech and knowledge-intensive sectors of the economy in the gross regional product of the Arctic zone of the Russian Federation (in percent)

	2018	2020	2022
Arctic zone of the Russian Federation	7.5	7.1	6.1
For reference: The share of products of high-tech and knowledge-intensive industries in the gross regional product, obtained as the sum of the gross regional products of the constituent entities of the Russian Federation.	19.7	19.6	19.3

Table 11. Number of advanced production technologies developed, units

	2018	2019	2020	2021
Arctic zone of the Russian Federation	16	18	20	23
For reference: Russian Federation	1402	1565	1620	1989

Table 12. Number of advanced production technologies used, units

	2018	2019	2020	2021
Arctic zone of the Russian Federation	7570	7719	8470	8248
For reference: Russian Federation	240054	254927	262645	242931

From the above tables 11 and 12, there is a fairly noticeable lag of the Russian Federation in terms of relative indicators of innovation activity from the all-Russian level. Thus, the share of added value of high-tech and knowledge-intensive sectors of the economy in the gross regional product of the Russian Arctic was three times lower than the all-Russian level in 2021, while in 2018–2020. showed a decrease. The number of advanced production technologies developed in the Russian Arctic in recent years has increased at approximately the same rate as in Russia as a whole; The share of advanced production technologies developed in the Russian Arctic remains approximately stable, amounting to 1.14–1.16% of the all-Russian figure. The number of advanced production technologies used in the Russian Arctic in recent years has also increased at approximately the same rate as in Russia as a whole.

Let us now consider the dynamics of the share of knowledge-intensive innovative goods, works (services) of organizations in the Russian Arctic and its individual constituent regions. In the AZ of the Russian Federation as a whole, this indicator decreased significantly in 2021 compared to 2018; the decline was due to a sharp drop in this indicator in the Murmansk region. Then, throughout 2018–2019, this indicator remained almost consistently low in the Russian Arctic with minor fluctuations. Not a single region of the Russian Arctic under consideration was

able to achieve the all-Russian level of the share of knowledge-intensive innovative goods and works (services) in the total volume of goods shipped and works (services) performed; in most cases, the regions of the AZ RF had 2 or more times lower values of this indicator. In other words, according to the effectiveness of innovation activities, created and implemented advanced production technologies, in terms of inventive activity, the regions of the AZ RF significantly lag behind the all-Russian level. So, for the full development of the AZ RF and the successful implementation of mega projects for the new development of the Russian Arctic, a high-quality intensification of scientific, educational and innovation policy in the region is necessary, promoting, with on the one hand, the integration of the Russian Arctic regions into the scientific space of Russia and sustainable and productive scientific contacts with leading scientific institutions of Russia, on the other hand, the development of “Arctic intellectual service” with specific research areas that are significant for the development of the Arctic. Features of Arctic employment and development of hard-to-reach Arctic territories have attracted the attention of a number of researchers in recent years.

- outflow of economically active population;
- harsh natural and climatic conditions;
- prolonged demographic crisis;
- imbalance in the personnel training system;

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- the decreased level of provision of public health services as a result of the “optimization” of the regional health care system;
- low attractiveness of the Arctic regions for young professionals.

By analyzing trends in changes in the personnel composition of the Russian Arctic and assessing the degree of staffing sufficiency, the study confirms the labor shortage in the Russian Arctic - already observed in one part of the regions and predicted in the immediate future for another part of the Russian Arctic regions. This shortage occurs against the backdrop of a stable or even growing demand for labor. Among the identified reasons for the observed and predicted deficit, the first place is occupied by migration outflow, which should be counteracted by the development of settlement systems and the attraction of young people for permanent residence. The authors note the need to use three approaches simultaneously - process, deterministic and functional, while noting that the components of the regional innovation complex necessarily include human resources (namely, “quality education, direct connections between educational institutions and the economy, attracting personnel (the ability to attract and retain)”), which also speaks of the importance of the efficiency of the service sector in the reproduction of human potential, which indicates that the reproduction of human capital serves as the basis for “innovative economic development ” A study

conducted by employees of Northern (Arctic) Federal University named after. M.V. Lomonosov, offers a forecast calculation of personnel requirements based on a survey of 127 enterprises/companies indicated by the Arctic regions as key employers, among which there were 50 large and large companies (Figure 4). What can we also talk about the importance of the efficiency of functioning of the service sector in the reproduction of human potential, which indicates that the reproduction of human capital serves as the basis for “innovative economic development”. A study conducted by employees of Northern (Arctic) Federal University named after. M.V. Lomonosov, offers a forecast calculation of personnel requirements based on a survey of 127 enterprises/companies indicated by the Arctic regions as key employers, among which there were 50 large and large companies (Figure 4). What can we also talk about the importance of the efficiency of functioning of the service sector in the reproduction of human potential, which indicates that the reproduction of human capital serves as the basis for “innovative economic development”. A study conducted by employees of Northern (Arctic) Federal University named after. M.V. Lomonosov, offers a forecast calculation of personnel requirements based on a survey of 127 enterprises/companies indicated by the Arctic regions as key employers, among which there were 50 large and large companies (Figure 4).

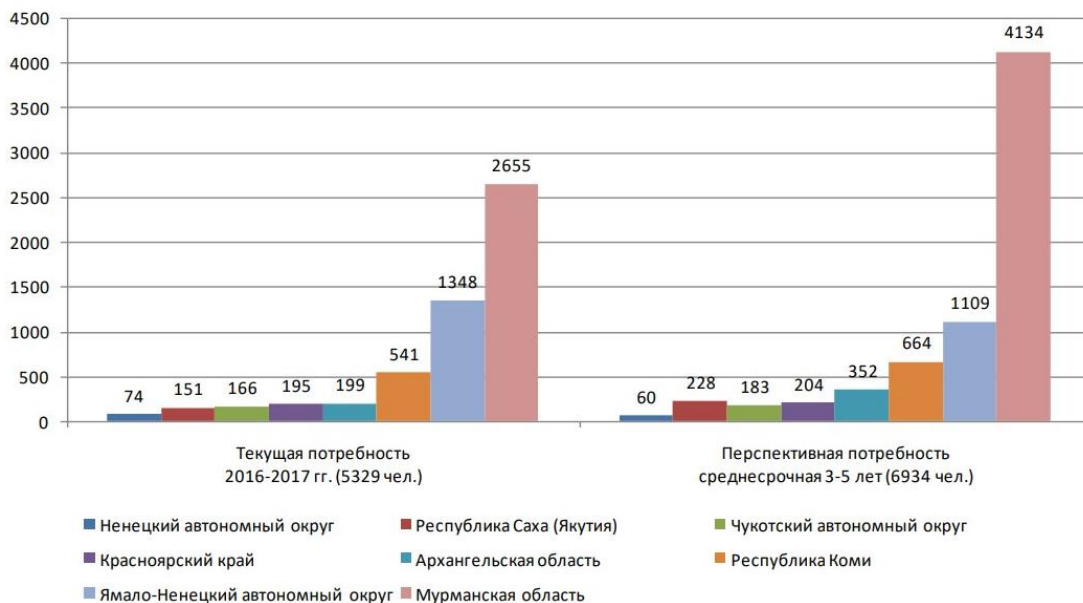


Figure 4. Assessment of personnel needs in the Arctic regions for 2016-2018. and 2019-2022

As part of the same study, 203 Russian universities were surveyed regarding the presence of Arctic programs; similar programs were present in 30 universities, most of which (24) were located outside the Russian Arctic. In total, the study counted 227

“Arctic” programs with the number of students 61,424, and 30 areas of training were a kind of “exclusive” of universities located in the Arctic Zone of the Russian Federation (see Figures 5 – 6).

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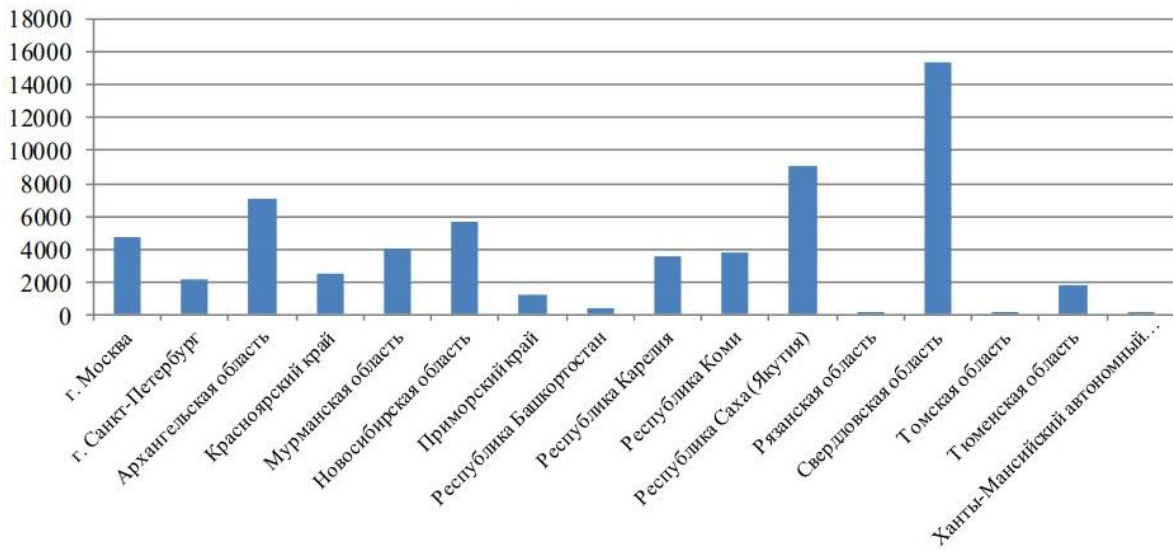


Figure 5. The number of students enrolled in “Arctic” programs in universities of various constituent entities of the Russian Federation.

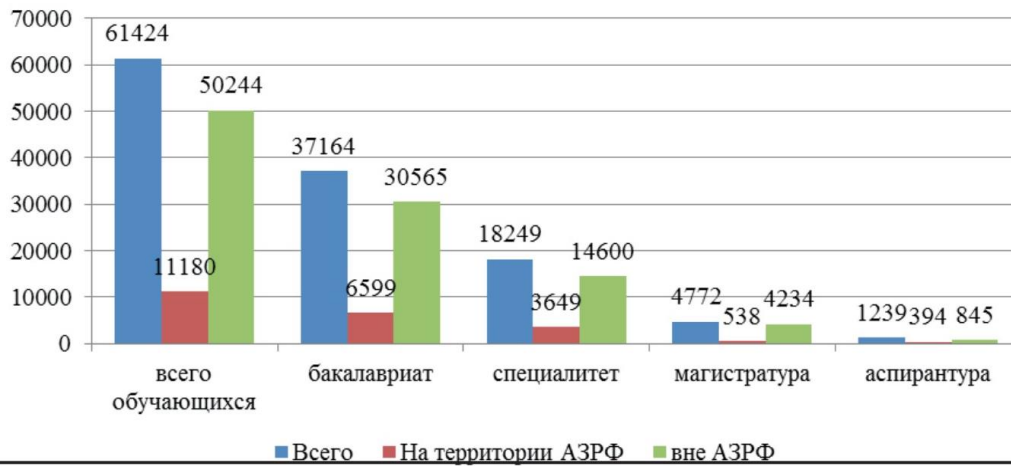


Figure 6. Number of students enrolled in educational programs with an Arctic focus at universities.

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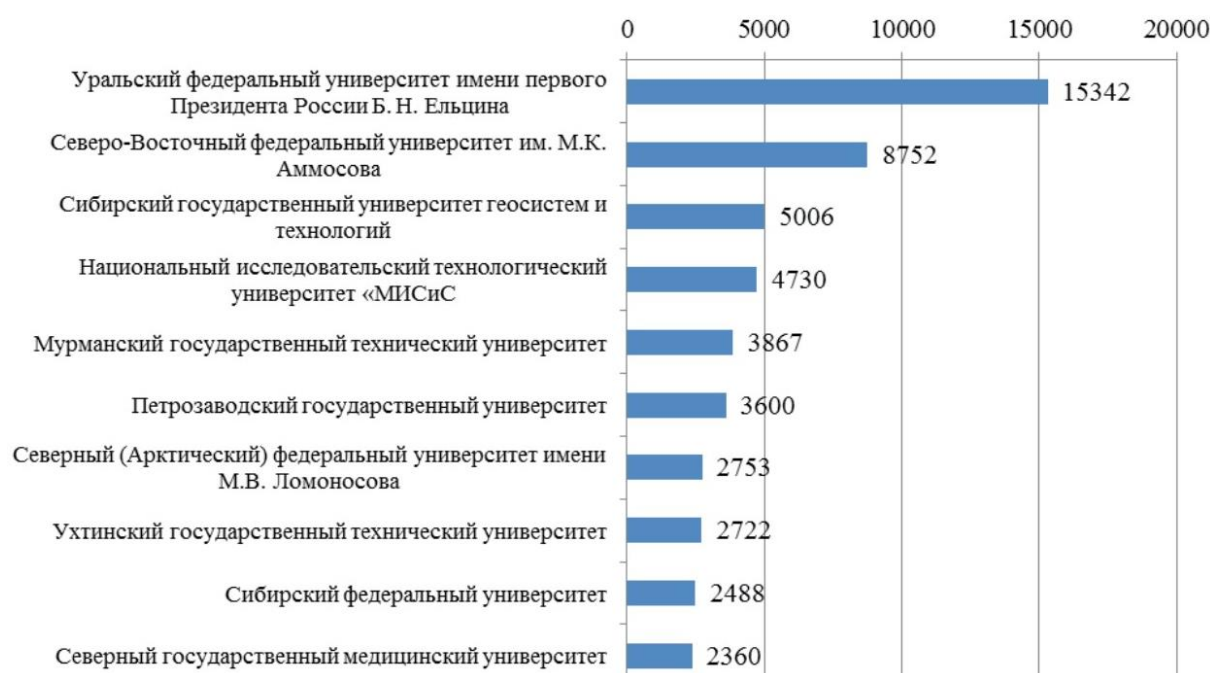


Figure 7. Top 10 universities implementing Arctic programs and the number of students enrolled in them.

In addition to a quantitative survey of “Arctic” programs, NArFU specialists monitored the trajectories of graduates of these programs. It was found that only 31% of such graduates remain to work in the Russian Federation; for comparison, among graduates of universities in the Russian Arctic as a whole, the same figure is 71%. In terms of diversification of the geography of employment in the AZ RF subjects, universities in Moscow take first place, universities in the Arkhangelsk region take the second place, and the Republic of Karelia takes the third place. The majority (72%) of “Arctic” programs are carried out by universities in cooperation with various enterprises of the Arctic Zone of the Russian Federation. The most common form of cooperation is organizing and conducting practices (73.6%), closely followed by cooperation agreements (23.3%). In addition to educational programs related to the Arctic as a whole, special mention should be made of a group of programs aimed at training personnel for “Arctic” mega projects. There were 204 of these and only 24% of the “Arctic” programs. For example, universities in the Arkhangelsk, Murmansk, Novosibirsk, Tyumen regions and Primorsky Krai are participating in offshore projects of Rosneft. As for the scientific side of the activities of universities, in the interests of the Russian Federation, research is carried out in 160 areas by 30 universities in the country (no more than 20% of the total number of universities). In terms of content, these areas are distributed as follows: “45% of research topics implemented by universities in the interests of the development of the Russian Arctic belong to the natural sciences, 41% to the technical and 14% to the humanities.”

- the lack of an effective system for monitoring and assessing the current and future personnel needs of the leading sectors of the economy of the territories of the AZ RF at the regional executive authorities of the AZ RF subjects;
- decrease in investment activity of companies in the Russian Arctic;
- negative balance of labor migration in all regions;
- extreme imbalance of the labor market, a shortage of engineering professions and a surplus of specialists in the field of services and management, which are not in such demand in the Arctic regions;
- insufficient prevalence of the organization of targeted training (only 3.4% of students in Arctic programs);
- lack of reflection in the educational programs of universities of competencies that are necessary for the successful implementation of promising mega projects.

We especially note the role of continuing education, which also requires monitoring and forecasting of the labor market. It is obvious that there are so-called popular professions of the current time on the market, and there is no reason to assume that this dependence will weaken in the future - which means that in order to understand the projected dynamics of demand for professions, it is necessary to analyze the list of development priorities for the Russian Arctic. In turn, such a forecast of the dynamics of demand for professions can become the basis for the development of regional systems of continuing education. Thus, in the study by I.S. Stepus and S.V. Shabaeva analyzed the array of vacancies of

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state employment services in the regions of the Arctic of the Russian Federation and compiled a list of the most widespread skilled professions - a total of 130 unique items. Regional lists vary depending on the specialization of the region - fishing regions, oil and gas producing regions, etc. At the same time, in the Russian Arctic as a whole, the need for personnel in blue-collar professions prevails: “the need for personnel with higher education is estimated at 6-8 thousand people annually, and with secondary vocational education – at the level of 25 thousand people.” Personnel with higher education are required, first of all, for the implementation of innovation and research projects. In particular, “There is a shortage of such very rare professions as oceanologists, permafrost specialists, cryologists, the absence of which does not allow solving pressing problems of the Arctic territories.” The availability of detailed and reliable data on the structure of personnel needs of the economies of the Arctic regions of Russia is necessary for the development of the sphere of lifelong education, including in the formats of “early career guidance” and “lifelong career guidance”. This will significantly correct the imbalance in the Arctic labor market. In their work, the authors explore the regional context set by Arctic conditions for the socialization of youth, and the implementation of life strategies of representatives of the younger generation in this context. Data were collected during a questionnaire survey in the Murmansk region in 2020–2022. Their study reveals a key contradiction between the strategic priorities for the development of the Russian Arctic and the actually observed trends in the Russian Arctic - despite the declared refusal of rotational development in favor of integrated development and attracting the population, in reality the Arctic is unable to cope with the outflow of the population. The increased economic attractiveness of the region through the Northern Sea Route and LNG projects is not sufficiently reflected in the increased attractiveness of the region as a place to live in the eyes of local youth. Macro factors that encourage the population to look for another place of residence instead of settling in the AZ of the Russian Federation can be considered extreme climate, the focal nature of the development of territories and remoteness from industrial and other centers of Russia.

The relatively high expectations of young people are met not only by these macro factors, but also by the discrepancy between these expectations in the educational and professional sphere (the latter, including in terms of expected income) of regions that are peripheral in their status. The authors see a potential solution to the problem of inconsistencies in territory branding and the creation of educational

clusters. The origin of the problem of the discrepancy between expected income and desired income may seem unclear, because throughout a significant part of the history of the development of the Soviet Arctic, significant financial incentives were provided to personnel attracted there (the so-called “northern allowances”). However, the remaining advantages in wages are currently practically leveled out by the virtually equal ratio (depending on the areas of employment) with other regions of Russia. Moreover, the current peripheral position of the Arctic regions does not allow one to reduce the motives for leaving to a financial motive alone - “the remoteness of the Arctic regions is associated with the main characteristics of the periphery, such as backwardness and stagnation, which initially sets the direction in life planning for finding a better place of self-realization.” We also note the historically weak self-identification of a significant part of the local population (of course, excluding the ethnic minority of the indigenous peoples of the North) with the Arctic territories - neither in the early USSR, when the Arctic was developed mainly through forced migration, nor in the second half of the 20th century, when material incentives and incentives were introduced for work in the Arctic territories, there was no emphasis on the formation of regional identity. It is important that modern researchers draw attention to the need to create compensation costs for the indigenous peoples of the North, which, in the opinion of O.A. Krivoshapkina, could also be aimed at developing human resources in the region. The current situation in the Russian Arctic is characterized by the need for tens of thousands of qualified specialists with higher and secondary vocational education. The above figures are consistent with the statement of the former Minister of Education and Science of the Russian Federation D. Livanov, who estimated “the average annual staffing requirement for specialists with secondary vocational education for projects in the Arctic zone at approximately 25 thousand per year.”

Now this problem is being recognized much more acutely and measures are being taken to combat it. A striking example here is the strategic plan of the Government of the Murmansk region until 2035 “Living in the North”. However, the question of how this plan relates to the actually observed life attitudes of young people remains open and requires further study. It should be noted the influence of the COVID-19 factor on the development of this area. Due to the pandemic, funding for many activities has been reduced, which increases the volatility and unpredictability of the future trend in Arctic staffing.

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Article



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**THE EFFECTIVENESS OF STRATEGIC HUMAN RESOURCES
 MANAGEMENT FOR THE SUCCESSFUL IMPLEMENTATION OF
 PROGRAM DEVELOPMENT OF THE ARCTIC ZONE OF THE
 RUSSIAN FEDERATION. MESSAGE 3**

***Abstract:** in the article, the authors analyze the need to manage labor resources for the development of the Arctic zone, since. The Russian Arctic is a strategically significant macro-region of the Russian Federation for a number of reasons, the most significant of which are colossal proven hydrocarbon reserves that can provide the country with fuel, energy and mineral resources for many years; the economic and geopolitical significance of the Northern Sea Route as potentially one of the largest transport arteries for maritime transport; as well as the significant length of the maritime border of the Russian Federation and the need to ensure its security. In the 1990s. The development of the Arctic has taken a back seat among Russian government priorities. However, since the beginning of the 21st century, regulatory legal acts regulating Russia's policy in the Arctic have allow us to talk about an ever-increasing awareness of the critical importance of this region for achieving the goals and objectives of the development of our country as a whole. Currently, we can talk about a large-scale multi-purpose mega project for the development of the Arctic - perhaps the term "redevelopment" would be more accurate.*

The largest projects included in the modern Arctic mega-project are the exploration and development of oil and gas fields (both on land Arctic territories and on the Arctic shelf), as well as the development of the Northern Sea Route. Both of these projects require a significant amount of qualified human resources - this means that the human resources of enterprises and organizations operating in the Arctic territories play an important role in the development of the Russian Arctic. However, for state corporations of the mineral resource complex, transport companies, scientific and educational institutions of the Arctic zone of the Russian Federation (AZ RF), as well as state executive authorities, there is a significant problem of a shortage of highly qualified specialists, capable of

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living and working effectively in the extreme natural and climatic conditions of the Arctic. At the same time, there is a clearly expressed need not only for specialists with higher education, but also for workers with secondary specialized education in working specialties.

For 2024, the annual need for specialists was estimated at almost 74 thousand people for the entire Arctic zone of the Russian Federation. The possibilities of meeting the existing demand for personnel "on our own" vary from one Arctic region to another, however, it is obvious that this demand cannot be satisfied only by graduates of universities located in the Arctic Zone of the Russian Federation; Additional resources are required, especially if we are talking about narrow-profile specialists in those specialties for which the universities of the Russian Federation do not provide training at all. The problem remains of the migration outflow of youth from the northern regions to study at universities outside the Arctic Zone of the Russian Federation (after which a significant proportion of young people no longer return to the Arctic, but find employment outside of it), as well as the migration outflow of graduates from northern universities, seeking employment opportunities in other regions of the country. The underdeveloped intellectual infrastructure of the Arctic regions provokes an outflow of population.

Key words: forecasting, strategizing, additional resources, Arctic zone, Northern Sea Route, personnel, training, need, graduates, specialists, reproduction, profiles, redevelopment, demand.

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Introduction

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The conceptual approach involves the preliminary development of a research concept, that is, a set of key provisions that determine the general direction and continuity of research. A concept is a certain way of interpreting any actions or actions. In this regard, in order to eliminate, or prevent, or to reduce the migration of qualified personnel from the Arctic zone of the Russian Federation, including from strongholds, it is necessary to implement a series of measures to motivate qualified personnel to show interest in their desire to provide effective and formulated goals and objectives for them, there are all the prerequisites for this, which is confirmed by their effective results of activity in Karelia and the Murmansk region.

The leaders of the Arkhangelsk region can boast of certain successes in reducing the migration of the population and qualified personnel; their decisions, together with federal and regional authorities, were the creation of a cosmodrome, which provoked an understanding among the population that everything in the region is being solved efficiently and for a long time, everything for the population so that guarantee them comfortable living conditions and high wages. Especially, this is being successfully implemented after the completion of the construction of the Arkhangelsk seaport. Based on the results of the research, the following main conclusions can be drawn:

It is shown that the personnel potential of the enterprises of the Arctic Zone of the Russian Federation represents the total labor potential of the Russian Arctic, which, in turn, is one of the key

systems of human potential. For this reason, human resource potential must be considered in close connection with labor potential. When analyzing personnel and labor potential, it is necessary to give priority attention to the role of the education system in the reproduction of personnel, since education is a key factor in the formation of personnel and labor potential;

It has been established that successful management of human resources should be based on strategic management tools, which in modern conditions should be based on systemic digital support (databases, analysis of human resources, etc.);

It is shown that insufficient attention is paid to the need to change the state employment policy in the Arctic, which has proven to be insufficiently effective. To a large extent, this policy comes down to attracting additional labor resources, although the existing labor resources may be sufficient in quantitative terms - but they do not have the required qualifications;

It has been revealed that a qualitative intensification of scientific, educational and innovation policy in the region is necessary, promoting, on the one hand, the integration of the Russian Arctic regions into the scientific space of Russia and sustainable and productive scientific contacts with leading scientific institutions of Russia, and on the other hand, the development of "Arctic intellectual service";

It is shown that digital transformation can bring significant changes to the employment structure of the Arctic population. The development of remote employment using modern ICT gives residents of the Russian Arctic significantly more employment opportunities anywhere in Russia and the world without the need to leave their place of residence.

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Such employees can and should be trained through a distance learning system, the development of which the Arctic regions should pay more attention to;

It has been established that Norway's experience in developing the human resources potential of the Arctic territories reveals the importance of such measures as initiatives to create a competitive local and regional supplier industry for the oil and gas sector; the requirement that 70% of the employed engineering and administrative potential be located in a given region; training programs and programs specifically for the recruitment of young people and government subsidies for the provision of training courses for youth up to 24 years of age and other programs for youth;

It has been shown that the personnel supply system for maritime transport is highly globalized, which poses certain problems for maintaining the level of personnel supply for the sea and river fleet in Russia due to the high gradient of wages towards work on foreign ships for high-quality Russian specialists. The problematic field of staffing for maritime transport in the Arctic and the Far East is complicated by an even more complex demographic situation in the region compared to the average Russian one;

It has been determined that, according to labor potential indices, a number of subjects whose territories are part of the AZ of the Russian Federation are likely to have a relatively stable situation in terms of economic indicators, most of them are above the median (except for the Republic of Karelia and the Krasnoyarsk Territory), as well as in terms of demographic indicators, where only the Republic of Karelia and the Arkhangelsk region were below the median - however, it should be remembered that the demographic situation seems more prosperous than it really is due to the so-called "export of mortality". To increase the labor potential of the population of the Russian Arctic, it is necessary to concentrate on innovative development, as well as on the development of education and healthcare;

It is shown that the contribution of demographic potential to the labor potential of the Russian Arctic is currently ambiguous. The most serious negative demographic manifestations that undermine the labor potential of the Arctic regions of Russia include the aging of the population and the growing proportion of the population older than working age against the backdrop of continued high mortality in working age. The migration balance of the Arctic regions of Russia is also critical for the labor potential of the Arctic, and we are talking not only about the quantity, but also about the "quality" of migrants, their human capital;

It is shown that one of the most problematic modern trends in the socio-economic development of the Arctic territories is a decrease in the absolute size of the labor force in many Arctic regions, namely in the Republics of Karelia and Komi, the Arkhangelsk and Murmansk regions, as well as the Krasnoyarsk

Territory. In the Arctic regions, along with aging, the size of the labor force may also be influenced by the migration outflow of the population, however, this influence will not necessarily be negative, since the population of working age mainly comes to the most successful Arctic regions, and the population of older ages leaves, wishing to spend their old age in more favorable conditions.

It was revealed that the experience of the Soviet Union, as well as foreign Arctic countries, indicates the success of the development of remote regions through a systematic increase in the level of their scientific and innovative potential. Currently, the trends in the number of scientific and innovative personnel (including higher education) directly in the AZ of the Russian Federation indicate an increasing insufficiency of this potential (its personnel component), which cannot ensure the economic and personnel security of the region in the long term and will affect its development;

it is shown that the personnel and demographic situation in the Arctic regions and regions with Arctic territories, associated both with problems of natural reproduction and with the outflow of population (as well as with a significant influx with a positive balance, especially for the most economically successful regions), could be called quite natural and not requiring special measures to support the human resources potential of the Arctic macroregion, however, the author has established that the level of migration (balance) depends not so much on the economy as on integral indicators of the quality of life, as well as the level of scientific and educational development of the regions of the country as a whole;

a reasonable assumption has been made that the most promising approach to the strategic management of staffing in Russia's Arctic policy will be its implementation within the framework of digital management of the personnel system of the entire country, with an emphasis for the Arctic regions on the desire to achieve indicators that determine the quality of life as central to the sustainability of their staffing management in long-term period in conditions of strategic geopolitical turbulence.

Main part

The analysis allows us to make a methodological contribution to the development of Russia's Arctic personnel policy. An important principle of such a policy must be the need to integrate it into the personnel policy of the country as a whole, otherwise the training and attraction of personnel for the Arctic can lead to imbalances in other regions that also require development. At the same time, taking into account the above proven position that human resources should be considered as a fundamental factor in the strategic development of the Arctic regions of Russia, it should be noted that Russian researchers, for example, note the possibility of using

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at least two models of human resource management, namely:

a) a model of a soft management option with an emphasis on “leadership and the effective use of communication”;

b) a model of a rigid management option with a focus on planning “quantifiable strategic and operational indicators of human resources management.”

Therefore, first of all, it is important to assess the real level of personnel shortages in the Arctic in comparison with national trends.

As is known, the needs of the Arctic regions for personnel practically “lie” on the trend line, that is, the needs of the regions of the Arctic Zone of the Russian Federation for personnel are not much different from the all-Russian pattern. Thus, it would seem that there are no special problems with Arctic personnel, based on the processes common to Russia.

A different situation for the Arctic regions appears with regard to the representation of the Arctic and Northern regions in the picture of the relationship between the level of GRP and the number of vacancies. High GRP in a number of Arctic regions (Murmansk region, Yamalo-Nenets Autonomous Okrug and Nenets Autonomous Okrug) does not lead to a significant increase in personnel requirements, which is largely the effect of the high share of the mining industry.

As the results of the authors’ research have shown, the regions of the Arctic and North that are most prosperous in terms of wages are below the trend line, that is, where wages are high, there are not as many available vacancies as one might expect. The exception is the Murmansk region. Thus, the real severity of the personnel problem in the Russian Arctic, based on the general indicators of personnel needs, is not so obvious.

The so-called subsidization or non-subsidization of a region can say little. The list of constituent entities of the Russian Federation that are not recipients of subsidies to equalize budgetary security in 2022 was approved by Order of the Ministry of Finance dated November 11, 2021 No. 49. In 2022, the list included 23 constituent entities of the Russian Federation, exactly 10 more than last year. These are: the Republic of Tatarstan, Krasnoyarsk and Perm territories, Belgorod, Vologda, Irkutsk, Kaluga, Leningrad, Lipetsk, Moscow, Murmansk, Nizhny Novgorod, Samara, Sakhalin, Sverdlovsk, Tula, Tyumen and Yaroslavl regions, the cities of Moscow and St. Petersburg, as well as Nenets, Khanty-Mansiysk (Ugra) and Yamalo-Nenets Autonomous Okrugs. It is not surprising that many territories from this list occupy leading positions in the ranking of regions in terms of quality of life. The remaining 62 constituent entities of the Russian Federation, respectively, will receive subsidies to equalize budgetary security in 2022. One of the most subsidized regions is Yakutia,

although the region has a very high level of GRP per capita. Maintaining a high population in the North is a difficult task.

The first reason: the Arctic is a large area with complex communications.

The second reason: infrastructure, which does not exist or is insufficient for the current population, which leads to an increase in the cost of almost any economic activity.

The third reason: the cost of maintaining the population in the North. It must be resolved so that the costs of developing the riches of the Arctic do not become even higher, because the complexity of the Russian social space of the Arctic reduces the degree of development of the territories.

The governor of the Murmansk region A. Chibis also speaks about the importance of quality of life in the region. “The region’s income has doubled over three years: we have the opportunity to invest this money in improving the quality of life. In all northern regions there is such a trend - people are leaving for a more favorable climate. It is impossible to turn the Arctic into a territory for shift workers; on the contrary, it is necessary to slow down the departure, reverse the trend, this is one of the important tasks. Thanks, among other things, to our additional income and investments in quality of life, in 2021 we achieved a reduction in the outflow of population from the region by 8%.” At the same time, the high level of influence of investments in human capital on socio-economic development is confirmed by calculations based on models, which integrates the formulation of development goals and applied solutions to achieve them. At the same time, In general, it is obvious that the principles of human capital management in the Arctic should differ from region to region. There are significant differences in this regard between the Murmansk and Arkhangelsk regions, the Republic of Karelia, the Komi Republic, as well as the Nenets Autonomous Okrug, the Yamalo-Nenets Autonomous Okrug, Norilsk, the Yakut Arctic territories and Chukotka.

In connection with the above, it is advisable to consider the general pattern of influence on the migration situation in the Arctic regions of various indicators of society and the economy, collected together in the Rosstat collection “Regions of Russia. Socio-economic indicators”.

As research results have shown, the relative value of the migration balance is determined both by the integrative indicator of the quality of life rating and, what is especially interesting, by the inverse “concentration” of mid-level medical workers in the regions. In all likelihood, this dependence is largely due to the relatively low concentration of medical workers relative to the vast Arctic expanses with low population densities. It can also be assumed that the higher the “concentration” of health workers, the less people get sick and are treated in inpatient settings

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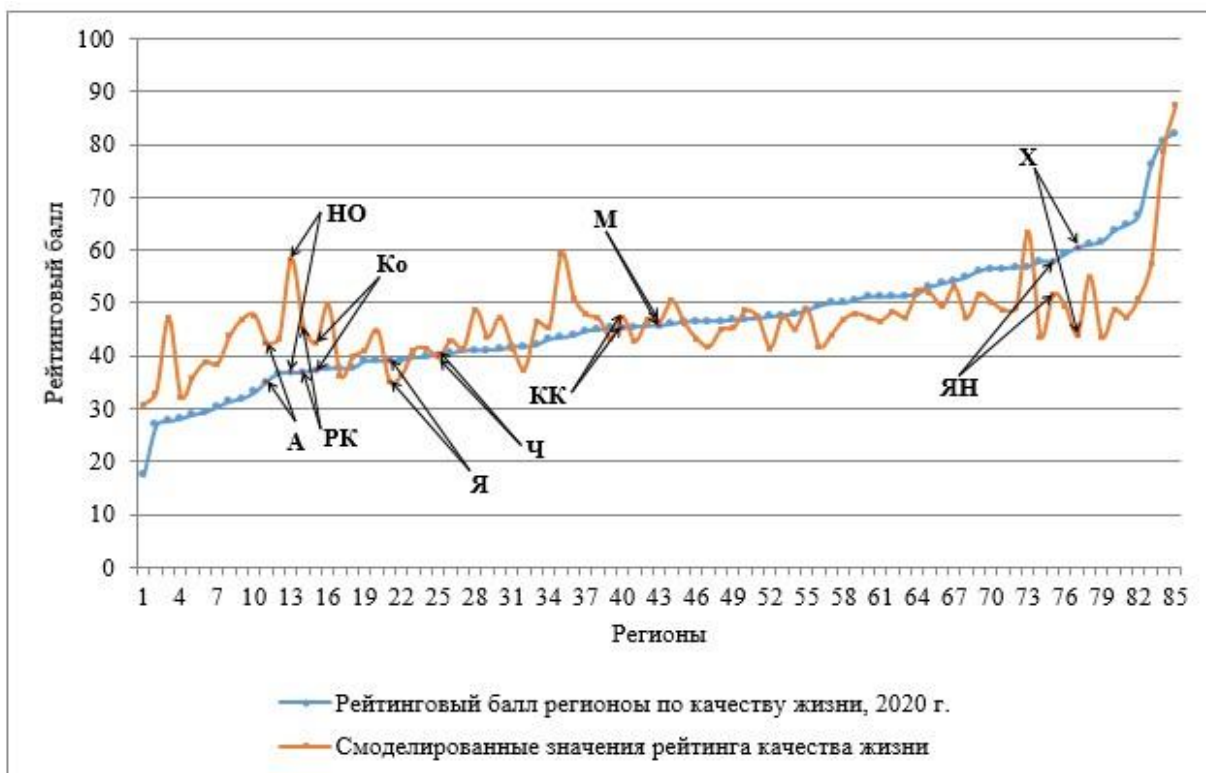
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(hospitals, sanatoriums, etc.), which, in turn, is an indicator of the level of general health of the population. Note that the number of indicators was quite extensive, but purely economic ones were not taken into account.

From the measurement results it is clear that the quality of life is positively determined by the magnitude of economic development (GRP per capita, the average January temperature, as well as the saturation of the region with scientific and educational potential. From our point of view, this conclusion is especially important for the Arctic regions of the Russian Federation.

Next, we compare the obtained rating values for 2020 with the values determined by its methodology, paying special attention to the Arctic regions of the Russian Federation.

As can be seen from Figure 1, it is the Arctic regions that have the greatest differences between the calculated rating value and its real value in accordance with the methodology. The calculated rating of the Nenets Autonomous Okrug (especially) as well as the Arkhangelsk region, the Komi Republic and the Republic of Karelia turned out to be higher than the real one, and the calculated rating of the most economically prosperous Arctic region - the Yamalo-Nenets Autonomous Okrug - was lower than the real one. In the latter case, this is due to the fact that there are few scientific personnel in the region, and in the first cases, the calculated value is “pushed up” by high rates of saturation of personnel in the scientific and educational sphere of the western territories and Arctic regions.



Picture 1. Rating score of the regions and modeled values of the quality of life rating (highlighting the Arctic and sub-Arctic regions).

To clarify the significance and relevance of the ASI rating, it is advisable to give the places of the

Arctic and sub-Arctic regions in the quality of life ratings, in the RIA rating:

15th: Yamalo-Nenets Autonomous Okrug	58.483;
38th: Murmansk region	49.113;
44th: Krasnoyarsk region	48.063;
59th: Chukotka Autonomous Okrug	42.933;
65th: Komi Republic	41.250;

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70s: Republic of Sakha (Yakutia)	39.230;
71st: Republic of Karelia	39.150;
72nd: Arkhangelsk region	37.428;
73rd: Nenets Autonomous Okrug	37.191.

Thus, the ratings are slightly different, but these differences are not significant. Both ratings coincide quite well in assessing the situation with the quality of life in the Arctic.

It can be concluded that ensuring the quality of life, which should be built both on a successful economy and on a high level of healthcare, as well as the development of the scientific and educational sphere, should be a policy priority in the field of personnel support for the Arctic development of the Russian Federation.

In general, the core of Russia's Arctic policy is to maximize the use of the resources of the macroregion and its transit potential in the coming decades. This is a natural stage in the development of the country's natural resources; the Russian economy is largely dependent on resource imports; in the Yamal-Nenets Autonomous Okrug, for example, 80% of the country's natural gas is produced and there is no way to abandon the economic use of the Arctic or even slow down its development. In the context of the most severe aggravation of the geopolitical situation in the last 30 years, it is impossible to expect Russia to comply with modern environmental imperatives in relation to the Arctic. Moreover, Arctic resources will most likely be sold in the coming decades to China, India, and other Eastern countries that are relatively loyal to the source of minerals and are heavily dependent on their supplies.

The fact that people are leaving the Arctic is a natural process, moreover, actively stimulated by the state. Is migration from a macro region an indicator of a personnel crisis? This issue seems difficult, since the emphasis on the mining and, to no less extent, transport industries does not give reason to hope that other industries will need personnel. However, demographic impoverishment leads to an increase in the costs of attracting personnel in precisely these industries, since the mono-oriented economy of the macroregion reduces its overall development.

In addition, a simple question arises: if migration is caused by purely economic reasons related to the lack of demand for personnel and natural issues of personnel transformation, then it is not necessary to raise the question of personnel problems in the Russian Arctic at all. At the same time, the general weakness of the economy, reflected in the low GRP per capita, does not threaten the Arctic - there this level is quite high, as are wages (even if the level of their gradient, directed in the community of Russian regions to the North, may be insufficient).

The conducted research, a broad measurement of indicators influencing migration, demonstrates that, in general, it is its values, along with the quality of life, that make it the most important parameter for managing the staffing of Russia's Arctic policy. High values of migration indicators are associated with problems of ensuring the quality of life in the Arctic, which, in turn, are reflected and interconnected with indicators of the scientific and educational potential of the region and the level of healthcare.

Conceptually, it is also necessary to form a digital personnel twin of the Arctic macro region, built into what is in the future a digital twin of the personnel system of the Russian economy as a whole. At the same time, we agree on the significant influence of institutional conditions that contribute to the increase in the quality characteristics of human resources. All of the above allows us to hope for the possibility of forming some optimal model of the population of a macro-region and the employment of its population by industry (note that a similar approach is presented in works devoted to the strategic development of territories, which declare the need for harmonization of industry and regional strategies, although some researchers generally exclude staffing from consideration when assessing the prospects for the development of regional mineral resource centers. In some regions, it is quite possible to rely on a rotational system with remotely provided experience economy services. At the same time, you will still have to spend money on healthcare, sports, and infrastructure. It can develop according to three main scenarios, namely:

scenario one – Arctic resources are developed more intensively than indicated in the strategic plans;

scenario two – resource development proceeds according to plans;

scenario three – there is some stagnation in the demand for resources (it may be associated with geopolitical turbulence);

For each scenario, it is advisable to have its own modeling, linked, however, in general to the personnel needs of the country. Arctic specialists need to be trained widely, providing opportunities for practice in the Arctic for almost all specialties, attracting workers throughout the country from school. The Arctic region is of enormous importance for the world in general and for the Arctic states in particular, not only due to its strategic location, which allows large trade flows to pass through it in a warming climate, but also due to its significant oil and gas reserves - a study by the US Geological Survey, completed in 2008, showed

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that estimates of conventional oil reserves in the region range from 44 to 157 billion barrels, conventional natural gas - from 22 to 85 trillion. m³; There are also reserves of shale oil, shale gas, heavy oil, gas hydrates, etc. A very significant part of these reserves are located in the Russian Arctic, including the Russian part of the Arctic continental shelf - for example, this is where 70% of all undiscovered gas reserves in the Arctic are located. A number of Russian researchers provide their estimates of hydrocarbon reserves in the Russian Arctic (including estimates of recoverable reserves). Currently, hydrocarbon production on the Russian Arctic continental shelf is carried out only at the Prirazlomnoye field, although it is adjacent to a number of promising fields, in particular, the Shtokman gas condensate field (GCF). Active plans to develop this latter field were developed in the 2000s. however, in 2012, this process was suspended for a number of reasons, including the fact that the “shale boom” in the United States made the development of the Shtokman gas and condensate field unprofitable. However, hydrocarbon reserves on the Russian Arctic continental shelf remain of the highest strategic importance. Speaking about the prospects for the development of hydrocarbon reserves of the Arctic continental shelf of Russia from the point of view of human resources, it should be noted the Strategy for the socio-economic development of the Murmansk region, adopted back in 2010 - this document, along with the “traditional” rotational method of developing the resources of the North, relied on “deserted” technologies (about such technologies in different industries). This approach had much in common with the Norwegian experience, when projects for the development of the Arctic continental shelf were developed within the framework of the Norwegian Technology Strategy for the 21st Century. Indeed, Norway (as well as Russia, Canada and the USA) can get an “increase” in its hydrocarbon reserves through the exploration and involvement in the development of natural gas fields located on the Arctic shelf. In recent years, Norway has been extremely active in this direction; One of the most important priorities is to promote the technological frontier in various areas of the oil and gas industry, since exploration and production in the extreme conditions of the Arctic pose new challenges for the sector that require innovative technological solutions. Technologies, that can “unlock” (make technologically accessible) new volumes of oil or natural gas or increase the efficiency of production processes are prime candidates for research, practical development and industrial implementation. This section of the article examines the most important challenges to the technological development of the oil and gas sector on the Norwegian Arctic continental shelf and specific innovative technological solutions associated with “unmanned” technologies used by the largest

Norwegian oil and gas company Equinor (formerly Statoil ASA) to automate technological processes. The key objective of the study is to identify the potential reduction/increase in demand for personnel in certain specialties, taking into account digitalization and the development of technological responses to those or other challenges to the development of the oil and gas industry in the Arctic continental shelf. Statoil was founded in 1972. It became the largest oil company in the Scandinavian countries. Currently, the company has more than 21 thousand employees and operates in more than 30 countries, being one of the largest offshore operators, as well as one of the largest sellers of crude oil. The company's total revenue for 2021 was \$90.9 billion. During 2021, the company produced 2.08 million boe of oil and gas daily. Technological development – including digitalization in its various aspects – is one of the company’s pronounced priorities. It can make a company’s work smarter, more efficient, safer for people and more environmentally friendly. This can be achieved through the use of sensor technologies, cloud solutions and large volumes of data; applying digital technologies to improve the efficiency of specific work processes; analysis of accumulated data sets using machine learning to make better decisions on the exploration of new fields. Having analyzed data on various technological solutions introduced by the company in recent years, we have identified those that, in our opinion, will have the greatest impact on the volume and structure of employment (as well as the need for personnel in certain specialties) during the development of hydrocarbon reserves in specific conditions of the Arctic continental shelf. Autonomous, independently powered, remotely operated systems can support and significantly improve the efficiency of a variety of routine subsea operations in the oil and gas sector. Such systems can communicate with a shore-based Support Center using a 4G mobile broadband signal transmitted through a surface-mounted buoy equipped with a 4G transmitter and receiver. By securely transmitting remotely controlled system data and transmitting high-definition video in real time via satellite or high-speed terrestrial network, the operator has full control over the system and all its instruments - also in real time. Back in the 1990s. Some of the labor of general workers in oil production was replaced by machines - in particular, hydraulic machines appeared, the main task of which was initially to connect drill pipes. Currently, these machines are gradually being replaced by more reliable and efficient electric robots. Robotization of this operation has changed the need for a worker directly on the platform - now a human handyman controls robotic handymen from a control room, rather than working directly on the well site, assembling pipes by hand. This resulted in significantly less risk for workers and reduced the number of accidents. Today, “handyman” robots

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presented on the oil and gas equipment market provide the opportunity to fully automate the drilling process. This is possible thanks to high-resolution cameras with fast image processing. The robot has a number of built-in tools that allow it to perform all tasks during the drilling process that would otherwise require manual intervention by an operator. Robots improve the safety of the human crew and the rig as a whole. According to Equinor, the entire range of operations on the rig deck (both manual and remotely controlled) can be performed by just four robots developed by the Norwegian company Robotic Drilling Systems (RDS). These robots are dynamic in performing their tasks and have no need for micromanagement. This reduces the need for human labor in the red zone on oil platforms - and therefore reduces the risk of accidents. Under optimal conditions, four robots perform tasks at approximately the same speed as human performers; under non-optimal conditions, they are ahead of humans. The development of the Valemon deposit is one of the special projects which Equinor is currently operating on the Norwegian continental shelf. The field, whose hydrocarbon reserves are estimated at approximately 192 million barrels of oil equivalent, is located in the North Sea approximately 160 km west of Bergen and is being developed using a separate platform. Due to the presence of high pressure and high temperature conditions in certain parts of the field, Valmont is a complex field. The most innovative aspect of the development of this field is the design of the platform - it is a stationary platform on which no maintenance personnel or technical specialists are expected to be present. It is the first offshore platform in Norway to be controlled entirely remotely by operators onshore (in Bergen). Back in the first half of the 2000s, Statoil began to develop such a promising area as automated control of the well drilling process. In 2005, the first version of the DrillTronics system appeared; in 2008 it was field tested on the Staffjord C platform; In 2014, DrillTronics was fully deployed on this Staffjord C platform and successfully participated in the drilling of multiple wells, reducing the average time spent drilling one well, improving drilling safety and automating many repetitive process steps. Work on the development of automated control of the well drilling process is actively continuing at the present time. Equinor engineers were involved in the development and field testing of a wireless intelligent post-drilling well completion system, which allows long-term monitoring and control to improve production management by wirelessly connecting the user from a desktop computer to the downhole component of the system. Equinor and Microsoft have entered into a strategic partnership agreement. As part of the agreement, Equinor will provide industry knowledge and business needs to support Microsoft in developing new solutions for the oil and gas industry. Microsoft, for its part, is providing expertise to

accelerate the development of Equinor's IT infrastructure and the company's new data centers. The partnership with Microsoft enables Equinor to accelerate the development of fit-for-purpose IT services within the energy industry and enables a faster transition to the cloud. Effective use of the cloud is a prerequisite for transforming the energy industry towards a digital future. In less than a year, Equinor adopted the Microsoft Azure cloud. In parallel with the digital transformation of its activities, Equinor is actively increasing the volume of digital skills, knowledge and competencies among its personnel, having already conducted more than 150 thousand digital training sessions. In total, the digitalization of the company's various activities on the Norwegian continental shelf is expected to reach approximately \$3 billion by 2035. The growth in available sources of information in the oil and gas industry requires new efficient methods of accessing data from end users, whose ability to analyze data lies in basis for making business decisions. Data analytics can suffer from end users' insufficient ability to effectively integrate data distributed across many different sources. Current centralized approaches, in which IT translates the requirements of domain experts into upload-transform-load processes in order to integrate data and apply a predefined set of analytical reporting tools, are too heavy and inflexible. To support interactive data exploration directly by subject matter experts without the participation of IT specialists, a more flexible and modular information systems architecture is needed. At Equinor, such a system is the Optique platform, which significantly reduces the time and cost of accessing data, automating the process of converting an information request into a search for relevant data. At Equinor, the Optique platform integrates multiple large and complex data sources and allows geoscientists and geoscientists to query detailed subsurface information directly into existing expert client tools, as well as web portals to easily disseminate information from a central location throughout the enterprise.

Equinor (then Statoil) established a new onshore integrated operations center (IOC) in 2018 that will help improve safety, increase value-added generation and reduce emissions from installations on the Norwegian continental shelf. "The creation of the center contributes significantly to our ambition to become a global leader in digital technology. This will enable us to optimize production and better anticipate support needs, ensuring optimally efficient and safe operations at our producing fields. The center will be important in advancing work to improve workflow on the Norwegian continental shelf and delivering added value to Statoil, our partners and society," said company CEO Eldar Sætre. The Bergen center integrates the company's technical support centers and condition monitoring centers located in various parts of Norway. The Integrated Operations Center aims to

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make data available in a more user-friendly format, supporting the organization of offshore operations through better decision support. IOC will help ensure that field production is optimally efficient at every point in time, eliminating bottlenecks through diagnostic monitoring of current conditions. Instruments are currently being developed that will transmit real-time data from offshore sensors. These tools will help you conduct a detailed analysis of the mining process and equipment activities at the installations. One of the center's important goals is to identify and prevent operational failures.

digitalization of work processes. Many areas of the complex hydrocarbon production process involve repetitive, manual tasks. Digital solutions can reduce the time spent on non-value-added tasks (such as searching for data or moving information from one system to another);

advanced analytics. The oil and gas industry generates large volumes of data. As of August 2021, Statoil/Equinor data centers stored 28 petabytes. Using data analytics and machine learning, understanding of many important issues can be improved;

robotics and remote control. Taking into account the trends of recent years, it seems possible to safely say that in the near future, an increasing expansion of the use of robotics and remotely controlled technological solutions for various physical and mechanical processes is expected. Automated drilling, drone inspection and completely unmanned fields are just a few examples of how digital solutions can be used to improve employee safety, add value and reduce a company's carbon footprint.

Summarizing the experience presented above, we can assess the prospects for staffing Russia's development of hydrocarbons on the Arctic shelf as follows. It seems appropriate that Russia's preparation for the development of hydrocarbon deposits on the Arctic continental shelf should have the development of "unmanned technologies" as one of its priorities. These technologies, coupled with the digitalization of work processes in general, will improve the safety of industry workers and partially mitigate the impact of extreme Arctic conditions on work processes, however, for their successful implementation it will be necessary to anticipate some structural changes in the needs of oil and gas production in personnel of various specialties.

Trends in recent years allow us to speak with a fair degree of confidence about the displacement of human personnel who provided monitoring and control of the condition of various objects during the development of oil and gas resources of the Arctic continental shelf, by complex intelligent systems that monitor and control in real time due to the continuous receipt of operational data from a variety of sensors and sensors. At the same time, the role of personnel capable of acting as operators and dispatchers of such

systems is increasing. Moreover, there is an increasing need for IT personnel capable of developing such systems, including those involving the Internet of Things, cloud analytics, artificial intelligence and machine learning on high-resolution data. The direct participation of human resources as performers of technological processes is reduced to a minimum, but at the same time the need for personnel who set the initial algorithms for such processes and carry out remote control over their progress and troubleshooting if necessary increases. The infrastructure of the Arctic transport system, its modernization and development are defined as strategic priorities of the state policy of the Russian Federation in the Arctic. A key element of the Arctic transport system is the Northern Sea Route (NSR). According to Federal Law No. 132 of July 28, 2012, the NSR water area is understood as "... the water space adjacent to the northern coast of the Russian Federation, covering internal sea waters, the territorial sea, the contiguous zone and exclusive economic zone of the Russian Federation and limited from the east by the maritime demarcation line with the United States of America and the parallel of Cape Dezhnev in the Bering Strait, from the west by the meridian of Cape Zhelaniya to the Novaya Zemlya archipelago, the eastern coastline of the Novaya Zemlya archipelago and the western borders of the Matochkin Shar straits, Kara Gate, Yugorsky Shar" (Article 5). In addition to the water area directly related to the NSR, it is adjacent to the vast territory of Russia with such large rivers as the Northern Dvina, Pechora, Ob, Yenisei, Lena, Yana, Indigirka, Kolyma. These river highways form a single system of waterways, connected in the north by sea. The Northern Sea Route is one of the main, and in many ways the only, transport corridor for the movement of goods in the Arctic regions of Russia. Developed logistics is extremely necessary for the large-scale development of Arctic resources and the socio-economic growth of the Arctic macroregion. The history of the desire of Russia, and before the USSR, to develop this route can be dated back to the Kara expeditions in the 1920s, and then the founding of the Directorate "Glavsevmorput" under the government of the USSR (in terms of its status, responsibilities and rights, this Directorate was equal to the ministry) in 1932. It seems logical to count the development of the NSR precisely from 1932, since, in addition to the founding of the Glavsevmorput Directorate, it was in that year that the NSR was crossed in one navigation by a Soviet expedition.

Since the 1930s. Polar aviation was actively developing, a new icebreaker fleet was being built, the Northern Navy was being created and developed, ports and polar stations were being built, geological and hydrographic surveys were carried out. In the period after the Great Patriotic War, a number of large oil and gas fields were discovered in the Soviet Arctic. In the 1980s proposals for a transition from "local"

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development of the Arctic to comprehensive socio-economic development of the Arctic territories once again increased the importance of the Northern Sea Route and raised the question of the need to ensure its year-round operation. However, the collapse of the USSR significantly slowed down the development of the Northern Sea Route, reducing the scope of its functioning to individual random flights by the end of the 1990s.

A new wave of interest, including commercial interest, in the NSR is associated with climate change that has directly affected the Arctic. According to the National Snow and Ice Data Center in Colorado (NSIDC), in July 2018, the Arctic was covered with 5.7 million km² of ice, and in the first two weeks of August, the area of ice cover decreased by 65 thousand km² every day. First of all, global warming is most actively manifested in the Arctic, which is gradually losing permafrost and glaciers in area, warming up twice as fast as the rest of the planet. Scientists at Newcastle University in northern England estimate that the ice has been retreating by about 10% every 10 years over the past 30 years. This is also reflected in shipping - according to experts, by 2030, the waterways of the Northern Sea Route will be ice-free 6 months a year, and then ships can sail year-round without the need for icebreakers. At the same time, already now, from approximately July to October, with the help of experienced pilots and icebreaker support, commercial vessels can sail in the Arctic seas, although previously only powerful nuclear icebreakers could do this. Statistics on cargo transportation along the NSR confirm the theses defined above - if in 2010 their volume did not even reach 1 million tons, by 2018 it increased by an order of magnitude - to 10.7 million tons, and by 2021 it almost doubled to 18 million. t. In 2025, the annual volume of transportation, according to planned contracts, should increase to 75 million tons. As for the commodity structure of transportation, in 2018 the following distribution took place: 8399 thousand tons of liquefied gas (LNG), 7810.5 thousand tons of oil, 805.4 thousand tons of condensate, 290.8 thousand tons of coal, 43 thousand tons of ore, 2340.1 thousand tons of general cargo. According to the Federal Agency for Maritime and River Transport of Russia, the volume of cargo transportation is increasing due to the fact that it is provided by real economic needs - transportation of LNG, coal, increased gas and oil production, northern delivery through the Arkhangelsk transport hub. In 2019, the tonnage of transportation along the Northern Sea Route amounted to 31 million tons, and in 2020 - 32 million tons. The main growth since 2018 has been observed in liquefied natural gas. If in 2018 its volume in transportation along the NSR was just over 8 million tons (before that its share in transportation was very small), then in 2020–2021 it approached 20 million

tons. From 2014 to 2017, growth was mainly driven by oil.

The lion's share of LNG supplies in 2022 was carried out to Europe, only a small part of liquefied gas went to Asia (only in September and October 2022 did deliveries to Asia equal supplies to Europe). LNG went to Europe mainly to the ports of France, Belgium, the Netherlands, Spain and the UK. LNG supplies to Asia were carried out mainly to China and to a much lesser extent to Japan and Taiwan. Oil and condensate are transported mainly from the Novoportovskoye field. Iron ore accounted for 78% of the volume of transit traffic along the NSR. In 2022, the volume of transit traffic along the NSR exceeded 1 million tons (previously it reached such values in 2011–2012), while more than 90% of them were carried out from west to east, and not from east to west. It should be noted that this excess has always occurred in the last decade, i.e. China and other Asian countries are still weakly involved in the development of the NSR. The Northern Sea Route remains, as before, essentially an internal Russian transport artery. However, statements by the Chinese side about their intention to direct up to 15% of foreign trade in the next 10–15 years (which is more than \$350 billion) through the NSR suggest a significant increase in the efficiency of using this route. China already ranks second after Russia in cargo transportation along the Northern Sea Route.

In accordance with the master plan for the implementation of the “Strategy for the development of the Arctic zone of Russia and ensuring national security for the period until 2035,” mechanisms for accelerated economic and social development of the Arctic territories and a regulatory legal framework for the functioning of the special economic regime of the Arctic zone should be developed in 2020–2025.

Already at this first stage, it is planned to use a certain new model for the implementation of economic projects on the continental shelf, actively develop the Northern Sea Route, build a number of ships, modernize the energy infrastructure of the Russian Arctic (including ensuring the transition from diesel fuel to LNG), stimulate scientific research as part of the creation of a state system for monitoring and preventing the negative consequences of permafrost degradation; intensify international cooperation, including scientific and technical cooperation, in the development of the Arctic.

The second stage of the Strategy implementation covers 2025–2030 and is designed to ensure a significant increase in the competitiveness of the Russian Arctic economy through the introduction of a new special economic regime and investment. Year-round navigation in the Arctic should be ensured, taking into account the new fleet of ships, a communication infrastructure of the Northern Sea Route and the Arctic as a whole should be created within the framework of a highly elliptical space

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system for “obtaining hydrometeorological data of high temporal resolution for the polar region of the Earth”; New technologies must be created and put into operation, including robotic, unmanned and portable equipment, ensuring both an increase in labor productivity and an increase in the safety of production activities.

At the third stage of the Strategy implementation (2031-2035), it is actually planned to complete the transformation of the region’s economy with the formation of a highly efficient, environmentally friendly, transport-supported industrial complex of the Northern Sea Route, ensuring profitable oil and gas production (including offshore), processing (LNG, petrochemicals) and transportation (NSR, pipelines) of products to external markets and domestic consumers with minimal negative impact on the environment. Among the most important national tasks for the period until 2025, outlined in 2018 by the President of Russia, is the task of achieving 80 million tons of cargo transportation along the Northern Sea Route. However, in 2035, only 10 million tons are “strategically reserved” for transit cargo. This somewhat contradicts the idea of the Russian Arctic as a future transport corridor of global importance. Transport development of the Arctic is of great importance for the transportation of oil and gas products. In addition, the development of transport is of great importance for ensuring food security in the Arctic macroregion, including from the point of view of the sustainable development of modern agriculture and the formation of sustainable food systems. The Strategy for the Development of the Arctic Zone of Russia and Ensuring National Security until 2035 sets the task of organizing training and retraining of personnel in terms of personnel needs of the Northern Sea Route. The most in demand are “specialties for manufacturing and mechanical engineering, mining, and various types of engineers. Also in demand areas of activity are: social, transport, education and communications.” The emergence of new technical and technological complexes related to the development of the Northern Sea Route will obviously require retraining of personnel and the search for new qualified personnel, for which A.P. Isaev and I.A. Fomina proposes the development and active use of professional standards for various specializations, which become the main tool for regulating the balance of graduates and their employment. A separate acute problem is the training of highly qualified researchers to create an up-to-date fundamental and practical knowledge base on these technologies. The strategy provides for the formation of a cluster of scientific and educational centers, ensuring the development and application of new progressive technologies; A number of priority research areas have already been identified at the Strategy level. Additional research will also be required to increase NSR freight traffic. It is

appropriate to recall here that at the initial stage of development of the NSR, during the existence of the “Glavsevmorput”, under the head of this organization there was a division whose tasks were the selection and distribution of personnel, “all specialized and administrative and management departments, research and development” were accountable to him. –construction organizations, interdepartmental bureau of long-term ice forecasts, etc.” The training of personnel for the development of the Soviet Arctic was actively carried out by the Hydrographic Institute, which opened in April 1935, and in 1945. transformed into the Leningrad Higher Arctic Maritime School, as well as a number of polytechnic schools in the country. In the 1950s at the level of the leadership of the USSR, a decision was made on the advisability of abandoning the mobilization approach to the development of the North and emphasizing policy in this area on efforts to secure the population and qualified personnel, and since the 1960s. this desire was actively realized. However, in the 1990s. “The economic and social situation in the Russian Arctic has sharply worsened. The state and local governments were unable to cope with a series of problems. Sea ports and infrastructure were left to the mercy of fate”; There was a colossal outflow of personnel to the “mainland.” Now, according to the government plan for the development of emergency services, staffing the successful functioning of emergency services is allocated to a separate group of tasks, within the framework of which the Ministry of Eastern Development, together with the Rosatom Corporation, should study the personnel needs of shipowners transporting goods along the NSR, and on their basis calculate the state order for personnel training; for their part, the Ministry of Education and Science and the Ministry of Education must ensure the training of the necessary personnel.

The staffing of ports connected to the NSR is extremely important. It is currently “the weakest point in the Arctic shipping system.” According to the representative of the Legislative Assembly of the Primorsky Territory L. Talabaeva, “for the international transport corridor within the Northern Sea Route to become an impetus for development for the Far Eastern region... At the initial stage, up to two thousand sailors will be required to work on high-tech ships, gas carriers that will have to work in difficult conditions of the Arctic on the Northern Sea Route. To prepare them, we will need highly qualified teachers and a qualified educational base, which is being created with the participation of the state. There is also a shortage of personnel at shipbuilding and ship repair yards.” The shortage of such personnel may worsen significantly in the coming years, given the fact that that it is planned to build additional ships to transport investors’ products along the Northern Sea Route, and for such construction, in turn, it is planned to create new shipbuilding centers (for example,

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Rosatom and the United Shipbuilding Corporation are preparing to locate a cooperative shipyard for large-tonnage shipbuilding in the Leningrad region on Kotlin Island). The authors note that the construction of new Arctic ports will lead to the fact that “the total length of the berthing front can be tens of kilometers. To implement such large-scale projects, polytechnic education in courses in the design and construction of water transport infrastructure will be a key task for universities and design organizations.” Official estimates of the personnel needs of the NSR have not yet been developed - according to the government plan for the development of the NSR, the Ministry of Eastern Development and Rosatom must submit them only by the end of 2023. However, it is possible to calculate estimates (which, of course, are only very preliminary, “rough” in nature) based on a comparison of the cargo turnover of sea ports of the Russian Arctic with some foreign ports. The cargo turnover of Russian seaports in January-November 2022 increased by 0.6% compared to the same period last year and amounted to 768.2 million tons. The cargo turnover of the Arctic seaports “amounted to 89.9 million tons (+3.7%), of which the volume of dry cargo transshipment amounted to 26.8 million tons (-0.1%), liquid cargo - 63.1 million tons (+5.4%). Cargo turnover of the ports of Murmansk amounted to 51.2 million tons (+1.7%), Sabetta - 25.9 million tons (+2.1%), Varandey - 5.4 million tons (+27.9%) and Arkhangelsk - 2.2 million tons (27.7%).” A large OECD survey study found that on average there are 800 jobs per million tonnes of port throughput - a finding based on a comparison of more than 150 studies of individual ports, with two-thirds of these studies producing estimates ranging from 200 to 1,500 workers places for 1 million tons of cargo. However, as noted by D.V. Martynov, “This number includes jobs associated with the port, both directly and indirectly, and should be interpreted with caution as it is based on port impact studies that use different definitions of ports and apply different methodologies.” According to another OECD study, which looked at 560 regions in 10 European countries, an increase in port capacity of 1 million t leads to an increase in employment in the port region by 300 people for every million of the region’s labor force (and subsequently up to 7,500 people, if we take into account not only direct, but also indirect employment in the port sector). At Russian Arctic ports, employment rates relative to cargo turnover are likely to be somewhat lower than these average figures if the share of liquid cargo continues to be significant - the need for personnel to handle it is relatively small, since the majority of such cargo is loaded and unloaded via pipelines.

Training of personnel for the Northern Sea Route (as well as other areas of intellectual development of the Russian Arctic) is specialized for the North-Eastern Federal University named after M.K.

Ammosov in Yakutsk (established in 2007) and for the Northern (Arctic) Federal University named after M.V. Lomonosov in Arkhangelsk (established in 2009), which implement, among other things, “programs on hydraulic, industrial and civil construction, construction of roads and airfields, new building materials and technologies for the North, etc.” However, of course, the training of personnel necessary for emergency medical services is not limited to these two universities. An analysis of Russian university enrollments made it possible to identify more than 10 universities, leading the training of specialists in the bachelor's degree "Hydraulic Construction" and the specialty "Hydraulic Construction of High-Responsibility Structures" are polytechnic and technical universities, and construction and transport universities. It should also be mentioned that since 2016, the National Arctic Scientific and Educational Consortium has been operating, uniting 14 scientific and educational organizations, including federal universities, for cooperation in the field of training personnel for Arctic projects (mainly in master’s programs in areas related to hydraulic engineering construction of ports and structures inland waterways), including for the Northern Sea Route. However, the requirements for staffing EMS are not limited to professional specializations alone - psychological preparation (psychological endurance, the ability to act competently in emergency situations and survive in difficult climatic conditions) and health indicators (for working in the extreme climatic conditions of the Far North) are also important. To identify and attract such workers, career guidance and special internship programs can be extremely useful - such as, for example, the cadet program of the Federal State Budgetary Educational Institution of Higher Education "State University of the Sea and River Fleet named after Admiral S. O. Makarov." Some experts believe that the training of Arctic personnel should begin in secondary educational institutions (through, for example, career guidance not only by employees of such educational institutions, but also enterprise specialists; a particularly significant synergistic effect can be achieved with the involvement of representatives of leading state corporations, resource extraction, manufacturing and transport companies operating in the Arctic). Maritime transport and its infrastructure play an extremely important role in the development of the Russian Arctic; further strategic prospects for the development of the Russian Arctic are associated with it. Russia has ambitious plans to develop its maritime trade, while there are obvious personnel problems in maritime transport, which, naturally, cannot develop without adequate staffing, including the most important “layer” of managerial and scientific and technological personnel. The development of the Northern Sea Route as one of the new transport arteries of global importance is closely

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related to the solution of personnel problems in maritime transport in Russia and the Arctic as a whole. The outflow of specialists from Russia for maritime transport is on a significant scale, which, however, is difficult to accurately assess, since, for example, most of the Russian sailors work under a foreign flag. There are problems with university education, employment, wages, labor safety, retraining, career guidance - in all areas of the industry's personnel system. In general, the pace of development of the Russian fleet and its needs is outpacing the capabilities of the educational system and encountering demographic difficulties. Reducing the need for personnel through automation and digitalization, the development of unmanned maritime transport only increases the requirements for the qualifications of specialists, which makes solving personnel problems in maritime transport even more difficult. Currently, Russian maritime transport is showing good growth rates following the growth of port transshipments. At the same time, in the context of a significant increase in Russia's maritime trade turnover, the issue of providing maritime transport with its own personnel acquires the scale of a national security problem. This issue is important not only for Russia - the creation of a sustainable shipping sector is important for the development and growth of the global economy as a whole. Despite the current global economic downturn, demand for transport services will continue to grow over time. but the provision of this demand with a qualitatively and quantitatively adequate supply of human resources is by no means guaranteed. Certification and supervision of seafarers are regulated by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, adopted in 1978 (amended in 1995, 2006 and 2012 as part of the so-called Manila Amendments). Currently, more than 1.5 million people work in the maritime transport sector. If the global economy continues to grow, more trained and skilled workers will be needed. Related activities such as shipbuilding, ship repair and ship recycling will also have increasing human resource requirements. If the global fleet grows by 70% between 2015 and 2030 (as generally predicted based on growth trends over the past five decades), the number of naval officers is expected to increase from 500 thousand to approximately 850 thousand, if in this case, half of the current naval officers will retire, and a total of 600 thousand new officers will need to be recruited and trained during this period. This corresponds to the annual need for officers of about 40 thousand people.

It is no exaggeration to say that the safety and security of life at sea, the protection of the marine

environment and more than 90% of world trade depend on the competence of seafarers, largely determined by their level and quality of education and training. Indeed, according to the literature on the subject, many maritime disasters were caused by mistakes that could have been easily avoided. According to statistics, 75–96% of maritime accidents are due to human error.

The “cost” of such an error can vary significantly for different cargoes. Thus, about 50% of the world's oil is produced by sea. Considering that throughout the history of the transportation of petroleum products, numerous accidents have already been recorded, some of which led to real environmental disasters, the International Maritime Organization has developed a new set of strict rules and regulations to ensure safety. The new specialized curriculum lists learning objectives and target competencies to be achieved upon completion of the course. Safe and reliable transport is essential to the smooth functioning of global trade.

According to Gosmorrechnadzor, there has been a critical increase in accidents at sea: from 2014 to 2017, their frequency doubled, from 45 to 84 cases, for merchant ships - from 36 to 49. The number of very serious accidents increased 8 times! - from 1 to 8, for merchant ships - from 0 to 5. The most difficult situation is in the fishing fleet - the number of accidents has increased from 9 to 35. At the same time, however, the accidents of ships are very rarely to blame for their age, 90% of accidents are human factor. It turns out that the reason for 90% of accidents lies in the fact that small (mostly) shipping companies operating on very old ships with low salaries cannot attract highly qualified workers; they are unattractive for an experienced sailor. The most qualified personnel go to foreign companies, often under the flags of other countries.

This problem is directly reflected and most acutely manifested in the regions of the Arctic and Far East that are rapidly developing in terms of transport, remote from central Russia and having harsh climatic conditions. Since the beginning of the new millennium, the cargo turnover of Russian seaports has increased almost 5 times, its maximum value was in 2019 - 840.3 million tons. The throughput capacity of Russian ports has increased 2.5 times over 15 years: from approximately 452 million tons in 2004 to 1.13 billion tons in 2019. By 2025, this figure should reach 1.3 billion tons. Growth has been uniform throughout the two decades. Only in the pandemic year of 2020, cargo turnover decreased slightly - by only 2.3% compared to the same period last year, amounting to 820.8 million tons (Figure 2):

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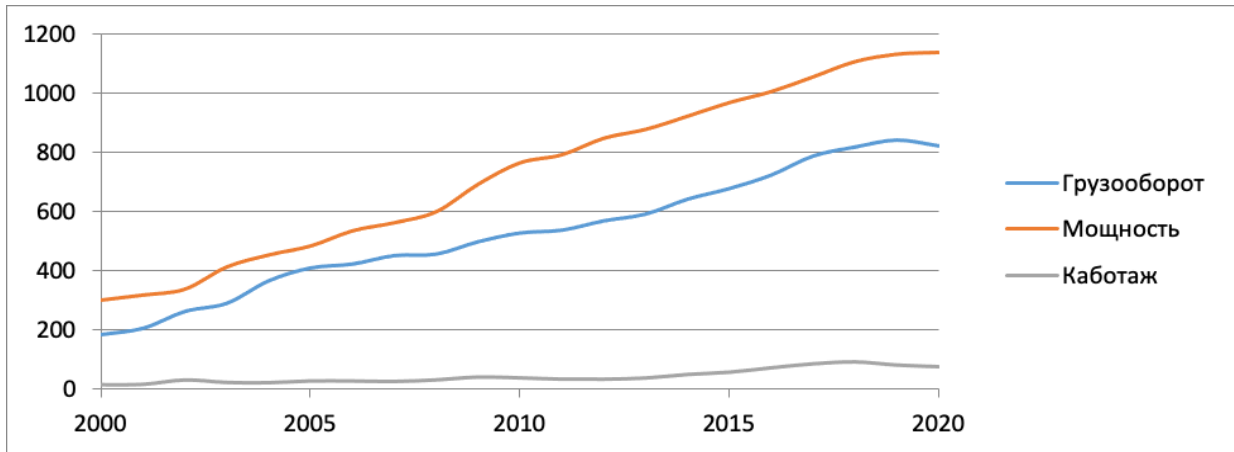


Figure 2. Freight turnover, throughput and volume of cargo turnover of coastal (inland) transportation of sea port facilities in Russia (from 2000 to 2020).

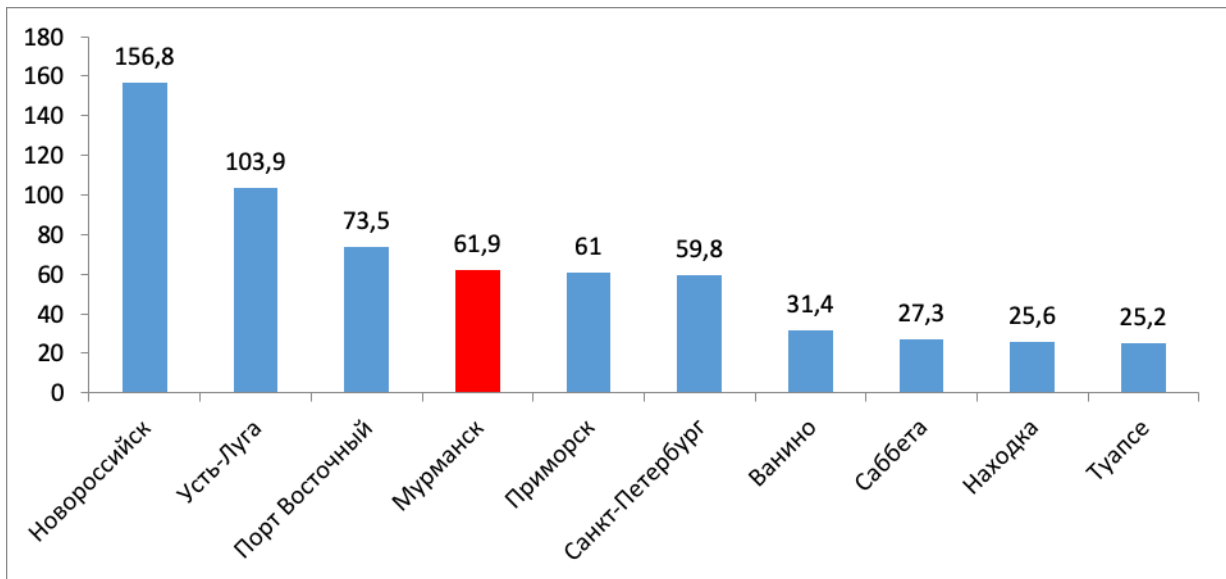


Figure 3. 10 largest Russian ports by cargo turnover, 2019

Murmansk is the largest city in the entire world Arctic and the largest seaport in the Arctic basin; its cargo turnover in comparison with some other Russian seaports is presented in Figure 2. In general, the cargo turnover of the seaports of the Russian Arctic in 2020 amounted to 96.0 million tons (a decrease of 8.4% compared to the previous year 2019), dry cargo - 30.1 million tons (-4.9%), liquid cargo - 65.0 million tons. The pandemic led to a decrease in cargo turnover in almost all Arctic ports: Murmansk - 56.1 million tons (-9.3%), Sabetta - 27.8 million tons (+0.5%), Varandey - 4.9 million tons (-31.8%), Arkhangelsk - 3.3 million tons (+22.4%). At the same time, as we noted above, by 2025 it is expected that the throughput capacity of Russian ports will reach 1.3 billion tons. At the end of the last decade (2018) the Azov-Black Sea basin was in the lead in terms of cargo volume

(33.3% of the total volume), the Baltic basin accounted for 30.2% of the total volume, the Far East - 24.6%, the Arctic - 11.3%, the Caspian Sea - 0.6%. The raw material bias of the cargo turnover of Russian ports, however, does not impede the development of container cargo turnover, which, it should be noted, is developed to a lesser extent. Container transshipment in 2018 amounted to 5.1 million TEU.

The development of cargo turnover is associated with an increase in the efficiency and capacity of Russian maritime transport, especially in intensively developing regions. In 2018, cargo transportation by sea under the Russian flag amounted to 23 million tons, and cargo turnover - 45 billion ton-km. The supply of goods to the regions of the Far North and similar areas in 2018 in the total volume of goods shipped amounted to 6.6 million tons (an increase of

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124.2%). The volume of passenger transportation by sea in 2018 amounted to 7.5 million people.

In general, at the end of 2019, the cargo turnover of Russian seaports increased by 3%, exceeding 840 million tons, and the capacity of seaports by the beginning of 2020 reached 1.13 billion tons. The cargo turnover of the ports of the Arctic (by 15%) and Far Eastern (by 6.5%) basins increased. At the same time, the volume of cargo transported by sea under the Russian flag has decreased. The decrease by 2018 was 12% (to 32 million tons), which is explained by Rosmorrechflot mainly by the transfer of cargo to land modes of transport after the commissioning of the Kerch Bridge. According to the Central Research Institute of the Maritime Fleet, the maritime transport fleet controlled by Russian companies as of February 2025 includes the fleet of Russian shipping companies registered under the Russian flag of Russia - 1176 ships, with a total deadweight of 7.7 million tons, under foreign flags - 247 ships with a total deadweight of 14, 7 million tons. The total number of vessels in the maritime transport fleet managed by domestic companies is 1,423 vessels, their total deadweight is 22.4 million tons, of which 65.7% of the tonnage operates under foreign flags. Since 2019, the number and tonnage of ships have increased slightly: +2% in number of ships and +3.0% in deadweight. In total, according to the Russian Maritime Register of Shipping, there are 425 shipping companies in Russia, including 71 companies (17%) with sea vessels. Meanwhile, back in 2019, the Russian Ministry of Transport initiated a campaign to transfer the domestic fleet under the Russian flag. It is proposed to oblige the export of up to 50% of cargo by ships registered in

the Russian registry, today this is only 12 million tons of cargo per year - and this is less than 2% of maritime exports. At the same time, Gazprom asked the Ministry of Energy to identify cases when it is possible to use ships under foreign flags to carry out certain technical operations in the Arctic. Within the framework of the Northern Sea Route, there is a permitting procedure for the navigation of vessels. In 2018, the Federal State Budgetary Institution "Administration of the Northern Sea Route" issued about 800 permits for ships to navigate within the Northern Sea Route, of which about 100 were foreign. The Arctic basin is thus developing largely thanks to the domestic fleet.

Since the beginning of 2019, Russia has had amendments to the Merchant Shipping Code prohibiting the use of ships under a foreign flag to transport goods (including oil, gas and coal) in the Arctic along the Northern Sea Route, as well as cabotage. These measures were taken by the Russian Ministry of Industry and Trade to support Russian shipbuilding. Gazprom asks the Ministry of Energy for exceptions to this rule in cases where the required type of vessel under the Russian flag is not available at all.

At the same time, as already noted, Russia has created the Russian International Register of ships that sail under foreign flags, but maintain contact with Russia, which is a kind of compromise for the use of "flags of convenience."

Table 1 shows the number of different types of vessels in Russian maritime transport.

Table 1. Maritime transport: number of sea vessels as of the end of 2021

	2005	2010	2018	2019	2020	2021
All sea vessels	3574	2779	2760	2718	2717	2726
Including						
Oil tankers	310	311	430	407	397	397
Other liquids	20	22	18	18	19	17
Oil and oil ore carriers	44	32	24	18	15	14
Ore and bulk carriers	31	20	13	12	9	6
For general cargo	811	620	533	505	545	541
Cargo-passenger	9	9	13	15	16	12
Container, barge carriers, dock carriers	13	8	10	10	10	11
Fishing bases and fishing vessels	84	38	26	22	20	20
Fishing	1455	932	843	820	818	832

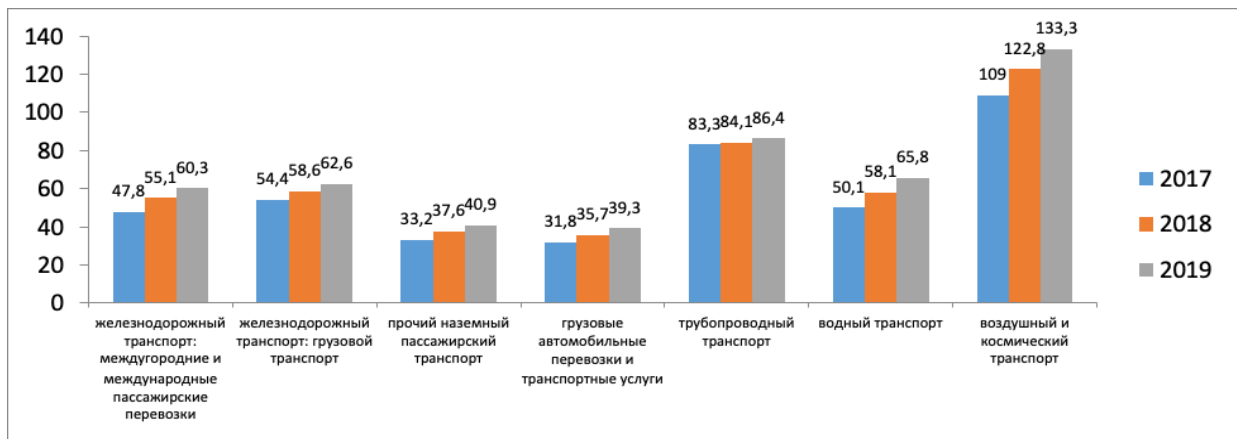
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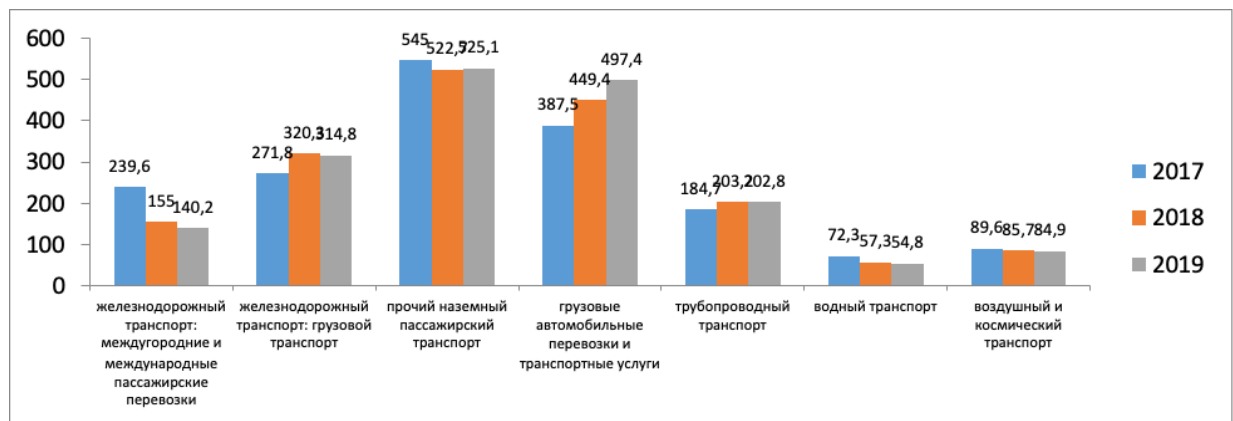
Passenger and passenger non-berths	51	47	42	39	38	37
Support vessels serving vessels	27	36	42	49	46	45
Tugs	272	312	338	370	363	369
Dredgers	16	16	14	17	15	14
Icebreakers	26	34	31	33	32	32
Research	77	73	75	74	72	68
Others	328	269	308	309	302	311

From the data in Table 3 it can be seen that for all types of ships there was a decrease in their number (despite the fact that the process of updating the ship fleet is underway with an increase in its tonnage). At

the same time, the number of workers in water transport in Russia is declining, and wages in the industry are growing (Figure 4).



A)



B)

Figure 4. Salaries (in rubles) of specialists in various transport sectors of Russia (A) and their number (B) in 2018–2021.

At the same time, there is a growing need for the development of domestic maritime transport, which is also associated with an increase in the throughput and cargo turnover of Russian ports. The Russian port industry consists of more than 900 complexes in 67 seaports of the country, their total capacity exceeds 1

billion tons. By 2025, according to the Comprehensive Plan for the Modernization and Expansion of Trunk Infrastructure, the throughput of Russian seaports will increase by 338 million tons. In our country, sea transport ensures the transportation of about 60% of export cargo. Thus, the growth of port

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cargo turnover in the context of the growing importance of national security issues in Russia will inevitably lead to an increase in the need for domestic maritime transport and its personnel, but the number of this personnel has been declining in recent years. An important aspect of national maritime policy is the development of a training system for seafarers. Twenty years ago, problems with personnel appeared: the number of qualified sailors has decreased, the motivation of young people to master maritime professions has decreased, the scale of maritime production has decreased, many specialists in maritime affairs have retrained and gone to work in other economic sectors.

The industrial education system currently has five subordinate universities, including 24 branches. About 6,000 people work at universities, of which the teaching staff of universities is 3,000 people, including 350 doctors of science and 1,030 candidates of science. The graduation rate of specialists in 2017 amounted to 10,964 specialists. By the beginning of 2022, a total of about 55,000 people were studying in higher (HE) and secondary vocational education (SVE) programs, of which 33,700 people were studying on a budgetary basis.

Based on the results of the 2022 admissions campaign, 4,400 people were admitted to study at the expense of the federal budget: under secondary vocational education programs. – in swimming specialties; 85 people – in coastal specialties. in HE programs: 3940 people. – in swimming specialties; 785 people – in coastal specialties. To implement work of an organizational and educational nature, the Maritime Federal Resource Center for Additional Education of Children (MFRC DEC) was created in 2020.

The main thing in the process of training specialists is the formulation of industry standards. Thus, in 2021, 13 industry-specific profs were developed. standards. For swimming specialties of higher education, three federal state educational standards of the 3rd generation, 60 exemplary programs for training and advanced training of crew members of inland navigation vessels have been approved. More than 6 thousand people work at universities, almost 3 thousand are professors and teachers (1.3 thousand - with academic degrees of Candidate of Sciences and above). A reserve of management personnel is formed annually. For 2021, in addition to universities, institutions subordinate to Rosmorrechflot included 4 enterprises and 38 other organizations (8 seaport administrations, 15 inland waterway basin administrations, 10 other organizations).

Thus, if we proceed from the current number of workers in Russian maritime transport (about 50 thousand people), then with the average possible work experience of a professional specialist being 30–35 years, the current output of maritime transport

specialists is 5–7 times higher than the future needs of Russian maritime transport. This suggests that not all graduates are employed in their specialty and go to work in Russian maritime transport.

The strategy for the development of maritime activities notes both the lack of its own personnel and “the insufficient level of provision of scientific and pedagogical personnel, the development of the laboratory, educational and methodological base of educational organizations that train specialists for the field of maritime activities.

The shortage of workers in the industry in the middle of the last decade was estimated at 13 thousand people. At the same time, the total number of seafarer passport holders in Russia is estimated at 168 thousand people, of whom at least two thirds work under the flags of other states. The peculiarity of maritime education is that a diploma from any country is recognized in the navy of a foreign state. A crew member of a foreign ship receives from 4 to 8 thousand dollars a month. Flags of convenience: Panama, Cyprus, for their owners fees and taxes are minimal. On domestic ships, earnings are several times lower. It is proposed to solve the problem field comprehensively through career guidance. However, this work can also be done for foreign companies. Moscow State University named after Admiral G.I. Nevelskogo, the only one in Russia, trains personnel in personnel management in the maritime industry. Personnel marketing usually begins with an analysis of the external environment. As a rule, businesses prefer to hire a ready-made specialist from outside, reducing the cost of training young people. At the same time, a feature of the global labor market in the maritime industry is cheap labor from Asian countries, which competes through social dumping.

There are difficulties in implementing the Bologna process in Russia. The fact is that secondary education in the European Union takes 12 years, the last years are devoted to career guidance. Thus, in reality, a European bachelor's degree lasts 5 years, and until 2011, a bachelor's degree in Russia was almost equal to a specialist's degree. As a result, the middle management level in Russia suffers, since, according to established requirements, bachelor's degree graduates are equal to graduates of colleges and technical schools. In this regard, we can conclude that the current two-level system “bachelor - master” is not able to meet the personnel needs for engineers and middle managers, or rather, creates obstacles for this. In this regard, it is possible to propose a modernized structure of higher education within the framework of the Bologna system. It is proposed to strengthen practical, technological training in bachelor's degrees, while maintaining the basics of management, and divide master's programs into 2 profiles: engineering and technology and management. PAO Sovcomflot, wholly owned by

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Russia, has, unlike many non-state companies, a sufficiently qualified workforce with good salaries.

Cadets and trainees of maritime universities undergo sailing practice on ships of the Sovcomflot group of companies, and the most promising graduates are selected for further work. At the same time, in 2020, 166 cadets from maritime universities and 21 trainee sailors and motor mechanics completed sailing practice on the company's ships. If the number of employees of an enterprise is divided by the approximate number of years of professional activity, the result will be (35–40), that is, the number of young people is far from sufficient for simple personnel reproduction. The Sovcomflot group of companies works with personnel, promotes the professional development of personnel, obtaining additional education, studying modern technologies, and training employees in master's and postgraduate programs. Optimizing ship personnel by reducing the number of ship crew members has a negative impact on the safety of navigation. The legal requirements for crew composition are not met, which often happens on small ships with crews of less than 15 people, and even more often with crews of less than 8. The change in the personnel needs of Russian maritime transport over the past 15 years can be traced by changes in the ship and personnel composition of Sovcomflot. . Currently there are 146 vessels with a total deadweight of 12.6 million tons. As of December 31, 2022, the fleet of the Sovcomflot group of companies includes 144 vessels with a total deadweight of 12.44 million tons, the number of personnel is about 7.8 thousand (53 people per vessel and 619 per 1 million deadweight tons). In 2012, the fleet included 157 vessels with a total deadweight of 12 million tons with a staff of more than 9.3 thousand people. (59 people per vessel and 775 per 1 million deadweight tons). As of 01/01/2006, the fleet consisted of 50 vessels with a total deadweight of 3.95 million tons, the total number of personnel was about 3 thousand people. (60 people per ship and 759 per 1 million deadweight tons). Thus, there is a clear tendency to save human resources with an increase in the deadweight of individual vessels. All this makes it difficult to solve personnel problems in maritime transport in the interests of Russia and, in general, poses challenges and threats to its security. There are problems in the scientific organization of labor. Often, seafarers unofficially admit that there is a double recording of working time on ships: one - real, the second - for regulatory authorities. It is very important that from the beginning of 2000 to the present, the number of accidents due to fatigue of navigators has been increasing. The most surprising thing is that the introduction of conventions, designed to improve safety, increased the paperwork load of seafarers and worsened the situation. This was mainly due to poor labor organization. In 2020, the number of inland navigation vessels was 30.4 thousand, their average age was 37 years, and their total deadweight

was 9.7 million tons. The systems managed by FSUE "Rosmorport" are kept in good technical condition, certified by the relevant authority and effectively perform their functions. The strategy for the development of sea port infrastructure until 2035 involves a significant strengthening of the industry's human resources potential. There will be a shift to on-demand learning. It is expected that specialists from the educational sector will be involved in the process of planning the development of the industry. The Comprehensive Plan for the Modernization and Expansion of Trunk Infrastructure for the Period until 2025 also pays great attention to personnel issues. The relatively good personnel situation at FSUE "Rosmorport" is explained by the growth of cargo turnover in Russian ports and the organization's assets. Thus, the income of FSUE "Rosmorport" from port dues in 2019 amounted to 19,759.3 million rubles, the target was met at 102%. According to the current program of the FSUE "Rosmorport" event, a lot of attention is paid to personnel. It is planned to introduce professional standards as they are approved by the Russian Ministry of Labor on the basis of the Plan for organizing their application at the enterprise (the entire period from 2019 to 2025). It is important to increase labor productivity and quality of services, which is impossible without improving the qualifications of personnel, events for the exchange of experience among employees, including all-Russian and international ones, internships for students of specialized educational organizations in departments and branches of the enterprise.

At present, there is practically no Russian commercial fleet as such. There are Sovcomflot structures (less than 10 thousand employees), and two or three other large companies with a stable personnel situation. The remaining Russian companies are, for the most part, small firms with two or three obsolete ships. The personnel shortage is only partially filled by employees from Belarus and Ukraine, but in general, mostly pensioners work in Russian companies and on research vessels. There is an acute problem of personnel shortage in many categories of specialties. This problem is especially noticeable among enlisted personnel on ships of the icebreaking and service fleets.

The bulk of deliveries to and from Russia come from foreign fleets, which leads to colossal budget losses. Charterers do not take the risks of transport on old ships, so they turn to foreign ones. At the same time, a foreign flag does not provide sailors with the protection of Russian legislation, to say nothing of qualified personnel work. The USSR had a huge fleet. Now the domestic fleet is registered more in foreign jurisdictions. At the same time, ship owners support the requirements of the ministry only if the requirements for the use of the Russian flag are reduced. Shippers themselves note that they are confident that they will have to export products

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through other countries. The level of direct and indirect influence of the transport industry in the Arctic and Far East on the economy is significantly higher than the Russian average. The transport industry as a whole has a higher level of wages compared to the regional average, which ensures the operation of a “personnel pump” that acts on both residents of the region and migrants, attracting and retaining the most active in the port industry and directly related areas and able-bodied workers. Trade and services related to the port industry are developing. However, there is also the effect of redistribution of resources and personnel in favor of the transport sector, as a result of which the development of the region as a whole can lead to certain imbalances, giving negative effects on the construction sector, the social sphere, foreign trade and hindering the innovative development of the region. An important addition to the description of the situation is the fact that the industries directly related to the region’s science, which is quite developed compared to the average Russian level (mineral resources development, fishing), find themselves isolated from the transport industry, which is leading in terms of level and pace of development, which generally affects one of the most important indicators of the region’s development – its level of innovation. the reproduction of maritime transport personnel depends on the personnel needs of the relevant labor market, the number of youth cohorts ready to study at universities and other vocational education organizations, and the capabilities of the educational system to accept and graduate trained personnel; these circumstances form the basis of the problem field for maritime transport personnel in Russia in general and the Arctic in particular, including the uncertainty of long-term plans for the development of maritime transport, a demographic situation unfavorable for personnel reproduction in general, as well as problems of the organizations themselves engaged in training the relevant personnel;

- The personnel supply system for maritime transport is highly globalized, which poses certain problems for maintaining the level of personnel supply for the maritime and river fleet in Russia in general and the Arctic in particular due to the high gradient of wages towards work on foreign ships for high-quality Russian specialists. The problematic field of personnel support for maritime transport in the Arctic and the Far East is aggravated by the even more complex demographic situation in the region compared to the average Russian one, i.e., a relatively low proportion of young people with a high educational migration to the central regions of the country and the development of other types of population migration, not giving the region the opportunity for rapid innovative development due to the permanent shortage of personnel in recent decades. At the same time, the progressive

development of port capacities and cargo turnover in the region is mainly associated with an increase in the need for low-skilled labor, since this cargo turnover is largely associated with the transshipment of Russian coal. In addition, the problems of maritime transport in the region are complicated by the uncertainty of the prospects for its development, as well as in Russia as a whole, tied to the situation in the commodity markets. In recent years, there has been a trend towards a decrease in the quality of personnel training for maritime transport, determined through such an indicator as the accident rate, which indirectly reflects not so much the state of the personnel training system as a whole, but the quality of the training (and teaching) contingent itself; this phenomenon is associated with the outflow of personnel most capable of maritime activities to other industries; and the quality of the student (and teaching) population itself; this phenomenon is associated with the outflow of personnel most capable of maritime activities to other industries;

There are general trends in optimizing personnel requirements in the domestic fleet by increasing the deadweight of ships and the level of automation of their management, to a limited extent (for the transportation of export cargo, first of all, this can provide significant benefits) contributing to the solution of personnel problems in maritime transport. However, without a long-term program to improve the efficiency of maritime transport management and the adjustment of this trend to the raw materials transportation sector, the positive effect on the personnel system will be very limited.

Thus, with the number of professional seafarers in the country being approximately 160 thousand, it can be argued that organizations are preparing workers “more than” exceeding the required number for simple reproduction in a scenario of no growth in personnel needs in terms of the number of workers. Perhaps an adjustment should be made taking into account the share of only swimming specialties, it will be approximately 62% of the graduation rate, that is, 6.2 thousand people of potential future sailing personnel, which, given their expected service life in the fleet, is not even 40, but 30–35 years, will also ensure easy reproduction. At the same time, no one anywhere measures the drain of personnel to other areas of the national economy, which complicates our measurements of the personnel system.

- formation of a system for strategic planning of the personnel needs of Russian maritime transport, based on long-term forecasts for the development of exports, construction and acquisition of ships, expansion of port capacities, preparation of relevant strategic and program documents;

- increasing the level of scientific support for personnel training, as well as the intensity of scientific activity in the field of maritime transport on the basis of relevant universities and research centers;

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- increasing the flexibility of the personnel training system for maritime transport (for example, in the Arctic and the Far East, increasing the level of interaction between leading universities in the region, up to their merger with the possibility of any students receiving maritime specialties as additional ones);

- increasing the level of attraction of schoolchildren from the interior regions of the country into maritime professions through early career guidance with benefits for studying at specialized universities;

- increasing the level of digitalization of the educational process, developing distance educational, educational, and career-oriented programs;

- the formation of career guidance and pre-university training programs for migrants promising in maritime professions (relevant for the Arctic and the Far East), attracting promising foreigners to work on Russian ships;

- introduction of a system of restrictive measures for Russians to work for foreign maritime transport companies immediately after graduating from universities;

- increasing automation of control, increasing the deadweight of Russian ships, which may lead to a decrease in personnel requirements for maritime transport.

The economic effect of the implementation of the proposed management solutions is to increase the efficiency of the process of training and working with them, which will contribute to solving the strategic problems facing the maritime transport industry. We can expect a reduction in accident rates by 3–5 times, optimization of costs for training specialists, ensuring growth in income from the port industry and its development as a whole; One can also expect an indirect effect on the economic efficiency of maritime

transport by improving the quality of its human resources. The personnel problems of Russian maritime transport are obvious. From a structural point of view, each link of the relevant personnel system has problems. At the same time, the personnel system that provides a particular industry depends on the demand for services or goods in this industry. That is, if it is planned to ensure the development of the Russian maritime industry due to the growth of income from it, then the personnel problem, it seems, should be solved “by itself.”

In addition, the general demographic dynamics directly in the Arctic and the Far East have negative trends. Programs to attract personnel to the Arctic and Far East show only relatively weak success. There is no necessary wage gradient in the region. The need for personnel is mainly in the port industry - for the provision of stevedoring services in the coal industry. This mainly requires low-skilled personnel. Staffing of shipbuilding and ship repair enterprises remains problematic. In general, the development of maritime transport under the Russian flag can be ensured by foreign ships, but this is not profitable for foreigners. Therefore, no one will voluntarily go to Russian sea transport. At the same time, not displaying the Russian flag is unsafe for possible sanctions. Thus, solving the problems of staffing Russian maritime transport in the Arctic and the Far East is in the context of the need for comprehensive solutions to the personnel problem in the Arctic and the Far East as a whole. The only prospect for solving the problem is to increase the tonnage of ships, increase the level of digitalization - automation of the process of managing them, which will lead to a decrease in the number of personnel in maritime transport and will open up opportunities for increasing wages.

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Article



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CLUSTERS – SPECIAL ECONOMIC ZONES (SEZ) – TERRITORIES OF PRIORITY SOCIO-ECONOMIC DEVELOPMENT (PSED) – SUPPORT ZONES OF DEVELOPMENT (SDA) – COMPREHENSIVE PROJECTS FOR THE SOCIO-ECONOMIC DEVELOPMENT OF THE ARCTIC ZONES OF THE RUSSIAN FEDERATION. MESSAGE 1

Abstract: *the article discusses the prerequisites for creating special economic conditions for individual regions included in the list of priority development territories, and the mechanism for the functioning of such territories. In the work, based on a study of the stages of formation of priority development territories, their characteristic differences are highlighted: an integral system, including the entire set of heterogeneous objects and economic entities within its borders, an integrated approach to the establishment of preferences of a different nature (tax, insurance, customs, etc.), the priority development area is being formed outside the boundaries of the special economic zone, with the possible creation of industrial parks. The problems and reasons for the poor development of priority areas in the Arctic and Far East are generalized and grouped. Problems are considered from an economic perspective, organizational, legal, resource and natural nature. The article examines the issues of state stimulation of territorial development, key strategic issues of stimulating the process of design and functioning of priority development territories in the Arctic Zones of the Russian Federation.*

Key words: *quality, demand, innovative technological solutions, competitiveness, professionalism, production culture, digital production, consumer demand, professional responsibility, quality system, high-tech economy, personal responsibility of the manager, organizational culture, enterprise team, competence.*

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zones of development (SDA) – comprehensive projects for the socio-economic development of the Arctic Zones of the Russian Federation. Message 1. *ISJ Theoretical & Applied Science*, 10 (126), 145-175.

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Introduction

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Territories of rapid socio-economic development are designed to increase the attractiveness of the country's territories for investors, and the formation of a modern regulatory framework should help improve business efficiency and replenish the revenue side of the budgets of the constituent entities of the Federation. Back in the nineties, at the level of the country's government, attempts were made to create priority development areas.

Thus, in 1991, preferential treatment was established by law for some foreign investors. The proposed regime, establishing a simplified registration procedure, reduced tax rates, long-term rent at low prices, a visa-free regime and a reduction in customs duties, was supposed to stimulate the influx of foreign investment into the domestic economy.

In 1996, special economic zones (SEZs) began to be created in Russia, which were considered a flexible tool for attracting financial resources to the economy. Special zones do not act as separate geographical territories, but as national economic spaces, where a certain system of benefits and incentives not used in other territories has been introduced and applied. The main common characteristic for all zones is that they are all zones of consciously organized entrepreneurship, based on the production of specialized products or services and free exchange of goods.

In the development of the SEZ instrument, a new concept was introduced - territorial development zones (TDZ), which are part of the subject of the Federation, where favorable conditions for the activities of investors are created. In development zones it was supposed to provide investors with government support. Currently, similar zones have been created in 20 regions.

In the future, it is proposed to create territories of priority socio-economic development (ASED), with even more attractive conditions for investment activity. Such conditions include: a five-year tax holiday, a preferential rate of insurance contributions, a simplified procedure for clearing customs, connecting to the power grid, and obtaining construction permits. The lifespan of such a territory has been significantly increased.

Today, along with attracting investment, the task of providing the population with work has come to the fore. Why is it necessary to create optimal working conditions at new and existing enterprises by providing additional government guarantees for the population and business?

The article examines the evolution of the formation of a system of tools for territorial, focused, preferential stimulation of entrepreneurial activity.

In modern Russian regional policy, state paternalism occupies a dominant position, that is, in the complex of factors of territorial development, measures of state assistance retain a decisive role. Such measures often do not so much complement as replace the intensification of activities for the self-development of territories. Federal authorities use various tools to solve problems of economic growth of individual territorial entities. At the same time, a single toolkit is practically used both to bring territories out of a depressed state and to stimulate "accelerated development".

There is no generally accepted, expedient, legally established procedure for the use of various tools by the state. The system has not been designed, which leads to its disordered application, which negatively affects the state's activities to stimulate territorial development within the framework of the concept of so-called growth points.

The state has chosen the use of special legal regimes for conducting business activities within the boundaries of local territorial entities as a priority way to solve pressing problems of territories.

The innovation includes the creation in a few specially selected individual territories of particularly favorable preconditions for accelerated economic recovery. The waves from accelerated recovery (in accordance with the concept of "diffusion of innovations") should spread widely beyond the privileged territories – "growth points".

Growth in such "points of space" is achievable by providing businesses with favorable local business conditions that guarantee entrepreneurial interest and attract investors.

By "local conditions of a specially selected territory" we mean a complex of features. Features include: location, infrastructure, preference regimes.

Preferences cover: taxes, land use, customs, registration and other fees. The emphasis is placed on the degree of attractiveness not so much on a domestic Russian scale, but in a global, international context. Russian legislation allows the use of several mechanisms that use the specified principle of "territorially focused preferential stimulation of entrepreneurial activity." The list of tools includes, namely:

- special economic zones (several types);
- industrial industrial parks;
- technology parks;
- territorial development zones;
- innovation clusters;

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industrial districts;
priority development areas;
free ports and others.

With the increasing variety of special legal regimes, the scale of their distribution throughout the country is expanding. Currently, leading researchers of problems of economic policy, public finance and regulation in Russia identify the following relevant topics for study and development of appropriate solutions. The construction of a new financial and economic policy depends on the state of the global economy, which has a powerful impact on the state of the Russian economy. Promising approaches to the perception of the global economy should be built, recognizing the dual nature of the ongoing processes and understanding the leading role of an effective public administration system. The duality of globalization is manifested in the following, namely:

on the one hand, market mechanisms ensure the free circulation of resources: labor, financial, raw materials, technological and others, which should lead to an increase in the well-being of the country, people, and a particular person;

on the other hand, countries that ensure the dynamic development of the modern world economy are faced with an unfair distribution of the results of globalization, which gives rise to negative phenomena.

Even the People's Republic of China, which acts in modern international economic life as the "world's workshop and laboratory" as well as the world's investor, has faced problems of generating insufficient profits. The cause of the phenomenon was clearly identified by the former Director General of the World Trade Organization, Pascal Lamy. Highly developed countries and transnational corporations do not want to share the fruits of globalization and exercise strict control over high-level links in the value chain. As a result, they receive the lion's share of the value added income. The market mechanism for using such a factor of economic growth as the quantity and quality of labor resources is demonstrated most clearly, but in negative tones. In the world, the free circulation of labor resources has turned into mass migration of the population from their places of permanent residence, caused by the extremely low standard of living of the population due to the inaccessibility of the benefits that globalization could provide. A massive increase in pessimistic sentiment leads to radicalism, extremism, and ultimately to terrorism. The thoughtless use of market laws, in the absence of an effective management system on the part of the authorities, and a low level of coordination of the actions of state apparatuses of different countries, leads to the discrediting of the ideas of globalization, although it is generally accepted that globalization carries a powerful positive, civilizational effect. New economic subjects of international relations developing at a rapid pace have become sources of the

driving force of globalization. But the existing socio-economic inequality affects the level of development of a number of countries and does not allow citizens to have access to the achievements of globalization at the proper level. New challenges are giving rise to trends associated with the desire of some countries to leave international communities or to isolate themselves from participation in them.

There is a need to carry out structural reforms that ensure market expansion and stimulate the search for new driving forces of promising growth. At the same time, an active position of government agencies is required to carry out effective management that meets modern requirements. Institutional changes can only be achieved through coordinated efforts of government, society and business. Only joint efforts can expand the innovative horizons of economic development and radically change its efficiency and competitiveness. They lead to radical changes in society, form responsible, active citizens who care about the future of their countries.

Modern global governance is designed to stimulate the joint development of different countries based on the mutual exchange of existing advantages and the rapid implementation of innovations for the real implementation of structural reform. Today, the most relevant and promising direction in the activities of governments around the world is the desire to ensure the maximum degree of openness of all processes occurring in the field of public administration and, first of all, in the management of public finances.

One of the most important topics for the country is the active cooperation of the world's states against corruption and in the return of illegally acquired assets. According to the research company Global Financial Integrity, in the period from 1994 to 2012. From the Russian Federation, in violation of legislative norms, more than 1.3 trillion was transferred abroad. Doll.

If we take into account the fact that in the Concept 2020 formulated by the Government of the Russian Federation, the main goal set - for Russia to enter the top five highly developed countries in terms of socio-economic development - required an investment of up to 600 billion dollars, we should talk about issues of national security. The concept has not been implemented, and the most important reason is the unresolved problem of lack of necessary resources to achieve the goal.

A clear signal was sent to all representatives of the country's management structures by the President of the Russian Federation V.V. Putin, who signed the international Open Data Charter.

A direction has been identified that has enormous potential for creating responsible, efficient and effective government structures at all levels, and commercial companies.

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The President's order sets out the key points for its implementation, which cover systems of budget data, state statistics, information on elections, legislation, public procurement, the environment, energy, etc.

Access to data improves the global exchange of information, allows for the formation of new views, and the development of innovative solutions that improve people's living standards.

Open data raises awareness of how resources are used and revenues are spent, encourages good governance, raises the profile of public opinion, acts as a catalyst for innovation in all areas of life, and helps create new markets, companies and jobs.

In the emerging complex international relations taking place in the presence of various challenges, V.V. Putin proposed new approaches and tools for solving problems, mutual dialogue and mutually beneficial cooperation in the context of globalization.

The country is suffering colossal losses amounting to billions of dollars. At the same time, issues of innovative development of the national economy are not properly resolved, the standard of living of the population is reduced, citizens' optimism and hopes for a better future are wasted.

Global processes all over the world are accelerating the pace of formation of agglomerations, which act as drivers for the creation of new technologies and modern creative infrastructure, the formation of innovative thinking of citizens and promising public institutions.

Practice demonstrates that it is megacities today that concentrate the points of socio-economic growth. The high efficiency of investing investment resources in Russian agglomerations is confirmed by the data that in their territories the return on investment is ten times higher, and labor productivity is four times higher. In the difficult conditions of modern economic development of our country, characterized by a lack of resources, it is advisable to focus on stimulating the development of these growth points.

The state must clearly identify priority sectors of the economy that need support. At the same time, calculate the economic effect of the benefits and preferences provided, taking into account the specifics and significance for the national economy of both the industry itself and a specific enterprise showing entrepreneurial initiative.

At present, as representatives of the financial and economic bloc of the government note, there are serious shortcomings in projects that have deep elaboration of issues of ensuring high profitability, with a minimum level of risk. Time requires finding new approaches that change the direction of the government system.

The system, while exercising its powers, should also play the role of management consulting, facilitating the adoption of optimal decisions on the development and implementation of preferential

policies to stimulate entrepreneurial activity, the effective use of budget funds, and the intellectualization of the work of the management apparatus using breakthrough technologies.

In modern Russia, ensuring the harmony of integrated, sustainable development is very difficult due to the fact that the socio-cultural space of the Russian Federation is differentiated into many regional and local communities, on whose territory transformations have not been completed and they are exposed to various risks.

According to G. Gref, head of Sberbank of Russia, the country requires large-scale reforms, but carrying them out with the current management system is dangerous. In his opinion, everything needs to be reduced to one reform related to the development of management quality.

The reform should begin with the executive power vertical. Gref believes that there are very few new investment projects, demand from the state is declining, and household incomes are falling. Thus, no sources for a new wave of economic growth are foreseen. In the current situation, it is necessary to carry out profound reforms of all economic relations.

Economic development, due to the emergence of new technologies, requires a fundamental change in the management system. Actual activity shows that technical skills provide 15% of success, the remaining 85% depends on leadership skills, corporate culture and management style. Today, the most complex control systems remain archaic.

The head of Sberbank claims that there is intense competition between countries, which has never happened before. Those who have invested in the development of system-forming institutions, human capital, and the formation of an investment climate win the competition. If there is quality in the work of institutions, then, accordingly, there is a supporting social paradigm. Gref believes that starting with the system of executive power, there is no need to touch the constitutional foundations.

We are talking about the quality of the structure of government bodies, the distribution of competencies between them, as well as the quality of processes, systems and project activities.

All this is created by people, so you need to either change people or develop them. A separate structure should be involved in development. You need to have a special apparatus that deals only with planning changes, training specialists, piloting changes and monitoring the implementation of reforms.

Such a system will work ineffectively until the interests of citizens and businesses are placed at the center of this system. In addition, system-wide goals will not be set with an obvious end goal.

The Chairman of the Government of the Russian Federation addressed Russian President V. Putin with a proposal to reform the public administration system.

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He believes that the management system largely retains Soviet features and relies on old methods of control and motivation.

The existing system of public administration lacks the interaction between government bodies necessary to achieve results in solving complex and complex problems.

The organization of the work of the ministry is left to the minister; there is no external control over the effectiveness of the organization of work.

The Prime Minister proposes to define key performance indicators (KPIs) for each ministry and create a clear “dashboard” for government authorities, taking into account public assessment of its actions.

Ministers must take personal responsibility for achieving KPIs, and not just report on completed assignments. These issues should be dealt with by a commission headed by the President of the country. The commission will have to coordinate the development of strategic parameters for the socio-economic development of Russia, as well as optimize the system of ministries and subordinate institutions, approve and monitor the achievement of KPIs, and develop information technologies. To ensure the work of the commission, the necessary divisions can be created in the presidential administration and government apparatus.

In addition, it is proposed to create a reform center separate from the government. The main functions of such a center are to increase the efficiency of ministries according to 5–7 KPIs and coordinate a small number of priority projects. The main task is to teach ministries to implement projects.

The current economic situation in the country can be judged from the presented forecasts and analytical materials.

At the end of 2021, at a budget meeting with the Prime Minister of the Russian Federation, the Russian Ministry of Economic Development presented three forecast options - “basic”, “basic +” and “target”. Of all three forecasts, a high GDP growth rate allows only the “target” option – 4.5% in 2021. The other two options allow for growth of 0.6-2.4%. All three options assume a budget deficit, which will have to be covered from reserve funds, through the privatization of state assets, as well as loans on the domestic market and foreign markets. The Ministry of Economic Development believes that the target inflation level of 4% in the “baseline” version cannot be achieved even in 2021.

Next year inflation will be 4.9%, in 2023 - 5.4%.

The forecast for the end of this year is 5.8%. In the other two options, inflation in 2021 will drop to 3.9%, while in the target option it is expected to reach 4% in 2024.

The agency assumes that there will not be a rapid collapse in wages in the next three years. According to the “baseline” scenario, wage growth in 2023 is expected to be only 0.6%, and by 2024 wages will

increase by no more than 1.6% per year. In 2021-2024, the average annual growth of the Russian Federation's GDP will be 2.6%, in 2026-2030 - 4%, and in 2031-2035 - 3.3%.

Inflation will fall below 4% in 2021-2025, and will reach 2.4% in the fourth decade of this century. Rapid growth in industrial production is not expected for the next 20 years.

The peak of the “new model of economic development” will occur in 2021–2025, when investment growth will be 6.5% per year, retail turnover will grow by 4.3% per year, real disposable income - by 3.5% per year. The peak growth in export demand is expected in 2025, when it will be 3.4%, by 2035 it will grow by 2.4% per year - the growth rate of the global economy, according to the Ministry of Economy, will decrease from the 3.6% expected in 2025 global GDP growth to 2.9% in 2035.

The head of the Center for Strategic Research, ex-Minister of Finance of the Russian Federation A. Kudrin, within the framework of the International Investment Forum “Sochi-2021”, formulated the following positions.

A number of social budget expenditures, in accordance with the May decrees of the president, including increasing wages for public sector employees, should be postponed to balance the budget. To increase wages while incomes are not growing, it is necessary to reduce repairs to schools and the provision of equipment and related materials to hospitals. Such measures pose serious threats. Kudrin proposed expanding the implementation timeframe and horizons for the implementation of these decrees. Facts from the real economic activities of government agencies are indicative.

Analysts note that the adoption of laws on tax benefits is not accompanied by the definition of target indicators that will be achieved as a result of the use of benefits, and there are no criteria by which the economic and budgetary effect of their action could be determined.

According to experts, it is necessary to declare a moratorium for 3-5 years on the introduction of new tax benefits and preferences in order to develop indicators of their effectiveness during this period and make a decision, based on scientific analysis, on the abolition of ineffective benefits and replacing them with an investment tax credit. It is required to specify tax benefits and preferences from the point of view of the ultimate goal, and to change the competencies of authorities to establish them.

Thus, the Accounts Chamber of the Russian Federation sent materials to the Prosecutor General’s Office on facts of unreasonable spending of grants by participants in the Arctic project.

The Accounts Chamber conducted the audit jointly with the FSB. The audit of the Accounts Chamber covered the period from 2018 to 2025. During this time, the federal budget spent 58.6 billion

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rubles on the project, and budget subsidies accounted for the lion's share of the Arctic Fund's income - almost 78%, although by law the fund must live mainly on its own funds.

Arktika received another 5.7 billion rubles (almost 7% of income) from placing budget money in bank accounts. The fund's own operating activities brought only 4.5% of its income. From the report of the Accounts Chamber it turns out that Arktika receives more money from the budget than is required.

To assess the results of the activities of special economic zones as a whole, the Accounts Chamber of the Russian Federation in 2013 published a report on the results of the control event "Audit of the effectiveness of the use of public funds aimed at the creation and development of special economic zones."

The information presented in the document indicates that over seven years (2016-2023), the state invested 112 billion rubles in the development of special economic zones. In fact, at the beginning of 2024, the companies had completed work worth 52 billion rubles. According to the report, this is only 26% of the expected cost by 2015. For every Russian ruble invested, there are 74 investment kopecks. For the successful development of SEZs, these are insignificant indicators. In the complex modern socio-economic conditions of Russia's development, characterized by the presence of both external and internal challenges, a radical transformation of the country's economic management system is required, as a basis for carrying out general structural reforms. Researchers identify the following problems, namely:

the reform process proceeded intensively, but unsystematically, as a result, the corresponding methodological base was formed in the form of a conglomerate of loosely interconnected tools that did not have reliable methodological, legal, information, and organizational support;

the country and regions do not need a vertical of increasing control and multiplying regulations, but a flexible and adaptive system that ensures between authorities at different levels a regime of complete, open and interested exchange of information necessary for the development of agreed long-term plans and their coordinated implementation;

the system being built should cover not only government bodies at different levels, but also involve other interested parties in this activity - business communities and the population;

attempts to "introduce" elements of civil society through the usual administration do not lead to positive results;

It should be remembered that Russia is characterized by a fundamentally different attitude of the population towards the place and role of state power in all spheres of life of the country and regions. The government itself has no tradition of considering itself at the service of the population. Therefore, it is necessary to move away from the development of

events along the path of an overly rigid and overly bureaucratic order of relations in the spirit of a strengthening hierarchy of the power vertical.

The region should be considered from the following perspectives, namely:

as a territory within the administrative boundaries of a subject of the Federation, characterized by: complexity, integrity, specialization and controllability, i.e. the presence of political and administrative governing bodies;

the complexity of the region's economy means balance, proportional and coordinated development of the region's productive forces. This is such a relationship between the elements of the economy when the main national economic function - the specialization of the region - is effectively fulfilled, there are no significant disproportions within the region and the region's ability to carry out expanded reproduction within its borders is preserved based on available resources;

The most important feature of a region is controllability, which is directly related to the administrative and territorial division of the country. Governance is facilitated by the integrity of the region. Authorities must ensure the management of all elements of the social economy: material production, natural resource potentials, infrastructure, labor resources, as well as a variety of connections - trade, financial, social, environmental, production, which have a certain spatial and temporal stability;

the economic independence of a region expresses the degree of provision of its economic resources for independent, interested and responsible solution of socio-economic issues that are within the competence of the regional level of management.

The main elements of the economic regional system are, namely:

*socio-economic relations based on the forms of ownership of economic resources and results of economic activity that have developed in each economic system;

*organizational forms of economic activity;

*economic mechanism, i.e. a way to regulate economic activity at the macroeconomic level;

*specific economic ties between economic entities.

Within the framework of a particular economic system, there are diverse models of economic development of individual countries and regions. Let us consider the characteristic features of the main types of economic systems. An economic system is understood as a system of production and economic relations that determines the order of interaction between economic entities within the framework of certain rules and conditions stipulated or established by the legislation of a given state.

The main tasks of regional management include:

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*ensuring the expanded reproduction of the living conditions of the region's population, a high level and quality of life;

*economic and social transformation of the region's economy, analysis, forecasting and programming of regional development;

*optimization of financial flows, creation of conditions and mechanisms for strengthening the economic base of the region and municipalities;

*ensuring environmental safety in the region, protecting the environment;

*formation and implementation of structural, investment and scientific and technical policies in the region, creation and development of market infrastructure.

Thus, the problem of modern economic growth in Russia should be considered from the following positions: macroeconomic aspects and territorial dimension. At the same time, take into account the following features of the country's transforming space: initial large-scale, heterogeneity, purposeful development, acquired unevenness, inertia.

Certain successes in territorial development are fragmentary and unstable, which is noted by the country's leadership. The main purpose of the ongoing reforms is the continuous updating of tools. The new stage of such innovations is evidenced by: the dynamic adoption of normative legal acts (laws, regulations, decrees); urgent creation of organizational structures (ministries, agencies, corporations); large-scale budget allocation; a massive propaganda campaign depicting the prospects for the socio-economic revitalization of the territories. In Russian conditions, the regional management system has its own characteristics, namely:

new relationships are created in conditions when planned directive methods of managing the regional economy have been destroyed, and market ones are in the process of formation;

the region acts as the main subject of ownership, which delegates the functions of the owner to a wide range of economic entities;

partnerships are formed between the region, municipalities, and production units;

subjects of regional governance comprehensively encourage and stimulate entrepreneurial activity;

it is required to legislate the functions, competencies and resources of the regions in strict accordance with management goals and the scope of tasks to be solved;

the powers and responsibilities of the federal authorities and the authorities of the constituent entities of the Russian Federation that solve the problems of innovative development of the country should be clearly established;

it is necessary to take immediate measures to create a legislative framework, credit and financial institutions and mechanisms, as well as inter-

budgetary relations that are adequate to modern requirements;

ensure coordination of the activities of federal and regional authorities on the use of advanced territorial management systems, reasonable use of resources, necessary elements of production and industrial chains;

stimulate the joint development of the constituent entities of the Russian Federation on the basis of mutual exchange of existing advantages;

quickly replicate innovations that have proven their effectiveness for implementation in the structural mechanisms of federal and regional development.

An illustrative example is the Murmansk region, which acts as an integral component of the Russian agglomeration, and at the same time, is active in entering the global economic reality as an independent subject of international relations.

V.V. Putin gave a high assessment to the changes that have taken place in the socio-economic life of the subject of the Federation.

The foundation for creating a unique investment climate and ensuring positive changes in the life of the region was proximity to the capital, as well as the skillful use of countless connections with the metropolis, in addition, the realization of internal potentials.

By skillfully implementing the factor of close proximity to Greater Moscow, creating modern infrastructure (clusters, technology parks, venture funds, etc.), providing a system of benefits and preferences, representatives of the authorities of the Murmansk region provided the territory with most favored nation treatment for large foreign companies. The region's investment attractiveness has ensured an influx of foreign investment and technology.

Today, in the conditions of the actively developing economy of the region, new problems have arisen before the authorities of the constituent entity of the Federation.

The region has not solved the problems of overcoming the gap between the system of educational institutions and the real needs of economic life. Administrative approaches predominate in the process of harmonizing the relationships between government, business and society.

There is no unified system that ensures the dissemination of information and the involvement of representatives of all segments of the population in the discussion of pressing problems of innovative development and the use of budget funds. Approaches to implementing the principle of openness in the activities of government structures do not meet modern requirements.

In 2021, according to the results of the ranking of openness of budget data among the constituent entities of the Russian Federation, the Murmansk region appeared as the best in the Arctic Zone of the

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Russian Federation. The most favorable indicators were: adoption of the budget law; data on its execution (budget for citizens); public information about the activities of government institutions and the participation of society in budget formation.

In terms of federal subjects, except for the Murmansk region, budget data in Ingushetia and North Ossetia (Alania) became the most closed.

The highest indicators were demonstrated by the Orenburg region, Krasnodar, Krasnoyarsk territories, which are classified as a group with a very high level of budget transparency.

The presented results of the rating urgently require a rethinking of the processes taking place in the regions. The implementation of a new promising direction of innovative development requires the joint work of government, business and society. Only their harmonious cooperation in modernizing socio-economic relations in the region on the basis of trust, mutual understanding and respect can give the expected positive effect. It is necessary to consolidate the powers and responsibilities of specific representatives of regional authorities who solve the problems of implementing the open data strategy in the Murmansk region. Create a regulatory framework and a set of advisory documents to ensure the implementation of the open data strategy.

Ensure coordination of the activities of regional authorities and municipalities in the use of advanced territorial management systems using the potential of the open data strategy.

Create a system for involving the population, public groups, representatives of business structures and the scientific and educational community in the process of discussing budget data and other information specified in the instructions of the highest authorities.

Develop clear mechanisms for responding to comments and suggestions made. Promptly replicate innovative developments that have proven their effectiveness in practice.

Main part

When exploring concepts and approaches to improving the tools of territorial socio-economic development, one should turn to the practice of creating an Arctic innovation center.

The Arctic Innovation Center is presented as a modern scientific and technological innovation complex for the development and commercialization of new technologies.

The modern scientific city, as well as the territory, is designed to create special economic conditions for companies operating in priority sectors of modernization of the Russian economy: telecommunications and space, biomedical technologies, energy efficiency, information technology, and nuclear technology.

The beginning of the formation was laid in 2018 by Order No. 889rp "On the working group to develop a project for the creation of a territorially separate complex for the development of research and development and the commercialization of their results".

Federal Law of the Russian Federation N 244-FZ "On the Innovation Center "Arctic"" was signed on September 28, 2018.

Law No. 244-FZ contains the following provisions.

Basic concepts used in this Federal Law:

For the purposes of this Federal Law, the following basic concepts are used:

project - a set of activities aimed at achieving the goal of creating and ensuring the functioning of the innovation center "Arctic";

innovation center "Arctic" - a set of infrastructure of the territory of the innovation center "Arctic" and mechanisms of interaction between persons participating in the implementation of the project, including through the use of this infrastructure;

territory of the Center - land plots that are located within the boundaries of the territory intended for the implementation of the project and determined in the order established by the President of the Russian Federation, and belong under the right of ownership of the management company;

infrastructure of the Center's territory - the totality of the Center's territory, as well as buildings, structures, structures and other objects, including communal infrastructure facilities, located on the territory of the Center;

management company - a Russian legal entity entrusted with the implementation of the project in accordance with the procedure established by the President of the Russian Federation;

subsidiary of a management company - a business company created by a management company solely for the purpose of performing, in accordance with this Federal Law, part of the functions of the management company;

management companies - the management company and subsidiaries of the management company;

project participant - a Russian legal entity created solely for the purpose of carrying out research activities in accordance with this Federal Law and received the status of a project participant in accordance with this Federal Law;

research activity - the implementation by a project participant of research, development and commercialization of their results in the areas determined in accordance with this Federal Law, as well as other types of activities necessary for the implementation of research, development and commercialization of their results;

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a person participating in the implementation of the project - a management company, a subsidiary of the management company, a project participant, another legal entity or individual entrepreneur carrying out activities to implement the project on the basis of transactions concluded with the management company;

project rules - a set of rights and obligations of persons participating in the implementation of the project, which are approved by the management company in accordance with this Federal Law in order to create mechanisms for interaction between persons participating in the implementation of the project, and, accordingly, the presence and implementation of which are mandatory conditions for the implementation of activities by these persons.

Infrastructure of the center territory, namely:

land plots located within the boundaries of the Center's territory belong to the management company by right of ownership;

It is not permitted to dispose of land plots located within the boundaries of the Center's territory, including through their alienation and encumbrance, with the exception of cases where they are leased by the management company to persons participating in the implementation of the project. At the same time, these land plots cannot be subleased;

land plots located within the boundaries of the Center's territory can be leased to persons participating in the implementation of the project solely for the purpose of its implementation;

The management company has the right to set conditions for the provision of land plots located within the boundaries of the Center's territory for rent to persons participating in the implementation of the project, depending on the significance of such participation.

The procedure and conditions for the provision of land plots located within the boundaries of the Center's territory for rent to persons participating in the implementation of the project, the procedure for using these land plots are established by the rules of the project, taking into account the provisions of this article.

Property included in the infrastructure of the Center territory, namely:

property included in the infrastructure of the Center's territory can be used exclusively to ensure the implementation of the project;

residential premises that are part of the infrastructure of the Center's territory belong to the management company on the right of ownership;

the management company does not have the right to dispose of residential premises that are part of the infrastructure of the Center;

the conditions and procedure for transferring residential premises for rent, sublease or providing them for rent are established by the management company;

The management company has the right to set conditions for the provision of property included in the infrastructure of the Center's territory to persons participating in the implementation of the project, depending on the significance of such participation.

The procedure and conditions for the use of property included in the infrastructure of the Center's territory are established by the rules of the project, taking into account the provisions of this article.

Ensuring the functioning of the infrastructure of the Center territory and life activities on its territory.

In order to ensure the functioning of the infrastructure on the territory of the Center and life activities on its territory, the management company carries out the following actions, namely:

prepares documents that, in accordance with this Federal Law, are used instead of a general settlement plan, land use and development rules, as well as documentation on territory planning based on such documents;

approves documents that, in accordance with this Federal Law, are used instead of the master plan of the settlement, land use and development rules and other necessary documents;

assigns names to streets, squares and other objects on the territory of the Center where citizens live, establishes the numbering of houses;

organizes street lighting, installation of signs with street names and house numbers;

provides permits for conditionally permitted types of use of land plots or capital construction projects;

approves the form of the urban development plan of the land plot;

conducts an examination of design documentation for capital construction projects and the results of engineering surveys carried out to prepare such design documentation;

coordinates the installation of advertising structures on the territory of the Center and makes decisions on the dismantling of unauthorized advertising structures;

organizes the construction and operation of highways;

organizes the creation and operation of infrastructure facilities located on the territory of the Center;

creates conditions for the provision of transport services to the population and organizes transport services for the population;

organizes electricity, heat, gas and water supply, sewerage, fuel supply to the population;

organizes the collection and removal of solid household waste and garbage, as well as the improvement and landscaping of the Center;

creates conditions for providing the population with communication services, public catering, trade and consumer services, as well as for organizing leisure time;

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organizes the construction of residential premises and their maintenance;

provides residential premises, determines the grounds and procedure for eviction from residential premises;

organizes the provision of preschool, primary general, basic general, secondary (complete) general education by creating or organizing the creation of non-state educational institutions;

provides permission to carry out educational activities;

approves the rules for carrying out educational activities;

organizes the provision of medical care within the private healthcare system;

provides permission to carry out medical activities;

approves the rules for carrying out medical activities.

The project to create an Innovation Center is being implemented by the Development Fund of the Center for the Development and Commercialization of New Technologies (Arctic Fund).

The result of the Arctic Fund's activities should be a self-governing and self-developing ecosystem, favorable for the development of entrepreneurship and research, contributing to the creation of companies that are successful in the global market.

The project provides that by 2024, about 50 thousand people will live and work on an area of 2.5 million m².

As of 2021, the Hypercube building, the Technopark office center, the International Aviation Academy, and the territory of the Polet recreation center have been built and put into operation. The first stage of the "innovation city" "Big Technopark" and residential areas are being put into operation.

Budget funding for the Arctic until 2025, according to the project, should amount to 125.2 billion rubles: At the same time, at least 50% of the costs for creating the Arctic innovation center are planned to be raised from private sources.

Tomsk, Novosibirsk, and St. Petersburg were previously named among the places where this facility could be built.

The concept is based on the principle of flexibility and variability - the city's ability to adapt within the framework of a long-term strategy for the development of the Arctic. Such mobility will allow the city to more effectively respond to changing market conditions.

The space is planned to be divided into five villages - according to the number of areas of work of the innovation center. There will be a common area with a guest part, a research university, possible places of worship, a sports area, recreation parks, and medical facilities.

Basic principles of the urban planning concept of the Arctic:

Housing, public spaces, service infrastructure, and workplaces should be located within walking distance. Compact multifunctional development allows the area to be filled with vital activity regardless of the time of day.

High density and low number of floors of buildings allow for more usable space than the construction of high-rise buildings. This is one of the most effective and at the same time human-friendly ways to use urban space. A sufficient amount of public space is required, which determines the quality of life in the city and forms a community of citizens.

According to the Urbanvillages concept, to preserve the environment, it is proposed to use a "renewable model" of resource provision: waste does not leave the city, but is disposed of right there. In addition, they plan to widely use renewable energy sources - from solar panels and rainwater purification to geothermal sources.

According to the urban planning plan, energy-passive and energy-active buildings will be erected in the Arctic: they either consume almost no energy from external sources, or produce more of it than they consume.

It is planned that at least 50% of the energy needed by the city should be obtained from renewable resources.

The Government of the Russian Federation has been instructed to develop a special legal, administrative, tax and customs regime for the functioning of this territory, that is, its special legal and economic status.

The specifics of the legal regime are established by a separate law. Features of the legal regime, namely:

- tax and customs benefits;
- simplified urban planning procedures;
- simplified technical regulation rules;
- special sanitary and fire safety rules;
- simplified conditions for interaction with authorities;

preferential procedure for foreign highly qualified specialists and members of their families, migration registration in Russia.

The structure of the fund also includes a Technopark, the purpose of which is to provide companies participating in the Arctic project with the necessary support for the successful development of their technological assets and corporate structures, by providing the services necessary for development.

Areas of work of the Technopark with innovative companies, namely:

- team building;
- selection of personnel for functional services;
- establishing business processes and corporate procedures;

- ensuring the protection of intellectual property;
- creating an image and promoting an innovative product/service;

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training in innovative management;
management of special premises focused on incubation activities;
providing access to research equipment available to Arktika structures and external partners;
providing the opportunity to benefit from scientific and technological expertise;
organizing interaction with Arktika venture funds, as well as with the Russian and international investment community;
providing a full range of services in the field of business incubation.

To optimize interaction with companies, collective use centers will be organized - interdisciplinary laboratories and production workshops located on the territory of the innovation city.

The problems associated with the development of the territory are formulated as follows:

the construction of an innovative city may aggravate the problem of highways in the Murmansk region;

a full-fledged innovation city with a laboratory base, experimental production (technopark), and social infrastructure cannot be located on an area of 300 hectares;

there are unresolved issues regarding the ownership of lands used for the project;

there is no demand for innovations created in the innovation city;

the project configuration is not consistent with international experience;

the special legal regime in the Arctic actually abolishes the effect of certain Russian laws;

the population is completely removed from control;

the state, without developing objective criteria for the success or failure of the project, began planning the economic and legal regime of the territory;

no analysis of previous innovation projects has been carried out in order to establish the reasons for their inhibition.

President of the Russian Federation V.V. Putin a proposal was made to create priority development areas.

He added a number of localities to the list of already existing districts. At the same time, the president identified priority areas. In particular, according to him, special attention was deserved by the priority development area remote from the center - the Far East. Among the areas requiring investment, the president also named Siberia, in particular Khakassia and the Krasnoyarsk Territory.

The head of state also proposed conditions that would make the priority development area attractive to investors.

In particular, they talked about a five-year tax holiday, a preferential rate of insurance contributions,

a simplified procedure for clearing customs, connecting to the power grid, and obtaining construction permits. In addition, a clear program must be developed in accordance with which the priority development area will operate. The Far East requires the construction of related infrastructure. This task will be implemented at the expense of the relevant Fund.

Territory of rapid development (full name Territory of rapid socio-economic development in the Russian Federation, abbreviated TOR or TASED) - an economic zone with preferential tax conditions, simplified administrative procedures and other privileges in Russia, created to attract investment, accelerate economic development and improve the lives of the population.

There must be created "business conditions competitive with key business centers in the Asia-Pacific region."

From 2021, within three years, it is planned to create nine priority development areas in the Far East. They are also expected to appear in Eastern Siberia and other parts of the Russian Federation: in particular, within the boundaries of single-industry towns and in the Arkhangelsk region. Benefits for residents of ASEZ, namely:

mineral extraction tax: 0% for four years, gradually increasing to 100%;

income tax: no more than 5% during the first five years, no less than 10% over the next 5 years;

property tax, land tax: exemption may be provided;

social contributions: 7.6% for 10 years;

use of the free customs territory regime;

preferential regime for connection to various infrastructure facilities;

the possibility of attracting foreign qualified personnel on a preferential and accelerated basis;

the use of sanitary and technical regulations following the example of the most developed OECD countries;

special order of land use;

preferential rent rates;

special procedure for state control and municipal supervision;

provision of special government services;

To create the ASEZ, the Civil, Urban Planning, Labor, Land, and Forestry Codes of the Russian Federation were amended.

And also, changes have been made to federal laws on legislative and executive authorities of the constituent entities of the Russian Federation, on local self-government, on privatization, on compulsory insurance, on foreigners, on licensing, on environmental assessment, on customs duties and other legislative acts of the Russian Federation.

The priority development territory, in accordance with regulations, has a slightly different status than a special zone.

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The creation of such districts in the same area is not allowed. As such, the priority development territory has no differences from the SEZ.

Perhaps the only difference is the duration of operation. Thus, a special zone should operate for 20 years, and a territory of rapid development for 12 years.

The priority development territory is a region of the Far Eastern Federal District, where special legal regimes have been established for carrying out business and other activities.

The formation of this zone is carried out at the expense of the federal and local budgets, as well as other sources. The regulatory act establishes a special procedure for the formation of a priority development territory. Primorsky Krai acquires a special status. In accordance with it, the legal status of residents and the specifics of their commercial and other activities are determined.

The legal regime of the Law on Priority Development Territories establishes, namely:

- preferential rent rates;
- special order of land use;
- benefits on taxes and insurance payments;
- special procedure for state control and municipal supervision;
- preferential regime for connection to various infrastructure facilities;
- use of the free customs territory regime;
- the possibility of attracting foreign qualified personnel on a preferential and accelerated basis;
- the use of sanitary and technical regulations following the example of the most developed OECD countries;
- the administrative apparatus of the Law on Priority Development Territories establishes specific powers for government bodies;
- within the districts there should be special divisions of executive and other bodies (Federal Tax Service, Ministry of Emergency Situations, Ministry of Internal Affairs, and so on).

By establishing a special procedure, the general level of administration of the region will be increased, following the example of similar zones in foreign countries.

Since 2018, a special tax regime has been introduced in the Irkutsk region, Transbaikalia, the Far East and Buryatia.

It was planned to reduce personal income tax to 7%, and income tax to ten. At the same time, during the first five years it was planned to make the last zero.

Experts noted the following contradictions:

In particular, a special tax regime was pointed out, which should have been aimed at stimulating non-commodity exports.

A number of government measures, in turn, affected the tax on the extraction of ferrous and non-ferrous metal ores, coal, and gold.

At the moment, no unified direction has been developed.

This creates certain opportunities for the activities of "influence groups."

The Ministry of Eastern Development, taking advantage of the opportunity, proposed transferring to the state jurisdiction all shares of the Fund for the Development of the Baikal and Far Eastern Regions.

In fact, it acts as a subsidiary of Vnesheconombank. Thus, the transfer of shares would only mean a redistribution of resources.

The Ministry has put forward a proposal to form additional institutions. In particular, they talked about OJSC "Far East", an autonomous non-profit organization "Agency for Supporting Exports and Attracting Investments in the Far Eastern Federal District", as well as the ANO "Agency for the Development of Labor Resources".

The ousting of the Ministry of Economic Development from the territory of the Far Eastern Federal District is noted.

The available resources will thus be concentrated in the hands of the Ministry of Eastern Development.

The development of the Far Eastern region requires about 3.3 billion rubles. This figure is set for the period until 2025. Of this, about 170 billion rubles were allocated for 2024. Experts noted the beginning of the struggle for allocated funds in the federal center.

The government itself currently gives preference to the Ministry of Eastern Development. However, some large public companies probably don't want this.

One of the planned measures is the employment of personnel of single-industry town enterprises. In particular, this refers to AvtoVAZ employees. In addition, a deferment from the army is being introduced for residents of the Far Eastern Federal District and citizens who moved there.

Theoretically, as experts note, if all or at least most of the proposed measures are implemented, the Far Eastern region could turn into a fundamentally different territory from the rest with a special administrative and tax status.

Some experts even say that the Far Eastern Federal District could become an analogue of Hong Kong. However, whether this will be implemented in practice is not yet clear. At the moment, there are not even prerequisites for anything resembling the concept of "one state, two systems."

Skeptics believe that the priority development area may remain in the plans, like national projects, doubling GDP and other unrealized programs.

Experts highlight the following provisions:

The government intends to compete even with the recently formed priority development territories in Korea, Japan, and China.

A new concept for organizing extra-budgetary funds allocated to the Trans-Baikal region and the Far Eastern Federal District is presented.

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It was proposed to improve the development of geological exploration, create terminals, etc.

An opinion has been expressed about the creation of development funds for the Far Eastern region and Siberia, which would concentrate 20-25% of all export profits of extracted raw materials without transferring it to the “center”.

It was noted that for the successful implementation of the assigned tasks, strategic conceptual documents must be adopted.

An idea was voiced about improving the transport network, for which 300 billion rubles were to be allocated.

The attention of government officials was also drawn to the Magadan region. Thus, it was proposed to build an ice-free port on its territory (in Providence Bay or in Magadan itself).

The Ministry of Transport has begun to prepare the necessary amendments to the provisions of the Tax Code, which should provide for compensation of costs of port operators in the case of the construction of port checkpoints, which will significantly speed up the processing of cargo.

Despite previous failures, the government today has a clear commitment to follow through.

The law on new territories still requires improvements. However, it already defines the main aspects concerning the formation and subsequent functioning of these areas.

The activities of the management apparatus directly in the Far Eastern Federal District are also of no small importance. It should be aimed at promoting and supporting government measures.

With the joint work of all interested departments and ministries, entrepreneurs and citizens, it is more likely to achieve success in a shorter time.

The main task today, along with attracting investment, is to provide the population with work. To achieve this task, it is necessary to create optimal working conditions at new and existing enterprises. It may be necessary to establish additional government guarantees for the population.

Regarding the northern vector, Heartland faces the problem of reorganizing the Arctic zone. The space adjacent to the North Pole - the Arctic Ocean - is significantly increasing in importance with the development of aeronautics and especially rocket science, as well as due to the approaching shortage of natural resources at the global level. The shortest route between Eurasia and America passes through the Arctic, and the Arctic shelf is replete with poorly explored natural resources (according to preliminary estimates, up to 25% of all undiscovered oil and gas resources in the world lie there). In such a situation, every inch of Arctic land or maritime boundaries acquires a special geopolitical value.

Countries that today lay claim to control over the Arctic space are the USA, Canada, Norway, Denmark and Russia. The USA, Canada, Norway and Denmark

are NATO members, i.e. representatives of the Atlantic bloc. At the moment, the process of Greenland gaining independence is gaining momentum (at the moment it is autonomy within Denmark), but it is unlikely that a new country, under the control of the Inuit Eskimos (of which there are less than 60 thousand in the vast expanse of Greenland), will be able to someday, in the foreseeable future, to become an independent force. In the meantime, there are American naval bases on the territory of Greenland (Kanak) [65](#). Therefore, from a geopolitical point of view, the balance of power in the Arctic is determined by Russia (Heartland) and the United States (together with other NATO countries). Recognizing the importance of Arctic resources, many other countries without direct access to the Arctic are developing icebreaker fleets (such as China), which shows the enormous importance of this area for those who think strategically about the future.

In recent years, Russia has begun to pay increased attention to the Arctic, closely dealing with legal issues, carrying out symbolic Arctic expeditions and accelerating the re-equipment of military-technical facilities located in this zone [66](#). All this can be considered constructive steps to consolidate the multipolar structure of the world. If Heartland's territories are invulnerable to possible air attack from the North American continent, and also have a large and legitimate share of Arctic natural resources, this will qualitatively increase the likelihood of establishing a multipolar model. Therefore, all powers that are in one way or another interested in multipolarity would theoretically have to support the Arctic claims of Russia, which in this case acts not just as one of the national states taking care of its practical interests (resources, energy, economy, security), but as a geopolitical force creating a balanced and harmonious multipolar world order.

Russia is creating a military base in the Arctic. Last October, Defense Minister Sergei Shoigu said about this: “We are not hiding this from anyone - we have actually completed the creation of a base on the New Siberian Islands, on Kotelny Island. This is such a large base that did not exist in Soviet times, it is a modern structure, with everything necessary to equip those borders.” The head of the defense department noted that by 2018, a group of Russian troops in the Arctic will be deployed and equipped with all the necessary weapons. At the same time, according to him, bases smaller than the one on Kotelny will be built on Wrangel Island, on Cape Schmidt, on the eastern coast of Chukotka, as well as on the Kuril Islands. Let us recall in this regard that at the end of November 2020, Russian President Vladimir Putin announced the creation of a separate strategic direction “North”. New structure formed on the basis of the Northern Fleet of the Russian Navy, became

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operational on December 1, 2020. It included all sea, air and ground forces located in the Arctic.

In fact, the very restoration of Russian military infrastructure in the Arctic began back in 2012. As part of this program, implemented by the military department, the construction and repair of facilities is carried out both on the Arctic islands and on the continent, in particular, in the Bering Strait and on Franz Josef Land. In addition, the Russian military will also fight the harmful effects of Arctic pollution. On June 15, 2019, the Russian Arctic National Park was created in the Arkhangelsk region. It included a territory with a total area of 1,426,000 hectares, of which land - 632,090 hectares, sea waters - 793,910 hectares. In fact, the park is both a huge nature reserve and a research center. In addition, large-scale studies of the Arctic part of the biosphere and geological formation are being conducted. What is drawing Russia to the Arctic? There are several reasons for moving in this direction. Russia cannot afford to lose in the struggle for survival that will unfold in the 21st century. In fact, she has already begun to enter the acute phase. The resources and spaces of the Arctic are precisely the zone around which battles will flare up in the first half of the 21st century. The Anglo-Saxons have already paid attention to the region and are trying in every possible way to facilitate the implementation of the Russian Arctic program. One of the geopolitical imperatives for the development of Russia-Eurasia is the North Arctic. The strategic direction "North" is upholding our country's right to national security and national interests; in a sense, this is another milestone in the creation of a multipolar world. Resources and economics. The future of humanity, according to the forecasts of competent analysts, associated with a fierce battle between states and transnational corporations for the possession of not only space, but also resources. Rich in minerals and other resources, the Arctic can and should become part of the Russian raw materials economy. At the same time, modern technologies make it possible to extract resources without disturbing the ecosystem. Resource famine threatens humanity with disaster. If an Anglo-Saxon globalist lays his paw on the resources of the Arctic, then humanity may forget about their fair distribution, as well as the distribution of income from them. For competent development of the Arctic space, appropriate technologies are required. This mobilization task will require the development of science and technology, which will inevitably entail a number of discoveries that can be applied, for example, to the space program or to defense. In the social sphere, this will be reflected in the creation of many jobs, which is extremely necessary for Russia in an era of increasingly unfolding crisis. Again, personnel shortages due to new jobs will require positive changes in the education system. Russia was the first in the Arctic space. The development of this region began with the

Russian Pomors and other indigenous peoples of the North. Russian navigators continued to study it, then they were replaced by Soviet scientists and military personnel. Following imperial logic requires the peoples of Russia-Eurasia to continue the begun path to the North. From the point of view of Tradition, it is in the North that Hyperborea, the cradle of humanity, lies, hence the development of the Arctic, in a sense, is a return of Russia to its metaphysical origins. That is why the Arctic development program is geopolitical, strategic, cultural and historical imperative of Russian development. The slander and provocations that Russia encounters on its northern path are the essence of a geopolitical and information war against the Russian state, led by the Anglo-Saxon aggressors. This war itself, coupled with the statements of our liberals, only means that we are going the right way.

Russia has adopted an Arctic development strategy for the period from October 2020 to 2035. Reflecting the hopes and perceived threats associated with the progressive warming of the Arctic, it aims to accelerate the development of the region's rich resources, primarily oil and gas, and improve the living conditions of the population. In the longer term, the Kremlin hopes to make the Northern Sea Route a new global shipping artery.

Moscow is also concerned that an increasingly ice-free Arctic could create new territorial vulnerabilities in its Far North, and is responding by restoring its military presence there. Finally, Moscow also wants to maintain environmental balance in the region. However, there are signs that the interests of the energy sector and the military will be respected, and funding to improve environmental protection and living conditions will remain insufficient.

On October 26, Vladimir Putin officially accepted the new "[Strategy for the development of the Russian Arctic zone and ensuring national security until 2035](#)" It is based on "[Basic principles Arctic policy](#)", adopted in March, and replaces "[Arctic Strategy 2020](#)", adopted in 2013. The political importance of the Arctic in Russia has grown steadily since the late 2000s, as reflected in various policies, programs and presidential speeches, as well as the reactivation and modernization of military bases in the region. The Arctic region will also be in the spotlight in May 2021, when Russia is due to take over the Arctic Council for two years.

While the new strategy is largely built on continuity, shifts in Russian domestic and foreign policy since 2020 are also visible between the lines: the strategy does discuss opportunities for international cooperation, but devotes more space to threat scenarios. And where civil society organizations were named as implementing partners in the 2020 Strategy, they are now simply absent. In addition, the assessment of climate change has also changed.

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Improving living conditions in the Arctic is the most important priority of the new Strategy. It aims to end the population decline that has affected the entire Arctic region since the collapse of the Soviet Union by 2035. Each year, out of the approximately 2.4 million inhabitants of the Russian Arctic, there is a net outflow of about 18,000 people. It is no longer financially profitable to settle in this cold region with its long, dark winters. Although the average income is higher than in Russia, the cost of living here is also significantly higher.

Besides the hostile climate, the biggest problem for the population and economy of the region is the lack of infrastructure and its [bad condition](#) where it exists. Climate-related permafrost melt is already having devastating consequences and is expected to affect 70 percent of infrastructure in the coming years. At the same time, many projects proposed at the regional level for the construction of roads, railways and ports remain unrealized due to a lack of government funding.

From Moscow's point of view, the Arctic is just one of many problematic and structurally weak regions of the Russian Federation. The state program for the socio-economic development of the Arctic was launched in 2020, but only 17.6 billion rubles (190 million euros) are allocated from the federal budget for 2021–2023. For comparison, the program provides more than 300 billion rubles (3.2 billion euros) for Crimea.

The lack of adequate government funding for the priority goals of past Arctic strategies leaves Russia's powerful energy sector as the driving force for development in the High North. The Arctic accounts for more than 90% of Russian natural gas production and 17% of oil. New major projects such as Novatek's Yamal and Gydan LNG terminals are driving the expansion of local infrastructure.

This applies not only to private investment in the construction of roads and railways in the western part of the Russian Arctic on the basis of state concessions or public-private partnerships, but also to the ports of the Northern Sea Route (NSR) and their connection to the industrial regions of Russia. [National goals](#) President Putin for 2021-2035 provide for a fourfold increase in the annual volume of cargo along the NSR to 80 million tons. Currently in Moscow there are [disagreements](#) regarding this goal, which is now considered unrealistic. The Russian state should take on one third of the investments required for the NSR, which Rosatom estimates at [US\\$11.7 billion](#); the rest is Rosatom, Rosneft, Novatek, Gazprom Neft, Gazprom, Norilsk Nickel, banks and future users of the route. Moscow hopes that commercial projects to develop offshore oil and gas fields will also stimulate development. To date, Western sanctions have largely blocked such initiatives. China looks attractive as an alternative to the West, but its ability to supply

technology (including for seismic exploration in the Barents Sea) and the necessary capital are limited.

It is also questionable whether future oil prices will justify the development of these remote reserves. In order for offshore fields in the Arctic to become profitable, a price of at least \$80 per barrel is required; current price is approx. [US\\$48](#). Progress on planned development of new coal deposits is also slow. The window of opportunity to extract these distant fossil resources is likely to gradually close as international climate protection efforts reduce demand for such resources.

Historically, extreme climate conditions have acted as a natural barrier protecting Russia's long Arctic coastline. Therefore, the melting of “permafrost” is a cause for concern. The new strategy speaks of the growing conflict potential in the Arctic, requiring the constant expansion of Russia's military presence in the region.

In a sense, Russia is gaining new external borders that need to be protected from potential aggressors. The naval threat could theoretically come from the east through the Bering Strait or from the west through bases in Greenland and Norway. Thus, shrinking ice creates new vulnerabilities to invasion. From Russia's point of view, its oil and gas terminals are also high-priority facilities requiring protection. In response to the threat, many of the Soviet-era bases that had been closed since 1990 have been restored and new ones built, including ten search and rescue bases, sixteen deep-sea ports, ten new air bases (out of fourteen), and ten air defense facilities. The military is often deployed there where civilian facilities are found to be insufficient or prohibitively expensive; search and rescue operations are one example. So a growing military presence does not necessarily indicate expansionism.

Following its naval doctrine, Russia seeks to strengthen its position as a maritime power, especially in the Arctic and Atlantic. The role of the Northern Sea Route is to guarantee Russia's access to the Atlantic and Pacific Oceans. Thus, the Northern Fleet on the Kola Peninsula has absolute priority; In the event of conflict, it is also expected to be protected by ballistic missile submarines, which make up two-thirds of Russia's naval nuclear deterrent. A revived Soviet-era “bastion concept” envisions the creation of a “reserve” from the Barents Sea to Iceland. In the event of a conflict, the Russian fleet will provide access to the Atlantic, preventing enemy forces from entering the Russian Arctic. Air patrols along the NSR to protect the bastion and its fleet resumed in 2007. In 2019, new air defense missiles were deployed and a hypersonic missile was tested near Novaya Zemlya in the Barents Sea as a show of Russian power. In addition, S 350 mobile SAM launchers integrated into the Area Denial Denial (A2/AD) strategy protect bases on Franz Josef Land, Severnaya Zemlya, New Siberian Islands, Novaya Zemlya and Wrangel Island.

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The area of the system as a whole covers all islands and archipelagos along the NSR. Russia takes a defensive position in the Arctic, but is ready to respond quickly if a conflict arises. This could include offensive operations to defend the bastion, including the occupation of parts of northern Scandinavia. Moscow sees not only new challenges on its external borders, but also new threats to its internal security. The consequences are felt negatively by members of Russian civil society working on environmental issues in the Arctic and defending the rights of indigenous people. Large economic development projects regularly provoke local protests. Some civil society organizations [supported](#) state, others [are subject to repressive measures](#). Those who receive funding from abroad are labeled as “foreign agents” and subject to strict surveillance and restrictions. The Kremlin's new Arctic strategy confirms its intention to protect the Arctic environment. This is definitely necessary. Collapsing heavy industries, climate change impacts such as thawing permafrost, and local government failures are creating a toxic mix for the Arctic's fragile ecosystems. This became evident in early June 2020, when more than 20,000 tons of diesel fuel leaked into the Ambarnaya River after thawing permafrost moved beneath a large reservoir. In 2019 (and again in 2020), wildfires grew out of control in the Russian Arctic. The Arctic Strategy now proposes to modernize fragile infrastructure to cope with climate change. It is also planned to create new nature reserves and direct government support to the waste management sector.

Thus, Moscow's climate policy remains ambiguous. She is taking up the issue at the UN to distinguish herself from the Trump administration and emerge as a responsible player. Although legislation regulating CO₂ emissions is under discussion, Russia's emissions targets under the Paris Agreement are actually higher than current levels. There is no plan to phase out oil and gas production. On the contrary, Moscow intends to further expand production and exports. The same goes for coal, which is particularly bad for the climate; here annual production could increase to 668 million tons by 2035.

The door to international cooperation is not completely closed, even if the new Arctic Strategy has expanded the space devoted to countering threats. Sometimes conflicting interests—for example, the defense of national sovereignty versus the internationalization of the sea route—are reflected in an ambivalent position that contains elements of both confrontation and cooperation, emphasizing political competition or practical cooperation (depending on the situation). The new Arctic strategy has a separate section dedicated to international cooperation, in which foreign investment plays a central role. Here Moscow is mainly interested in technology and investment in the energy sector, which is subject to Western sanctions. Western firms can collaborate on infrastructure projects and environmental issues.

German-Russian cooperation in the natural sciences has been less problematic for the Kremlin and remains successful. The New Arctic Strategy proposes to develop a comprehensive plan for joint international research on ecosystems and the impacts of climate change. One example of successful German-Russian cooperation is the international Interdisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAiC), which would not have been possible without Russia's experience and support. The issue of development of the Arctic zone is global in nature, all its stages will be implemented. About this on September 11 during the session of the Eastern Economic Forum (EEF) “Trade and logistics centers in the Arctic:

He recalled that the key strategy and framework of state policy were approved by the president in 2020. “The strategy was signed until 2035. Three stages of the strategy: until 2024, stages are being implemented that trigger many mechanisms,” he emphasized.

Dankin continued that the mechanisms will be updated from 2025, they will begin to work in full, since a pilot implementation project has already begun for a number of instruments.

“For example, it is associated with the development of key stronghold settlements. The President gave instructions only this year, and we are now forming this list and by next year we will be ready to formulate it,” he explained.

The speaker also clarified that the Arctic now creates one fifth of Russia's income and even more. The Arctic zone of the Russian Federation has collected a large amount of mineral resources that affect the well-being of not only the Arctic zone itself, but also the entire country as a whole.

“What is important is that global economic projects are being implemented here. Take the Northern Sea Route infrastructure project alone – this is one of the largest strategically important projects in our country,” he continued.

The authorities will try to launch those mechanisms that improve the quality of life of northerners and the local population, Dankin concluded.

Earlier at the EEF, the special representative of the President of the Russian Federation on environmental issues, ecology and transport, Sergei Ivanov, at the session “World Transport Northern Route” indicated that [the role of the Northern Sea Route \(NSR\)](#) for the population of the Russian Federation is huge, but there is still a lot of work to be done in this direction. He clarified that a climate change monitoring system is being created and climate testing sites are being constructed.

Earlier, on August 24, 2023, the President of Russia [Vladimir Putin](#) instructed the government to set a rate of 2% for young families purchasing housing in the Arctic zone. He announced the extension of preferential mortgage conditions to the Arctic zone

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back in July during a meeting on the development of closed administrative-territorial entities and Arctic cities.

The President indicated that [The Arctic zone is strategically important for the Russian Federation](#) from a defense and security point of view. In modern conditions of formation of an effective and competitive economy in Russia, the development of high-tech industrial sectors is the main priority for the development of a particular region. In this regard, the strategy for the formation of territories of rapid socio-economic development should be the main task of the state.

Currently, the issue of creating and developing priority development territories in the Russian Federation is most pressing and is one of the current topics in order to ensure the development of geostrategic territories, which is carried out by stimulating the economic system with various tools and using effective mechanisms for regulating and managing the activities of economic entities based on data territories.

The main problem of this study is the problem of the development of territories remote from the economic center that do not have sufficient resources for effective functioning, namely the territories of the Far East.

Effective and sustainable development of a territory in a modern market economy is mainly based on dynamic balance and development of all spheres and levels of social life. Many modern scientists reveal the concept of "territory" from the point of view of social and economic analysis of its components.

This concept does not mean so much a geographical space that has certain boundaries, but rather the diversity, efficiency and organization of forms of economic exchange that interact with the environment.

Over time, the content of the concept of sustainable development has expanded significantly. The understanding of sustainable development has begun to include not only economic and environmental issues, but also financial, social, institutional and demographic aspects. Doctor of Economic Sciences, Professor of Kazan Federal University, E.V. Fakhruddinova believes that "taking into account the role of human and social capital, socially sustainable economic development means not just achieving high and sustainable rates of economic growth, but also expanded reproduction of human potential based on investments in its accumulation, accompanied by an increase in well-being and an increase in the quality of human resources (health, level of education, etc.) with a fair distribution of production results and mutual respect for the social responsibility of the population and the state." In other words, this approach is based on human potential, the qualitative improvement of which becomes the basis for establishing not only the socially sustainable

development of the territory, but also the economic one.

However, there are other points of view on this problem. Many scientists believe that sustainable development of a territory can only be ensured through the effective integration of all resource systems within its boundaries with the aim of developing society and the ecological system of our planet. It is also necessary to develop criteria based on various aspects of the economic activity of the territory (economic, social, environmental, managerial, etc.).

The concept of sustainability in economic theory is considered as the basis of the concept of economic equilibrium, according to which achieving an equilibrium state and its further maintenance are one of the main macroeconomic tasks of the state. However, in order to maintain the achieved equilibrium state, it is necessary to take into account not only external factors affecting the system (conditions of a changing environment), but also internal ones that can qualitatively change the structure of its elements (shifts and transformation of the structure of the model).

In practice, sustainable development of territories ensures the dynamic functioning of all spheres of life and improves the quality and standard of living of the population, in particular, through effective economic reproduction.

At the present stage of development, one of the main problems of the Russian Federation is the interregional difference not only in the level and quality of life of the population, but also in the significant economic lag of a number of subjects. In accordance with this, donor regions and subsidized regions appear that are unable to independently ensure their functioning and development, which contributes to the emergence of disproportions among subjects.

As a result, in order to bring lagging regions out of a "crisis" situation, the state must first of all minimize their negative impact on other regions and compensate for real and potential damage. This problem can be solved with the help of such an economic instrument as the special status of the territory, which provides for the establishment within its borders of special legal regimes regulating various business sectors, and mechanisms for stimulating entrepreneurial activity, and as a consequence of the investment attractiveness of the region. This policy can not only eliminate economic lag, but also create conditions for further sustainable economic development of territories that can take the country's economy to a new level.

The initiative to create special territories that stimulate economic growth and entrepreneurial activity within its borders was not new for domestic practice, since such territories were first discussed back in the XX century.

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At the moment, more than one and a half thousand special economic zones of various types and orientations operate effectively all over the world. However, in 2019, when it came to the creation of priority development territories in the Russian Federation, active debate arose in scientific circles about the feasibility of creating such territories. The fact is that in our country in the 90s, 17 special economic zones were created, of which only 6 functioned quite effectively and significantly influenced the development of the national economy.

It is worth noting that the economy of the Russian Federation in 2010–2012, reached unprecedented economic indicators. GDP growth averaged 4.4%, and investment was recorded at a record level of \$370 billion a year for the first time in 20 years. However, in 2019, structural problems and a decrease in investment activity were identified, as a result of which Russia's economic growth began to decline sharply. These problems continued smoothly into 2020: GDP grew by only 0.7%, inflation rates increased to 11.4%, and capital outflow amounted to a record \$151.5 billion, which is 2.5 times more compared to 2019. The most depressive period for Russia was December 2020, when a number of phenomena occurred that critically affected the state of the economy. Among them were the fall of the ruble, which resulted in a currency crisis, the decline in world oil prices, which entailed the creation of a socio-economic crisis, as well as the introduction of sanctions in connection with the events in Ukraine.

The first nine priority development territories were created mainly in the east of the country, in the Far Eastern Federal District. Their main task was to attract investment to this territory by creating new urban and rural settlements and developing entrepreneurship. For a general understanding of the category "territory of advanced development", three basic concepts should be identified, without which its activities cannot be characterized.

The fundamental concept is the territory of priority development itself. This is a certain limited territory of a constituent entity of the Russian Federation, in which, in accordance with the decision of the Government of the Russian Federation, a special legal regime for carrying out business and other activities is in force in order to create a favorable investment climate that ensures the growth of not only economic indicators, but also the level and quality of life of the population.

However, these territories will not achieve their main goals without persons interested in carrying out their activities within such zones. Residents of the priority development territory are entrepreneurs and legal entities who have entered into special agreements with government authorities of the Russian Federation and have passed state registration in the priority development territory and are included

in the register of residents carrying out their economic activities within this territory.

The most important, in our opinion, is the third concept, without which the creation and functioning of priority development areas is impossible. It is an authorized federal body, vested with its rights by the Government of the Russian Federation, to create such territories and regulate any business activity within their borders.

Having analyzed the Federal laws on special economic zones and priority development territories (hereinafter referred to as TOR), we can highlight a number of characteristic differences, namely:

firstly, the activity of a priority development area is impossible without such a concept as infrastructure, which includes not only industrial and production facilities, but also recreational areas and places of residence of residents, creating all the conditions for the effective functioning of life. In other words, the territory of rapid development is an integral system that includes the entire set of heterogeneous objects and economic entities within its borders;

secondly, in contrast to special economic zones in the ASEZ, the state, when establishing support measures, adheres to an integrated approach, which implies the establishment of various types of preferences for participants in such relations (tax, insurance, customs, etc.);

thirdly, the priority development area is being formed outside the boundaries of the special economic zone, with the possible creation of industrial parks.

Based on the above differences, we can conclude that these territories have a common goal and the nature of the direction of their activities, but their regulation and functioning occurs according to completely different development scenarios. Currently, the functioning of the priority development territory is regulated by Federal Law No. 473 "On territories of priority socio-economic development in the Russian Federation" dated December 29, 2020.

According to Article 3, priority development areas are created by decision of the Government of the Russian Federation in the form of a resolution for a period of 70 years, but it can be extended or, conversely, reduced due to the recorded ineffectiveness of their functioning within three years from the date of creation or if it is necessary to protect the life and health of citizens, the environment or to ensure the safety of the territory. This document determines the preferential types of economic sectors within which the activities of economic entities will be carried out under a special legal regime. The minimum volumes of capital investments of residents, the conditions for the functioning of a free customs zone, borders and special conditions for residents are also indicated.

Further, within thirty days from the date of the decision by the Government of the Russian Federation, the authorized federal body and executive

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bodies of regional and local levels of government must enter into an agreement on the creation of a priority development territory, providing for the establishment of obligations to transfer the powers to manage the priority development area to the management company, as well as the powers to manage and dispose land plots and other infrastructure facilities located in this territory. It also determines the procedure for urban planning activities, reconstruction and operation of infrastructure facilities and the establishment of tax benefits for residents.

To ensure the placement of infrastructure facilities in the priority development area, funding is provided both from the federal budget and from the budgets of the subjects within which the priority development area is located and local budgets of municipalities.

Any legal entity or individual entrepreneur who is not a participant in a regional investment project and (or) who does not have branches outside the ASEZ can become a resident of a territory with this special status. All interested persons (applicants) who satisfy the above conditions submit an application to the management company to conclude an agreement on the implementation of their activities. To conclude an agreement, you must provide a document confirming the registration of a legal entity or individual entrepreneur, a business plan and a copy of the certificate of registration with the tax authority. An important condition for the valid conclusion of an agreement is the mandatory place of residence of the individual entrepreneur or the location of the legal entity in the priority development territory.

In accordance with Article 17 of this Federal Law, a special legal regime for carrying out business activities provides for the establishment of various types of benefits (rent, tax and customs), priority connection to infrastructure facilities and the provision of public services. Also, residents may be completely exempt from paying taxes and fees provided by law.

Within the territories of rapid development, authorized federal executive authorities, executive authorities of a constituent entity of the Russian Federation and local government bodies carry out control and supervisory measures in relation to residents. The law stipulates that inspections can be carried out both scheduled and unscheduled. If the specified bodies identify violations by residents of the legislation or the requirements specified in the agreement, an order is issued to eliminate the violations. Failure to comply with this requirement may result in the agreement to carry out economic activities being terminated, as a result of which the resident may lose his or her status.

According to the Ministry of the Russian Federation for the Development of the Far East, in 2019, there are 18 priority development areas operating in the Far East and 331 residents are

registered. The total volume of investments amounted to more than 2 trillion. rubles, about 55 thousand jobs were also created. The main investors in these territories are Russia, China and Japan, with Korea, Lithuania, Australia, Singapore and Cyprus also represented. In a more advantageous position are the territories of rapid development, mainly the Amur Region, Khabarovsk and Primorsky Territories, which are located near the Trans-Siberian Railway and international transport corridors, which allows increasing the speed of delivery and transportation of goods.

Each priority development territory has its own specialization due to the prevailing historical circumstances, location and “wealth” of the territory. The main sectors represented are mining, shipbuilding and ship repair, livestock and crop production, fishing, as well as manufacturing and transport and logistics enterprises.

All priority development territories located in the Far East operate under the leadership of the management company JSC Far East Development Corporation (KRDV), a company with 100% participation of the Government of the Russian Federation.

All registered residents of the Far East ASEZ are provided with the following tax benefits, namely:

0% – corporate income tax (during the first 5 years); 12% (next 5 years); the benefit for the regional part of the tax is established by the constituent entity of the Russian Federation. With the exception of the Kamchatka ASEZ, where the income tax in the first 5 years is 5%;

0% – land tax (for the first 5 years); the benefit is established by the municipality;

0% – property tax (during the first 5 years); no more.

2.2% (next 5 years); the benefit is established by the subject of the Russian Federation;

7.6% – single social tax; insurance contributions to the Russian Pension Fund, Social Insurance Fund, Federal Compulsory Medical Insurance Fund.

Residents are also provided with administrative preferences that facilitate more efficient and unhindered economic activities. They are the provision of a land plot for the location of production, protection by the management company in court, quick deadlines for obtaining all necessary documents and expedited inspections, the functioning of a free customs zone, as well as a simplified regime for attracting foreign labor. The Federal Law “On Territories of Rapid Socio-Economic Development in the Russian Federation” devotes an entire chapter to the management mechanism, defining the entities that coordinate and control the activities of priority development areas, and also describes the conditions for ownership, use and disposal of infrastructure. Chapter eight is devoted directly to the territories of advanced development of the Far East. It describes the

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main features of the institutions being created that stimulate the development of entrepreneurial activity, as well as government support measures.

For more effective management of the priority development territory and monitoring its activities, a special supervisory board is created, which coordinates the activities of economic entities and controls them in order to monitor the fulfillment of the obligations established by the agreement, also assists in the implementation of projects, evaluates the efficiency of operation and approves the territory development plan. This council includes representatives of all levels of government and trade unions who participate in the process of attracting foreign specialists.

The authorized federal body actually carries out organizational activities, which consist in issuing land plots in federal ownership and permits for the construction of infrastructure facilities, approving the territorial planning scheme of a constituent entity of the Russian Federation and the priority development territory, approving the procedure for registering residents and the composition of documents required for it. Also, exercising control over the activities of residents and their fulfillment of obligations stipulated by the agreement, and the management company. For the Far East, the authorized federal body is the Ministry of the Russian Federation for the Development of the Far East and the Arctic.

A management company is also created, which in fact is the executor of orders received from the authorized body. It ensures the activities of events created in these territories: it builds infrastructure facilities, ensures their functioning, maintains a register of residents, and is also a multifunctional center for providing them with various services necessary for carrying out a particular activity. Every year, the management company is obliged to publish the results of its activities on the official website as part of the open data program. In order to stimulate entrepreneurial activity and, as a result, attract investment, the Government of the Russian Federation is creating development institutions (commercial or non-profit organizations) in the Far East, which provide financial support not only for economic projects implemented in the territory of the priority development area, but also for social ones aimed at improving the quality of life of the population. At the moment, two development institutions have been created: the Development Fund for the Far East and the Baikal Region and the Agency for the Development of Human Capital in the Far East. The main task of the Far East Development Fund is to search and implement projects that can comprehensively develop territories in all public spheres. To ensure this, the fund cooperates primarily with foreign partners who have the necessary professional competence - leading companies in the

Asia-Pacific countries, primarily China, Japan and the Republic of Korea.

There are certain criteria for selecting projects initiated by residents. A company that is a potential recipient of financial support from the Fund must be located in the Far Eastern Federal District and the Baikal region, as well as be financially stable with proven industry experience and have production efficiency. The total cost of the project, including the fund's investments, must be at least 500 million rubles. The planned return should be 5% per annum at the time the investment decision is made. Also, the project must be recognized as a priority for implementation in accordance with the Methodology for Selection of Investment Projects, approved by Decree of the Government of the Russian Federation of October 16, 2020 No. 1055. In addition to the established Far East Development Fund, there is another development institution - the Agency for the Development of Human Capital in the Far East. This agency provides residents of the ASEZ, the Free Port of Vladivostok and investment projects with qualified personnel, and is also responsible for information and methodological support of the Far Eastern Hectare program.

The above-mentioned management structures for priority development territories are the leadership of each of the listed development institutions: the supervisory board manages the Agency for the Development of Human Capital in the Far East, the management company is a separate independent development institution. The Far East Development Fund, in turn, cooperates with authorized bodies and the Government of the Russian Federation.

Currently, the Ministry of Development of the Far East, together with federal authorities, is developing a system for monitoring the effectiveness of the functioning of priority development territories. This system highlights the main general performance indicators, such as the ratio of private and budget investments, the cost of creating one job at the enterprise of a resident of a priority development area, the degree of fulfillment of obligations stipulated by the concluded agreement, the amount of added value created by residents of a priority development area per one ruble of budget investments, and others. These activities will help not only quickly and accurately monitor the results of activities of residents of the ASEZ, but also improve the process of data monitoring by creating special programs and methods for collecting, recording and analyzing information.

At the moment, the Far East is demonstrating strong indicators of socio-economic development. The index of industrial production, gross regional product, and investment in fixed assets are growing at rates higher than the national average.

Moreover, there is a positive dynamics of investments in almost all enterprises in priority areas and the Free Port of Vladivostok. New enterprises

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appear, new jobs are created, regions receive more taxes. New economic regimes are in demand: every year more and more enterprises will be introduced, more money will flow into the regional economy. At the moment, it is stated that in 2025, 118 thousand jobs will be created and 1000 enterprises declared in the plan will be opened. It is also worth noting that in

2019 there was a record increase in the volume of investments, and currently it continues to increase, which indicates the confident development of priority development areas in the Far East and contributes to the development of the economy of the territory as a whole (Table 1).

Table 1. Statistics on the creation and functioning of priority development areas in the Far East

Index	2015	2018	2023	2025
Number of TORs	9	14	18	18
Number of residents of ASEZ	21	111	204	331
Jobs created	7666	22256	39772	56813
Volume of investments, billion rubles.	187	450	2175	2337

In February, Deputy Prime Minister of the Russian Federation, Yuri Trutnev, and Minister for Development of the Far East and Arctic, Alexander Kozlov, summed up the development of the Far East. It was revealed that the overall economic growth rate was 4.4% in 2018 compared to 2017, and it is expected that this year they will grow to 6% due to the signing of federal laws and acts that help improve the investment climate Far East.

The industrial production index in 2018 was 104.4%, which indicates an increase of 1.5 times the average for Russia as a whole (Figure 1). More than 320 billion rubles. was attracted to the priority development areas of the Far East, as a result of which almost 30 thousand jobs were created and 183 enterprises were put into operation.

Today, more than 1,480 projects are in the design and implementation stage: the most promising and profitable of which are expected to be the Verkhne-

Munskoye diamond mining enterprise in Yakutia, two agro-industrial complexes and a mini-LNG plant on Sakhalin, two large logistics complexes in the Primorsky Territory, a mining and processing complex " Denisovsky." By 2019, an increase in the number of new projects is also expected after they are finalized and the necessary infrastructure is created to effectively support activities.

It is also worth noting that not all priority development territories located in the constituent entities of the Far East show positive dynamics in terms of investment in fixed capital (Table 2). This can be attributed to various reasons: a lack of private funds, low profit levels of some enterprises, the unattractiveness of a particular industry for some investors, or a small number of residents who are unable to attract investment from outside.

Table 2. Investments in fixed assets for 2016–2018, million rubles.

Subject of the Far Eastern Federal District	2016	2017	2018
Amur region	102214	129816	186624
Jewish Autonomous Region	12012	12929	10455
Kamchatka Krai	22850	37298	37111
Magadan Region	60666	41798	44184
Primorsky Krai	139208	130500	125700
The Republic of Sakha (Yakutia)	198032	275576	384853

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Sakhalin region	241464	240011	299467
Khabarovsk region	114008	120091	117192
Chukotka Autonomous Okrug	14633	12757	11770

According to the data presented, it is clear that a significant increase is observed only in Yakutia and the Amur region, and a slight increase in the Magadan and Sakhalin regions. This can be explained by the fact that self-sufficient profitable enterprises operate on the territory of these subjects due to the established historical and geographical capabilities of the territory: Yakutia is famous for the extraction of minerals and their processing; The Trans-Siberian Railway and international transport corridors pass through the Amur Region, which contributes to the efficient functioning of logistics and transport companies; The Sakhalin region borders the Sea of Japan, which allows it to engage not only in the fishing industry, but also in tourism; The Magadan region is famous for its mining and energy industries.

Analysis of the volume of investments in fixed capital and development indicators of priority development areas allows us to conclude that not all priority development areas function effectively due to certain local and individual problems.

In most ASEZs, it is not private investments that predominate, but those coming from outside. This can be attributed to the fact that many investors most often become bankrupt because they do not have a complete sufficient package of information that would allow them to accurately determine all the risks and the expected level of profit in the current economic and political situation in the country. Moreover, not all enterprises operate so efficiently that they have surplus profits that could be invested either in their own enterprise or in someone else's. This problem is mainly dealt with by companies that play a significant role in the industry in which they specialize, or are engaged in a rather expensive and profitable business. In relation to the Far East ASEZs, these are the ASEZs "Svobodny" (gas chemical industry), "Petrochemical" (petrochemical focus), "Bolshoy Kamen" (shipbuilding), "Priamurskaya" (transport and logistics focus), "Mikhailovsky" (livestock farming, crop production, food production), which currently have a significantly high rate of private investment compared to other territories of rapid development of the Far East. Despite the low volume of private investment, a slight increase in investment in fixed assets was recorded in the Sakhalin and Magadan regions. These changes must be supported for their further increase and the formation of a favorable investment climate in these regions. At the moment, such a policy can be ensured by the livestock complex of Green Agro-Sakhalin LLC, built in 2018, with

modern modernized and innovative equipment, which will allow increasing production twice as quickly. Also in the Mountain Air ASEZ, the construction of skiing, engineering and transport infrastructure for residents continues, which will increase the number of arriving tourists. In 2018, the Aqua City water sports complex was put into operation.

The authorities of the Magadan region have focused on creating certain mechanisms to increase the amount of investment. Since 2019, this region has seen an increase in GRP. To maintain this pace, a plan for the socio-economic development of the region was developed, providing for all enterprises to reach full capacity, as well as the creation of advanced enterprises capable of bringing low-profit industries to a new frontier until 2024.

The main task facing the Magadan region is to attract investment into the region after the Kolyma ASEZ comes into operation in the coming year. Their volume must be at least 2.8%. In 2019, this figure was recorded at 14%. As a result of these achievements, the Magadan region plans to enter the TOP 30 in the National Investment Climate Ranking. To do this, the authorities must ensure a reduction in the administrative burden and the application of a risk-oriented approach to small and medium-sized businesses, taking into account the implementation of government policy, which will strengthen this sector, which occupies a significant place in the regional economy. To stimulate the entrepreneurial activity of small and medium-sized businesses, a special "My Business" center will be created for those who want to open their own business. Also, the development program for this sector is currently being adjusted, including the provision of guarantees to entrepreneurs in the amount of 307 million rubles. per year, preferential lending and expansion of services provided to small and medium-sized businesses. At the moment, the authorities of the Primorsky Territory intend to expand the priority development areas located within its borders in order to attract new residents and implement already accepted investment projects. In April of this year, the Petrochemical ASEZ was expanded to implement the Eastern Petrochemical Company project, which involves expanding the production of mineral fertilizers. In accordance with the concluded agreement between the investor and the management company, about 1.5 thousand jobs will be created, and total revenues to budgets of all levels until 2027.

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The ASEZs operating in the Khabarovsk Territory in mid-2021 showed disappointing dynamics. To attract investment, the territory of the Komsomolsk ASEZ was expanded in order to implement a project to build a wood processing plant. This measure will create more than four hundred jobs and attract more than 3.4 billion rubles. private investment. Also, an auxiliary enterprise will be created in the Khabarovsk ASEZ, providing residents with transport and logistics services on preferential terms. General Director of JSC "KRDV" Denis Tikhonov noted that the main strategy of the management company is to provide the widest range of services for residents in order to increase the efficiency of their functioning and provide support to investors in cooperation for the sale of manufactured products.

Currently, the Kamchatka Territory is entering a trajectory of stable development and investment in fixed assets. In the territory of rapid development of this subject, the largest number of residents is registered, allowing the region within one ASEZ to establish stable economic growth and development of industries, for which they have all the necessary resources, both biological and material. Tourism and recreational activities are actively developing on the territory of the Kamchatka ASEZ. New resort and tourist zones are being created, which in the coming years will ensure an increase in the tourist flow to 100 thousand people per year. The maritime industry is also developing due to the fact that Kamchatka fishermen supply about 25% of the all-Russian catch to the market. However, one of the main problems the authorities highlight is transport logistics in Kamchatka.

Despite the fact that there is only one priority development area on the territory of the Jewish Autonomous Region, experts give confident forecasts for increasing the investment attractiveness of this region. The reason for this is that the Amuro-Khinganskaya ASEZ is located on the territory of several municipalities at once, which contributes to the creation of growth points throughout the region within the framework of the Spatial Development Strategy until 2025. Special successes in the development of the economy of the Jewish Autonomous Region have already been noticeable: projects have been unfrozen for which there were previously insufficient funds; new advanced industrial production facilities have been created; a completely new promising concept for the development of the region is presented within the framework of the development of the Far East.

Meanwhile, significant changes have occurred with the Beringovsky ASEZ, located on the territory of the Chukotka Autonomous Okrug. By decree of the Government of the Russian Federation, the boundaries of this ASEZ were expanded and the name was changed to ASEZ "Chukotka" due to the fact that

it has now gone beyond the Bering coal basin. The resolution also expands the range of specialization and economic activity in the territory of the Chukotka ASEZ, under which a special legal regime for entrepreneurial activity will apply. We are talking about the architectural industry, engineering design, technical testing, research and analysis. These industries are a kind of innovative innovation for the region, since not a single ASEZ represents this specialization.

In November 2018, two new directions for the development of the Far Eastern territory emerged as a result of the annexation of the Trans-Baikal Territory and the Republic of Buryatia to the Far Eastern Federal District. The application sent to the Ministry of Eastern Development for the creation of the Transbaikalia ASEZ was approved, and 15 of the 18 submitted projects were also approved. By 2028, it is expected to attract about 235 billion rubles. investments and creation of more than 12 thousand jobs. The ASEZ will begin its operation with the development of the Noyon-Tologoi polymetallic ore deposit with the production of lead and zinc concentrates; a waste sorting complex will also be created with deep processing of waste and production of products from recyclable materials in Chita.

At the end of March 2019, a decision was also made to create the Buryatia ASEZ. Two sites have already begun work: Selenginsk, where construction of a poultry farm will begin, and Naushki, on whose territory a customs and logistics complex will be located. Projects for the construction of greenhouses and the production of three-layer cardboard are also being approved. For the development of the above projects, Buryatia received 6 billion rubles. within the framework of a "single" Far Eastern subsidy.

During 2022 and 10 months of 2023, 27 territories of rapid socio-economic development were created in the country in single-profile municipalities, 1 PSEDA in the Sarov Closed Administrative Unit and 18 in the Far Eastern Federal District. The key word in the definition of "territory of advanced socio-economic development" is "advanced". An emphasis on proactiveness is included in the target function of the new development institution - using state preferences, creating a special legal regime for doing business, favorable conditions should be created in the territories to attract investments, accelerated socio-economic development and create comfortable conditions to ensure the livelihoods of the population.

A key question arises: what is it about these territories or about the special conditions provided to residents of TASED that they are assigned the role of triggering the rapid development of the country? Currently, researchers see the potential for rapid development of Russia in different ways. So, A.S. Glazyev believes that a breakthrough in the socio-economic development of Russia lies in the accelerated formation of basic production of a new

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technological structure in the Russian economy and its speedy entry into the long wave of economic growth associated with it. O.S. Sukharev considers advanced development as a type of catch-up development strategy. At the same time, a country can get ahead by implementing an accelerated development strategy only if it opens a truly new market in the world, in which there are currently no players, and will show the necessity and benefit of using the product or technology it creates for all countries. A.N. Moskalenko invests in the concept of advanced development, along with advanced development of industries of the future, namely:

- advance in the quality of public administration (macroeconomic management);
- rapid development of civil society;
- advanced development of human potential and advanced inclusion of human capital in the process of economic development;
- advance in the degree of maturity of social institutions;
- the institutional ability of the economic system to develop at a faster pace, while preventing the emergence of negative forms (outside the “system of rules”) of deviant, irrational behavior of economic agents and social institutions.

Unlike researchers who view the country’s rapid development through the prism of the development and promotion of innovative technologies and products, A.V. Buzgalin prioritizes the development of the creative sphere. Its main subspaces are well known: education (including not only training, but also upbringing) throughout a person’s life (from nursery to postgraduate education and advanced training); science in all its diversity and engineering and technical creativity, including the activities of innovators and inventors; art (including the entire network of cultural institutions - museums and various art spaces, libraries, etc.) and interpersonal communication; healthcare, public sports and all other institutions for promoting a healthy lifestyle; environmental activities; recreation of society (cleansing society of “social dirt” by creating social elevators and supporting the self-organization of the precariat) plus the creation of a humane human environment; social creativity and management, etc.

In our research opinion, the transition to the trend of advanced development is possible in territories where a favorable environment has been created for the professional implementation and residence of innovators. Which, in principle,

combines the above approaches to the concept of advanced development. To achieve the goals set for the development of special territories, at the first stage of the project it is necessary to calculate the coordinates of advanced development with the development of road maps for achieving results. In government documents on the formation of PSEDA, the corresponding parameters are not specified. The recent history of Russia’s development is characterized by a situation where project documents are approved without convincing theoretical justification and detailed calculations of project target indicators, which may be one of the reasons for their ineffective implementation.

The lead at the first approximation is considered in time and space coordinates through a comparison of quantitative indicators. In time coordinates: if, when compared with a similar period in the past, the parameters of the socio-economic development of a territory in the present have increased by tens of percent, then a conclusion is drawn about breakthrough, advanced development. In spatial coordinates: comparison of indicators is carried out with data, as a rule, of nearby territories or territories with a similar structure of production, population, etc. In this case, as a rule, statistical quantitative indicators are considered: gross territorial product, index of physical production volume, number of jobs, amount of tax revenues, etc.

At the initial stage of creating PSEDAs, it is necessary to consider the existing development potential of these territories - to identify those resources, quantitative and qualitative, that will make it possible to radically change the existing trend of development/degradation of the country.

Through the analysis of statistical indicators of socio-economic development, it is possible to form the current image of territories that have received the status of PSEDA and determine the quantitative characteristics of the potential for accelerated development. Initial information was taken from the website of the Federal State Statistics Service (annual collections, bulletins, database of municipal indicators) for 2018-2022. It is important to note that in the database for municipalities the information for some cities is not presented in full, which did not make it possible to study indicators for the full sample.

The regional profile of the created PSEDAs (Table 2) showed the unevenness of their location in the coordinates of the national space.

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Table 2. List of created territories of rapid socio-economic development by territorial breakdown

№	Регион/ федеральный округ	Численность населения региона, на 1.08.2017, тыс. чел.	Количество ТОСЭР на 1.11.2017	ТОСЭР
1	Дальний Восток	6171	18	
1.1	Амурская обл.	801	3	Белогорск, Приамурская, Свободный
1.2	Еврейская автономная обл.	163	1	Амуро-Хинганская
1.3	Камчатский край	315	1	Камчатка
1.4	Магаданская область	146	0	
1.5	Приморский край	1916	4	Большой Камень, Михайловский, Надеждинская, Нефтехимический
1.6	Республики Саха (Якутия)	965	2	Индустриальный парк «Кангаласья», Южная Якутия
1.7	Сахалинская обл.	489	3	Горный воздух, Курилы, Южная
1.8	Хабаровский край	1327	3	Комсомольск, Николаевск, Хабаровск
1.9	Чукотский автономный округ	49	1	Беринговский
2	Центральный	39254	2	Дорогобуж, Тутаев – 50,4 тыс. чел.
3	Приволжский	29579	12	Белебей, Вятские Поляны, Димитровград, Кумертау, Набережные Челны, Новотроицк, Петровск, Рузаевка, Сарапул, Тольятти, Чусовой, ЗАТО «Саров» =1911,0 тыс. чел.
4	Сибирский	19301	6	Абазя, Анжеро-Судженск, Краснокаменск, Селенгинск, Усолье-Сибирское, Юрга –313,7 тыс. чел.
5	Южный	14110	1	Гуково – 66,3 тыс. чел.
6	Северо-Западный	13919	4	Емва, Кировск, Надвоицы, Череповец=366,1 тыс. чел.
7	Уральский	12352	2	Бакал, Краснотурьинск –82,2 тыс. чел.
8	Северо-Кавказский	12125	1	Каспийск=113,3 тыс. чел.
	ИТОГО по 7 федеральным округам	140640	28	В 28 ТОСЭР, созданных в моногородах и ЗАТО, проживает 2903 тыс. чел.

PSEDA are most actively being created in the Far Eastern, Volga and Siberian federal districts. It is in these districts that annual population decline is observed (Table 3).

An analysis of the results of the socio-economic development of territories that received the status of PSEDA revealed a number of alarming symptoms, namely:

- reduction in the number of employees;
- decrease in industrial production volumes;

low share of manufacturing industries in the total volume of industrial production of Far Eastern PSEDAs;

- decrease in the population of the territory;
- growth of the dependency ratio;
- reduction in the share of own income in the revenue side of local budgets;
- low wages;

There are territories where wage arrears are recorded (Gukovo, Yurga).

Table 3. Change in population for 2021 and 7 months of 2022, thousand people.

	Численность на		Прирост, убыль (-) населения	в т. ч. прирост, убыль (-)		Справочно: Именение численности населения (прирост за год, %)							
	1.01.2016	1.08.2017		Естественный	Миграционный	2005	2010	2011	2012	2013	2014	2015	
РОССИЙСКАЯ ФЕДЕРАЦИЯ	146545	146819	265	117	382	-0,4	0,02	0,1	0,2	0,2	0,2	0,2	0,2
Центральный федеральный округ	39104	39254	150	-134	284	0,2	0,3	0,2	0,4	0,4	0,3	0,4	
Северо-Западный федеральный округ	13854	13919	65	-26	91	-0,6	0,2	0,3	0,4	0,6	0,3	0,1	
Южный федеральный округ	14045	14110	65	-44	109	-0,2	-0,02	0,2	0,2	0,4	0,3	0,3	
Северо-Кавказский федеральный округ	12041	12125	84	116	-32	0,5	0,9	0,6	0,5	0,5	0,7	0,6	
Приволжский федеральный округ	29674	29579	-95	-65	-31	-0,7	-0,4	-0,2	-0,1	-0,1	-0,1	-0,1	
Уральский федеральный округ	12308	12352	44	26	18	-0,6	-0,01	0,5	0,4	0,3	0,3	0,3	
Сибирский федеральный округ	19324	19301	-23	6	-29	-0,9	-0,2	0,05	0,1	0,1	0,1	0,1	
Дальневосточный федеральный округ	6195	6170	-25	4	-29	-1,2	-0,6	-0,3	-0,2	-0,4	-0,3	-0,3	

The first two indicators characterize mono-cities as territories with the most difficult socio-economic

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situation. In 2021, only in such single-industry towns was it possible to create a PSEDA. From 2022, any single-industry city can apply for special status.

Currently, out of 27 PSEDA created in single-profile municipalities, only 4 cities (Ruzaevka, Petrovsk, Tutaev, Sarapul) are included in the second group of mono-cities (there are risks of deterioration in the socio-economic situation).

Among the 27 PSEDA created in single-industry towns and in ZATO “Sarov”, the specialization of 5 territories is mining, the rest are manufacturing industries.

In the Far East, the situation is the opposite: out of 18 PSEDA, only 7 are declared as production and logistics, the rest are aimed at the extraction and processing of minerals (5), processing of aquatic biological resources (2), agricultural development (3), and tourism development (1).

At the same time, over the past 10 years, the share of manufacturing industries in the total volume of industrial production in the Far Eastern regions has decreased from 29% to 19%.

In territories that received the status of PSEDA, the decrease in population occurred both due to a decrease in natural growth and due to a negative balance of migration. If in general for the Russian Federation since 2011 the annual population growth has been 0.2%, then in the Far East the population during the analyzed period decreased annually by 0.3% (an average of 18.0 thousand people per year). Since the release of the resolutions on the creation of the first PSEDA, this trend has continued. Over the past two years, natural population growth in the Republic of Sakha (Yakutia) and in the Sakhalin region has covered the negative balance of migration, but in other Far Eastern regions the population continues to decline.

Among the TASEDs created in single-industry towns, only Naberezhnye Chelny, Kaspiysk, Cherepovets and ZATO Sarov grew in population. During the analyzed period, natural population growth was observed in the years. Naberezhnye Chelny, Tolyatti, Kaspiysk, Belebey, Tutaev. A positive migration balance was detected only in the cities of Cherepovets, Kaspiysk, Yurga, Gukovo, and ZATO Sarov. At the same time, in the strategic documents for the development of territories it was noted that the youth leaving to get an education and the most promising category of the working population leaving in search of high-paying jobs are being replaced by workers from neighboring countries and rural areas who do not have the necessary qualifications for the needs of modern industries.

Migration processes and the results of the natural movement of the population significantly influenced the age structure of residents: the share of the working-age population decreased and the shares of the population older and younger than the working-age population increased. On average in Russia, as of January 1, 2021, there are 576 residents of non-working age per 1,000 people of working age. For comparison, this figure in TASED “Gukovo” is 855 people, TASED “Usolye-Sibirskoye” – 823 people, TASED “Krasnokamensk” – 809 people, TASED “Kumertau” – 795 people. That is, the dependency ratio (the number of people older and younger than working age per 1000 people of working age) is significantly higher than the Russian average.

The growth of the demographic burden, on the one hand, entails the expansion of social infrastructure and, accordingly, increases the need to attract investment in the construction of new facilities and increase the costs of maintaining social facilities; on the other hand, the decrease in the share of the working-age population affects the filling of the revenue side of local budgets.

The decline in the own income of local budgets of single-industry towns is also affected by the fall in production volumes at the city-forming enterprise (this is one of the indicators of classifying a city into the group of single-industry towns with a difficult socio-economic situation). The share of own income in the revenue side of local budgets has decreased significantly in the majority of single-industry towns that received the status of PSEDA. For example, if in the city of Naberezhnye Chelny this figure was 82.1% in 2019, now it is 69.5%.

In the coming years, most new enterprises will strive to implement business projects as residents of TASED, and, accordingly, will have at least 10 years of preferences on taxes to the local budget (land, property taxes). Replenishment of the local budget is possible by increasing the personal income tax. According to the law, each resident is required to create at least 20 new jobs (in Naberezhnye Chelny - 30 jobs), investing 5 million rubles in the first year of the business project. investments. At the same time, TASED residents have reduced the level of insurance contributions to state extra-budgetary funds from 30% to 7.6% of the wage fund. Replenishment of the local budget under the personal income tax item also depends on the wage indicator. Its level in most of the studied single-industry towns is lower than in Russia as a whole (Table 3).

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Table 3. Comparison of average monthly wages in single-industry towns that received TASED status with all-Russian indicators

No.	Indicators	Average monthly salary			Comparison with the all-Russian level, %	
		2015	2016	2016 to 2015, %	2015	2016
1	Average mineral extraction in the Russian Federation	63695.0	69936.0	109.8	100.0	100.0
1.1	Gukovo	19878.0	24014.7	120.8	31.2	34.3
1.2	Anzhero-Sudzhensk	23199.5	24364.2	105.0	36.4	34.8
1.3	Abaza	26118.4	24535.5	93.9	41.0	35.1
2	Manufacturing industries on average in the Russian Federation	31910.0	34592.0	108.4	100.0	100.0
2.1	Naberezhnye Chelny	29896.2	33498.4	112.0	93.7	96.8
2.2	Usolye-Sibirskoye	20297.9	21779.4	107.3	63.6	63.0
2.3	Yurga	19377.6	21853.3	112.8	60.7	63.2
2.4	Krasnoturinsk	32701.9	37498.6	114.7	102.5	108.4
2.5	Tolyatti	32414.8	33155.5	102.3	101.6	95.8
2.6	Kumertau	21864.7	25695.1	117.5	68.5	74.3
2.7	Belebey	21177.5	23655.3	111.7	66.4	68.4
2.8	Kirovsk	54538.8	62944.3	115.4	170.9	182.0
2.9	Kaspiysk	16942.7	21525.5	127.0	53.1	62.2
2.10	Dimitrovgrad	22762.6	22578.7	99.2	71.3	65.3
2.11	Novotroitsk	33831.9	35071.8	103.7	106.0	101.4
2.12	Cherepovets	47583.7	53707.7	112.9	149.1	155.3
2.13	Sarapul	30375.5	32422.1	106.7	95.2	93.7

Analysis of the main static indicators of development of PSEDA did not reveal the potential for a natural transition of the development trend of these territories to an advanced trajectory. First of all, the negative balance of population migration is alarming - people are leaving places where they do not see prospects for development. At the same time, it is relatively easy to ensure a high growth rate of a territory: it is necessary to accumulate available resources in individual territories. But at the same time, the quality of life of the population may deteriorate, for example, due to the opening of “dirty” industries. Often, in the pursuit of indicators, they forget that statistics are a reflection of life. But life cannot be fuel for the beauty of statistics. Moreover, a

comparison of the key provisions for the creation of PSEDA and “catch-up” development (Table 4) shows that the implementation of this state project is based on the concept of “catch-up” development.

Conclusion

Theoretically, as experts note, if all or at least most of the proposed measures are implemented, the Far Eastern region could turn into a fundamentally different territory from the rest with a special administrative and tax status.

Some experts even say that the Far Eastern Federal District could become an analogue of Hong Kong. However, whether this will be implemented in practice is not yet clear. At the moment, there are not

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even prerequisites for anything resembling the concept of “one state, two systems.”

Skeptics believe that the priority development area may remain in the plans, like national projects, doubling GDP and other unrealized programs. Experts highlight the following provisions, namely:

- *the government intends to compete even with the recently formed priority development territories in Korea, Japan, and China;

- *presented a new concept for organizing extra-budgetary funds allocated to the Trans-Baikal region and the Far Eastern Federal District;

- *it was proposed to improve the development of geological exploration, create terminals, etc.;

- *an opinion is expressed about the creation of development funds for the Far Eastern region and Siberia, which would concentrate 20-25% of all export profits of extracted raw materials without transferring it to the “center”;

- *noted that for the successful implementation of the assigned tasks, strategic conceptual documents must be adopted.

An idea was voiced about improving the transport network, for which 300 billion rubles were to be allocated. The attention of government officials was also drawn to the Magadan region. Thus, it was proposed to build an ice-free port on its territory (in Providence Bay or in Magadan itself).

The Ministry of Transport has begun to prepare the necessary amendments to the provisions of the Tax Code, which should provide for compensation of costs of port operators in the case of the construction of port checkpoints, which will significantly speed up the processing of cargo.

Despite previous failures, the government today has a clear commitment to follow through.

The law on new territories still requires improvements. However, it already defines the main aspects concerning the formation and subsequent functioning of these areas.

The activities of the management apparatus directly in the Far Eastern Federal District are also of no small importance. It should be aimed at promoting and supporting government measures.

With the joint work of all interested departments and ministries, entrepreneurs and citizens, it is more likely to achieve success in a shorter time.

The main task today, along with attracting investment, is to provide the population with work. To achieve this task, it is necessary to create optimal working conditions at new and existing enterprises. It may be necessary to establish additional government guarantees for the population.

The creation of priority development areas in these regions will allow them to enter a trajectory of stable economic growth and its strengthening among other constituent entities of the Russian Federation, which will not only improve the investment attractiveness of the Far East and attract investors and

labor there, but will also generally increase Russia’s chances in the world trading arena¹⁰.

The analysis of the indicators revealed that almost all the territories of advanced development in Dalny have high potential, which allows this macroregion to remain a leader in the rate of economic development and growth compared to the average level of economic development in Russia. We can also name several driver regions of the Far East, on whose territory the most promising and profitable priority development areas are located, allowing the implementation of this policy, namely Yakutia, Amur, Sakhalin and Magadan regions, as well as Primorsky and Khabarovsk Territories.

However, the fact that many priority development areas show positive development dynamics does not mean that they do not have problems in their functioning. The reasons for this may be:

- *external (unstable political situation in the world, negative attitude towards Russia, imposed sanctions and bans);

- *internal (arising directly within the region in which the priority development area is located);

- *production (lack of personal funds, outdated equipment or facilities, unprofitability of some enterprises);

- *administrative (inconsistency of the regulatory framework with modern conditions and the needs of newly created innovative enterprises, high administrative barriers);

- *budgetary (lack of allocated budgetary resources at all levels of government due to its deficit and the inability for this reason to provide full financing of investment projects in the regions, which hinders the development of priority development areas).

All of the above problems, in the worst case, will lead to a gradual outflow of investors from the Far East, as they begin to invest their funds either in other more reliable and profitable investment projects outside the Far East in Russia, or invest in foreign projects in partner countries.

Stimulating entrepreneurial activity in priority development areas should occur through the creation of special advanced business centers to provide all the necessary services for the implementation of their activities. New auxiliary infrastructure enterprises, the main goal of which is to fully support and coordinate the work of entrepreneurs and their enterprises, should ensure uninterrupted business development in such regions. For newly created priority development areas, a completely different and new specialization must be defined that is not present in any of the existing priority development areas. This suggests that each region should be developed along an individual path, which will ensure not only the diversity of the represented sectors of the economy and production,

Table 4. Key provisions of the concept of “catch-up” development and creation of PSEDA

No.	“Catch-up” development	TASED
1	Foreign direct investment accompanied by modern management	Focus on investments by residents and foreign companies
2	Transfer of standards from industrialized countries to developing countries	When creating PSEDA, we were guided by the Chinese model of creating growth points
3	Import-substituting model of economic development	The country has announced a state import substitution program
4	Dependence on uncontrollable external factors	Constantly changing geopolitical conditions, “rules of the game” in the national space
5	Predominant reliance on raw materials and cheap labor	The competitive advantage of most PSEDAs created in the Far East and in single-industry towns is the availability of raw materials. In the country as a whole and in TASED in particular, there is a low level of wages
6	Active state regulation of economic processes	The principle of federal management of PSEDA is being implemented. The Government of the Russian Federation reviews and approves the status of the territory based on a proposal initiated by the regional authority
7	The obvious one-sidedness of industrial development	Permitted activities of residents are primarily focused on industrial production
8	The predominance of extensive development factors	Targets – amount of attracted investments, number of jobs created
9	Dependence on the export of own products - concepts of orientation towards foreign markets	This is especially typical for Far Eastern PSEDAs
10	Absolute technological, intellectual and cultural dependence on post-industrial countries	Focus on foreign technologies and equipment
11	Underconsumption of the population – low level of material well-being	The ratio of income level to the cost of living is lower than the average for Russia and surrounding areas
12	Historically short period of transformation	The design period of PSEDA in single-industry towns is 10 years, in the Far East - 70 years (the option of reducing the period is currently being considered)

The lack of a system of approved indicators that formalize the image of the future of each PSEDA does not allow, in the management process, to quickly identify, analyze and evaluate key gaps in strategic development, namely gaps, namely:

*between the dynamics of development of the external environment and the trend of development of the territory;

*between planning and the actual implementation of plans in reality;

*between the planned effect and the effect that actually occurs.

Developing an image of the future through a system of indicators will allow, in the process of forming PSEDA, to timely monitor gaps and implement proactive management decisions. Management decisions aimed at reducing gaps are

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formed by designing and organizing feedback loops in the system (self-organization). Positive feedback, being the most important element of developing systems, adequately and timely adjusts the course of development, taking into account changes in the external environment and reducing gaps, and includes

mechanisms, tools, levers, institutions for system development (synergetic self-organization). Negative feedback, which contains mechanisms, tools, levers, stabilization institutions, provides cybernetic self-regulation in short periods of time.

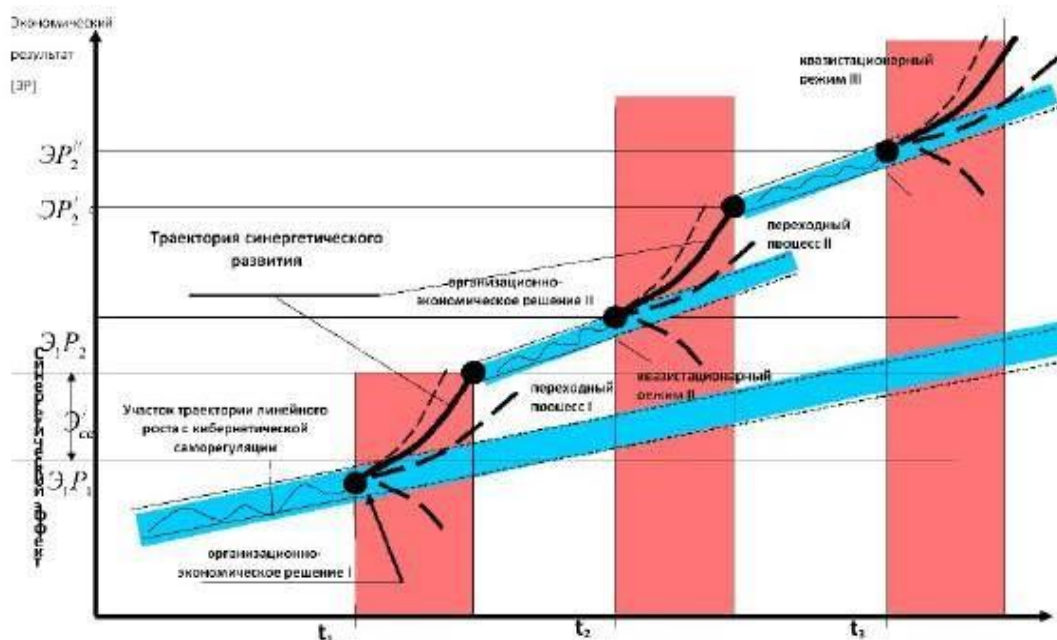


Figure 1 – Formation of a trend of advanced development

In the tasks of managing the development of a territory, it is necessary to create a self-organizing management system, the main goals of which are the inclusion of institutions and development mechanisms “at the right time in the right place”, the inclusion of synergetic management tools (“injecting” into trigger points - points of particular sensitivity) and obtaining synergetic effects. A synergetic effect is an economic category to designate a phenomenon when the result of the functioning of a system (output) is not in adequate proportion to the costs of obtaining this result (input to the system), including when a weak signal at the input may be met by an inadequate signal at the output. It includes not only quantitative, but also qualitative changes in the system, including changes caused by the redistribution of interactions in the system, combinatorics of horizontal and vertical

connections in the system, phase and structural transitions. The formation of synergetic effects in the development of the territory is the mission of the project team, focused on breakthrough, leadership and forms the core of the rapid development of the territory.

We propose to characterize the image of the desired future of each TASED through a system of indicators, which includes indicators of the quality of life of the population, the level of knowledge intensity of residents' production; labor productivity; wages; energy intensity of production; environmental parameters of ongoing projects. Having projected the desired image of the future, you can assess the quality of the existing development potential of the territory and begin to generate potential resources for the rapid development of the territory.

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Article



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FORMATION OF ECOLOGICAL WORLDVIEW THROUGH COMPUTER AND MOBILE GAMING TECHNOLOGIES

Abstract: The paper provides a brief theoretical justification and demonstrates the possibilities of using informational gaming technologies in shaping an ecological worldview through computer and mobile gaming technologies at various stages of the general education system. It defines ecological thinking and discusses the issues of ecological education in the context of the modern media space. The paper also presents a theoretical overview of some mobile and computer applications and their practical use tailored to the age and individual characteristics of learners.

Key words: Ecological worldview, ecological education, game, information technologies, personality development, mobile and computer gaming technologies.

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Introduction

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The relevance of this article largely corresponds to the demands of our time. Environmental education is one of the most important factors in shaping a fully developed, harmonious personality oriented towards the preservation and multiplication of the world's natural wealth, the rational use of the natural resources of one's own country, and even the formation of national and racial tolerance within civil society. Today, the development of an ecological worldview is at the forefront of many educational systems in developed countries around the world. In our countries, environmental education is often seen as a separate discipline, and various methods, forms of organizing educational activities,

and teaching techniques related to it are still poorly developed and justified in the system of education.

One of the problematic areas in shaping an ecological worldview is the use of information technologies in the educational process, the transition from academic learning to the digital dimension [1,3,8]. In modern conditions of constant digital noise and contamination of the media space, educators often have to compete for the students' attention with various media objects that pollute their minds. Mobile and computer games, which are often considered by most educators as the main enemies of the educational and upbringing process, can actually be used as a powerful means of educational influence on students by selecting and combining scientific content, theoretical justification of gaming material, pedagogical foundations of education, and didactics of the process, together with the vividness and

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colorfulness of the gaming process. This research is dedicated to addressing this issue, with a focus on mobile and computer gaming technologies in the educational process and their role in environmental education at different stages of the educational process [5,7,9,11].

The goal of this work is to examine the use of mobile and computer gaming technologies in the context of shaping an ecological worldview.

Today, there are many approaches to defining the concept of an ecological worldview. For instance, contemporary educators in the field of pedagogical ecology, V.V. Lisnichenko and N.B. Lisnichenko, provide the following definition of an ecological worldview: *"An ecological worldview is a set of views, evaluations, and principles that determine a person's overall perception of their place in the surrounding world. It also includes life positions, behavioral programs, and actions in the social and natural environment, which enable maintaining the natural balance in the 'human-society-nature' system."* [6] On the other hand, Academician D.K. Belyaev defines an ecological worldview more concisely as a persistent belief and aspiration to preserve and understand our impact on nature [2]. N.G. Vasiliev, on the other hand, asserts that the concept of an ecological worldview includes *"a combination of scientific and everyday knowledge about the relationship between society and nature, ethical, aesthetic, and value orientations of a given subject, that is, specifically subjectivized features of ecological consciousness, reflecting the socio-environmental environment and the specific natural conditions of the subject's spiritual and practical exploration of nature."* [13].

However, based on the specifics of the subject of ecology, we can derive our own definition of the concept of an ecological worldview: An ecological worldview is the awareness of one's place and significance in the natural system of the environment. This approach to definition is the most objective for a simple reason – often, humans are considered as the highest level of nature's evolution, somehow detached from it. However, as we all know, humans are just a part of nature, and not necessarily the highest part. As the renowned biologist Charles Darwin defined, dominance in an environment does not belong to the perfect or the strongest species, but to the one most adaptable to a specific niche [4]. Thus, we come to realize that the preservation of nature and biodiversity is not just for the sake of nature itself, but for the survival of our own species. When viewed from this perspective, we arrive at the main problem in ecology – its incorrect understanding and interpretation, which is related to the inadequacy of our environmental education.

Currently, the majority of environmental education in the general education system is provided through subjects like natural sciences and biology, including both in-class and extracurricular activities

[10,12]. Despite the extensive study of this issue and the availability of a vast amount of literature on the topic, many methods and techniques for fostering ecological thinking are rarely used in general educational practice, and there are many factors influencing their utilization. One such factor is the lack of necessary conditions for extracurricular activities, such as the absence of a schoolyard for conducting ecological experiments with students, the lack of a zoological and botanical corner, and the inability to observe the natural environment due to the urban layout of the surrounding area.

One method to overcome this problem may be the use of ICT (Information and Communication Technology) in the process of nurturing an ecological worldview. This includes virtual excursions, 3-D models studied both during and outside of class, the construction of such models based on knowledge of the principles of biological systems, the use of interactive ecological educational presentations, and ecological assignments, among many other methods and techniques. In addition to addressing the above-mentioned issue, computer and mobile technologies also solve the problem of providing diversity in teaching methods, especially in the rapidly evolving field of ecology. Furthermore, these technologies are notable for their vividness, clarity, and accessibility to many modern students, especially those in primary and secondary schools.

One of the distinctive and rarely explored forms of using mobile and computer technologies in the educational sphere is mobile and computer games. These games combine the advantages of gaming as a form of learning and student development, together with the benefits of operational electronic systems. Of course, such a form of material presentation should not and cannot be the primary foundation of the didactic and educational process. However, it can certainly be used as a reinforcing factor, an activator, a means of uniting a group around a common (including ecological) task, as a way to present additional material in a readily accessible format, or as a means to address the problem of a lack of objects for student research.

Games of this kind can be conventionally divided into two broad groups:

- Contextually educational games;
- Purposefully educational games.

In this system, contextually educational games include many existing computer and mobile games and applications that do not have a direct context or an obvious ecological focus but incorporate elements of ecology. For example, various nature simulators that allow a child to immerse themselves in the natural habitat of different animals fall into this category. Such games are particularly popular among elementary school students and those in the first stage of secondary education. However, it is essential to emphasize that before recommending a game as a

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supplementary or all-encompassing educational tool, educators must carefully examine the game. Over time, many of these games may transition from a scientifically grounded mechanism to purely recreational gameplay. For instance, games in which a mouse can kill a cat, snake, or badger, and spiders are often larger than mice, prioritize the colorful nature of the gameplay over scientific accuracy.

On the other hand, exemplary games like Plague Inc., which can serve as a visual aid for examining the ecological aspects of the spread of various diseases or understanding the challenges in combating disease spread, allow students to take on the role of the head of the WHO (World Health Organization) and may prompt a reconsideration of their attitude towards recommended sanitary measures. Additionally, there are numerous games that reflect the current ecological state and the uneven struggle of ecologists against the consequences of environmental pollution.

However, as mentioned earlier, games of this type can only be used as a supplement to the educational process and should be accompanied by some didactic task. For example, using the disease simulator mentioned earlier, students can be tasked with writing an essay on the importance of preserving personal health for the safety of society as a whole or on the nature of the rapid spread of certain pathogens within populations due to poor ecological conditions.

A special and highly significant group of computer and mobile games and applications are specialized or didactic games. Currently, there are very few such games available for public use, and

most of them are still in the testing and implementation phase in general educational practice. However, some developers are directly targeting the educational audience. For example, Mozaik3D app by Mozaik Education offers over a thousand different 3D gaming models, including those related to ecology and biology, as well as history, physics, chemistry, and various other school subjects. In the same category, games designed for individual purposes can also be included. For instance, a teacher can unite students from the entire school in a single ecosystem by developing an interactive mobile gaming application. For every "ecologically responsible" action, a student earns points for their group or class, and the teacher monitors compliance by analyzing photos and videos of students' work submitted through the app. An distinguishing feature of such an application could be an open database system, an electronic library, and various mini-applications for entertaining students in their free time.

In conclusion, despite the limited research and material availability regarding computer and mobile gaming methods for nurturing an ecological worldview in open access, a talented educator, by delving into the depths of the internet, can find a sufficient number of applications and games that position themselves as teacher's assistants. However, for the same purpose, contextual learning can be used, which, as practical experience shows, can often be even more effective in terms of education. After all, we not only influence our environment but, to a greater extent, what surrounds us influences us.

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SAYYID SHARIF JURJANI AND HIS SCIENTIFIC HERITAGE

Abstract: The article provides information about the life and scientific activity of Sayyid Sharif Jurjani, the classification of works written by the scientist.

The introductory part of the article focuses on the importance of studying the lives and activities of historical figures and its role in the education of young people. The main part of the article is about the history, geographical location of Jurjan, which was originally a center of science and culture, and the life and scientific activity of Sayyid Sharif Jurjani, including his travels in science, teachers and students, scientific debates of Jurjani and Taftazani, information about the relationship between Amir Temur and Jurjani is given. However, the article describes the classification of the scientist's works, the topics they cover and their features. In particular, Jurjani's works on kalam and aqeedah, tafsir, jurisprudence, mysticism, Arabic language and literature, logic, philosophy, astronomy, geography and other fields are named. "Sharh al-Mawaqif" on theology, "Hashiya ala-l-Kashshof" on Mahmud Zamakhshari's commentary on al-Kashshof, "al-Ta'rifat" on religious terminology, "al-Mukhtasar al-jame' li ma'rifat al-hadith", "Risolai Bahaiyya" dedicated to Baha'uddin Naqshband, "Hashiya ala sharh ash-Shamsiyya" on logic, "Sharh qasidat Bonat Suod" on Arabic literature, "Hashiya ala sharh hikmat al-ayn" on philosophy will be mentioned in more detail. In conclusion, it is noted that Sayyid Sharif Jurjani was an incomparable scholar of his time, wrote in all fields of science and left a great scientific legacy, as well as his works in the field of Arabic language and literature are in the spotlight of all scholars.

Key words: Jurjan, Sayyid Sharif Jurjani, kalam, tafsir, philosophy, logic, Arabic language, tasawwuf, Amir Temur, Taftazani.

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Introduction

Sayyid Sharif Jurjani was born in 740/1340 in Toku village near Jurjan. The scientist's full name is Abul Hasan Ali ibn Muhammad ibn Ali, and the title of Sayyid was given because of his lineage to the Prophet Muhammad (peace be upon him) [6, p.185]. He was connected to the Prophet's family tree by his ancestor Muhammad ibn Zayd (d. 287/900) through thirteen generations [14, p.488].

Sayyid Sharif, who received his primary and secondary education from the scholars of his country, went to the city of Herat (before 1362) to the presence of Qutbiddin Razi Tahtani (d. 766/1365) in order to acquire knowledge [9, p.127].

Qutbiddin Razi, after teaching Jurjani for a while, said that he was weak due to old age and could not teach more, and advised him to go to his student and freed slave, Mubarakshah, who was living in Egypt at that time, to receive education.

Jurjani, who studied intellectual sciences in Egypt from Mubarakshah and verbal sciences from Akmaluddin Babarti (d. 786/1384), then left Egypt for Anatolia in 776/1374 [1, p.246]. He met Sa'duddin Taftazani (d. 792/1385) and on his recommendation, he was appointed as the headmaster of the Dar al-Shifa madrasa in Shiraz by the governor of that time, Shah Shuja [7, p.426].

Amir Temur (d. 807/1405), who occupied Shiraz in 789/1387, showed respect to Jurjani and gave safety

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to those who took refuge in his house [12, p.335]. After meeting with Jurjani, Amir Temur invited him to Samarkand. Jurjani accepted the offer and went to Samarkand. The scientist worked as a chief editor in Samarkand for eighteen years and finished many works. During his life in Samarkand, Sayyid Sharif Jurjani held several scientific debates and discussions with a number of scholars, in particular, Allama Taftazani (d. 794/1392). The echoes of these discussions spread throughout the world. Even separate treatises on these scientific discussions have been published. Jurjani, who prevailed in the debates, became famous among the scholars, and his attention was also increased in the eyes of Amir Temur. As a result, Amir Temur promoted him to the position of a first-class scholar in Mawerannahr [6, p.92].

Once, during the famous debate between Sa'duddin Taftazani and Sayyid Sharif Jurjani, Sahibgiron Amir Temur expressed his high respect for Jurjani and said: "His Majesty Taftazani may be superior in debates and knowledge, but His Majesty Jurjani is the winner today because of his nobility" [9, p.127].

After the death of Amir Timur in 807/1405, Sayyid Sharif Jurjani returned to the city of Shiraz [1, p.247]. Jurjani, who devoted the end of his life to writing and teaching, died in Shiraz on the 6th day of the last month of Rabiul awwal, 7th July 1413 AD in 816 Hijri. He was buried in the Vaqib cemetery [9, p.127]. Today, the scientist's mausoleum has been turned into a shrine.

Jurjani, considered one of the first representatives of famous scientists, was a prominent representative of the scholars of the Islamic world in his time. In addition to being known as an Arabic linguist and philosopher, he was a teacher in the fields of knowledge such as kalam, Islamic philosophy, logic, Arabic language and literature, jurisprudence and method, tafsir, hadith and debate. The sources agree that he was very intelligent, thorough, thoughtful, sharp-minded, eloquent and mature, well-versed in arguments and arguments, and a conversationalist according to logic and reason.

Some of the chains of ijaza in the Ottoman state, Iran, Turkestan and India reached Fakhridin Razi (d. 606/1209) through Taftazani and another part through Jurjani. The famous mathematician Qazizada Rumi (d. 833/1430), Fathullah Shirvani (d. 857/1453), Sayyid Ali Ajami (d. 860/1455), Fakhridin Ajami (d. 865/1460) and scientists like Alauddin Ali Samarkandi are considered his famous students [6, p.92].

According to the research conducted about Sayyid Sharif Jurjani and his works, the scholar wrote about a hundred works. Most of his works are comments and margins. Sayyid Sharif Jurjani's works on Arabic language and literature have been passed down from generation to generation as books that scholars constantly refer to, and his ideas have served

as the basis for language and literature textbooks in madrasahs (1, p. 248). In addition, Jurjani wrote valuable works on tafsir, hadith, method of hadith, debate and discussion, geometry and astronomy, all of which were accepted by experts in these fields of science and are considered important sources of these fields [6, p.110].

He wrote "Sharh al-Mawaqif", "Sharh al-aqaid al-adudiyya", "Hashiya al-tajrid", "Hashiya ala Sharh al-Asfihani", "Sharh al-asma al-husna", "Hashiya ala Matole al-anzor", "Hashiya ala sharhi-l-Mawaqif", "Risalatul-qadar", "Risala fi tahqiq af'ali-l-ibad", "Risala fi kholqi-l-a'mal", "Risala dar Usuluddin", "Sharhu-l-khutbati-l-Wafiyya", "Sharh tabsirati Ibn Sina" works on the science of kalam. His work entitled "Sharh al-Mawaqif" is a commentary on the work "al-Mawaqif" by Adududdin Ijy [3, p.127], Jurjani wrote it in Samarkand in 1404 after Taftazani's work "Sharh al-Maqasid" was written. Despite the fact that the work was written in Samarkand, its introduction mentions the name of Shiraz Sultan Pirmuhammad Iskandar, the representative of the Timurid dynasty, and psalms are written in his name. The work explores all the debates about the kalam and philosophy. "Sharh al-Mawaqif" has been the main source of madrasahs in the field of science for nearly six centuries and has not lost its importance to this day.

Tabaqat books mention the works of the scholar on tafsir including "Hashiya ala tafsir al-Bayzawi", "Tafsir az-Zahrawayn", "Hashiya ala-l-Kashshaf", "Tarjuman al-Qur'an", and "Risala fi qawlihi taala "Sanuriyhim ayatina fi-l-afaqi va fi anfusihim". Among them, the work "Hashiya ala-l-Kashshaf" that has reached today and is widespread. This work of Sayyid Sharif Jurjani is considered super commentary to the first part of the famous tafsir work of Allama Mahmud Zamakhshari (d. 538/1143) "al-Kashshaf an haqaiq-t-tanzil", i.e. the commentary on Surah Fatiha and the first twenty-five verses of Surah Baqara.

Although the sources do not provide specific information about when and where this work of Jurjani was written, according to the level of the work and the information provided in it, the scholar wrote it after he had studied enough knowledge and during his discussions with Taftazani in 791/1389 or sometime after that. we can say. Because in this work Jurjani refers to the discussions between Taftazani and himself through expressions such as "Some people claim that" [5, p.386].

Sayyid Sharif authored the works named "Hashiya ala Mishkati-l-Masabih", "Hashiya ala khulasa al-Tibiy", "Hashiya ala sharhi-l-Mishkat", "Risala fi mustalah al-Hadith", "al-Mukhtasar al-jame' li-marifati-l-hadith" on the science of hadith. Although there are those who believe that the work "al-Mukhtasar al-jame' li-marifati-l-hadith" on the method of hadith does not belong to Jurjani, Abdulhay Laknavi (d. 1304/1886) proved that it belongs to

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Jurjani and called it "Zafaru-l-Amani Mukhtasar al-Jurjani" wrote a commentary.

The scholar's "Hashiya ala Sharh Mukhtasari-l-muntaho", "Hashiya ala-t-talwih ala-t-tawzih" and "Hashiya ala Sharhi-l-Wiqaya", "Sharhi Kanzi-d-daqaq" on the science of furu'ul fiqh. ", "Sharhul-Hidaya", "Sharh al-faraiz al-Sirajiyya" are famous works. The work entitled "Hashiya ala shhari-l-Wiqaya" is related to Hanafi jurisprudence, in which the book "Wiqayatu-r-riwaya fi masaili-l-Hidaya" of Sadrush-shari was finished. Also, the work "Sharhul-Hidaya" is considered as the background of the famous work "Hidaya" written by Burhaniddin Marginani (d. 593/1197) for the work "Bidayatu-l-mubtadi". The margin is not complete, but is written up to the chapter on the purification of wells. There is only one copy of this work kept in the Jarullah section of Sulaymaniyah Library.

The work "Sharhu-l-faraiz as-sirajiyya" on the science of inheritance is a commentary on the work of Sirajiddin Muhammad ibn Mahmud ibn Abdur-Rashid on the science of inheritance of the Hanafi sect called "Faraizu-s-Sajawandi" and was written in 1401. The work "Sharhu-l-faraiz al-sirajiyya" is still taught in madrasahs. It has more than ten borders written on it.

Most of Jurjani's works are related to the Arabic language and related sciences. Among them are "Sarfi Mir", "Sharh al-Izzi", "Risala fi ma'na-l-harf", "Sharh al-Kafiya ibn al-Hajib", "Hashiya ala sharhi-l-mutawassit", "Hashiyai Mutawwal", "at-Ta'rifat", "at-Tuhfa", "Hashiya ala-l-avamil al-Jurjaniyya", "Sharh tasrif al-Izzi", "Muqaddima fi-s-sarf", "an-Nisab fi lughati-l-a'jam", "Hashiya ala-l-Muwashshah", "Hashiya ala-l-Misbah", "al-Misbah", "Hashiya ala-l-Mukhtasar", "Sharh abyat Miftah", "Sharh talkhis al-Miftah", "Nahvi Mir". It was determined that the works named Jurjani were written by Jurjani.

Sayyid Sharif Jurjani's work "at-Tarifat" is the most famous work of the scientist. This book is a unique collection of religious terms. At the same time, it is one of the first dictionaries written in Arabic on this topic. It briefly and clearly explains the meanings of scientific terms up to the time of the author. In this wonderful encyclopedia, the scientist listed the words according to the order of the letters of the alphabet. This dictionary has not lost its importance until now, but its importance is increasing. Many orientalists have also recognized this scientific fact. The book contains definitions of 2026 terms, which mainly include words, philosophy, logic, nahw, sarf, aruz, qafiya, fiqh, faraiz, usul al-fiqh, calculus, puberty, tafsir and mysticism [15, p.68]. This work is scientifically one of the most important of the works written before and after it.

Jurjani was also involved in the science of Sufism and received Sufism lessons from Khwaja

Alauddin Attar (d. 802/1400), one of the Naqshbandi sheikhs in Samarkand, as a result of which he also finished works on Sufism [6, p.119]. He finished the work "Risalai Bahaiyya" dedicated to the founder of the Naqshbandi sect, Bahauddin Naqshband. The work is also called "Risala fi manaqib Khwaja Bahauddin". Although reliable authors such as Sakhavi and Katib Chalabi claim that there is such a work by Jurjani, no copy of the work has been found so far. Also, the scholar wrote "al-Risala ash-Shawqiyyah" consisting of thirteen chapters in Persian about the things that should be followed by the ascetic, and a work called "Hashiya ala-l-Awarif" as a ta'liq to the work "Awarifu-l-maarif" by Sheikh Shihabuddin Suhrawardi.

Jurjani's writings help us learn about the sciences that developed at that time. In particular, the science of logic was very developed during his lifetime. Jurjani wrote more than twenty works within this science.

The work "Hashiya ala Sharh ash-Shamsiyya", which is considered as one of the main sources in the science of logic until today, is considered the background of the commentary written by Qutbuddin Razi Tahtani on the work called "Shamsiya" by Najmuddin Qazwini (d. 693/1294).

According to information, this work of Jurjani received more attention and recognition than Taftazani's work called "Sharh al-Shamsiya". This work, which is not clear when and where it was written, has been published several times to this day, and a number of footnotes have been written on it.

The scientist, who was active not only in the fields of religious but also secular science, wrote "Sharh al-Chaghmini", "Hashiya ala-t-tuhfati-sh-shahiyya", "Sharhu-t-tazkiro", "Hashiya ala ashkal" on geometry and astronomy. At-ta'sis fi-l-handasa", "Hashiya ala tahrir usul handasati Aqlidis", "Sharh tazkira fi ilmi-l-hay'a" and others.

CONCLUSION

In conclusion, it can be said that Sayyid Sharif Jurjani is considered one of the great figures of knowledge grew up the Islamic world in the 14th century. Excluding Taftazani and some scholars like him, it is difficult to name a scholar who left such a significant mark as Jurjani in this century. It would not be an exaggeration to say that there is no opponent worthy of debating with Jurjani except Taftazani. Because the scientist waved his pen in almost all the sciences that were widespread in his time. In particular, he wrote such works in the fields of science as tafsir, kalam, jurisprudence, hadith, philosophy, logic, mysticism, astronomy, geometry, Arabic language and literature. Even the expression "Sayyid's word is the sayyid of words" has become a proverb among scholars.

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LITERARY EPONYMS

Abstract: Linguistics, like all other fields, is undergoing rapid changes. In particular, the lexical layer of the language level is enriched by the emergence of eponyms. Nowadays, we encounter eponymous units in almost all areas. This linguistic unit can be observed even in literary works. The following research is devoted to literary eponyms and their linguistic features.

Key words: eponyms, linguistic unit, literary eponym, literary text, domain.

Language: English

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Introduction

Today, in all aspects of life, there are domain-related linguistic units, which are considered domain lexemes as specific terms and are classified by direction. In this domain, lexemes - eponyms have a great stimulus on the expansion of the terminological level both in science and technology.

Literature review.

Many linguists and researchers have conducted scientific research on eponyms in certain fields; print and electronic works have been published by various authors. For instance, E.M. Kakzanova carried out scientific research in the fields of mathematics and medicine and considered "eponym" as a terminological unit containing a proper noun. V.M. Leychik states that in modern linguistics, eponyms are not only terms for certain concepts, but also nomenclatural units formed due to the emergence of special terminology.

In his research, Z. Taubayev studied the use of eponyms in political discourse. It can be seen that a lot of research on eponyms in the fields of science has been done and is still being carried out. The use of eponymous units in literary texts is also observed. The

existence of eponyms in this context, that is, in literature, can be understood from the definitions given to eponyms in the following sources:

"Eponym is a name of a legend or real person that writers associate with some other person, object, institution, or thing. Simply, we can define it as a famous person whose name is given to someone else, such as Homer has derived the name of his ancient epic *The Odyssey* from a major character, *Odysseus*"¹. That's to say, an eponym is the name of a myth or real humankind that authors associate with another individual, object, institution, or thing. As can be seen from the given classification, there are also eponymous units in the literary text, which can be called literary eponyms.

"The American Heritage Dictionary of the English Language" defines an eponym as follows: "a person whose name is or is thought to be the source of the name of something, such as a city, country, or era"².

O. Douglas added a cultural connotation to the given definition and described it as "A real or fictitious person whose name has become synonymous with an era, event, object, practice, or the like"³.

¹ <https://literarydevices.net/eponym>

² The American Heritage Dictionary of the English Language. Fourth Edition. 2000. P-2508.

³ Douglas, Auriel, 1990. Webster's new dictionary of eponyms. New York: Simon & Schuster A Webster's New World

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Analysis and results.

It is obvious that the scientist referred to eponyms in the work of art through the description of a real or fictional person. Literary eponyms are words or phrases taken from the names of characters, authors or other literary sources. These names often carry specific meanings or connotations associated with the works. For instance, *Jekyll and Hyde*: characters from Robert Louis Stevenson’s novel *The Strange Case of Dr. Jekyll and Mr. Hyde* are eponymous units used to describe two opposites: one good and one bad. Or *Don Quixote* - the main character of the novel “Don Quixote” by Miguel de Cervantes. Through the character of Don Quixote, the writer depicted an overly idealistic, unrealistic or foolishly passionate person, and the eponym of Don Quixote, which embodies a person with this characteristic, originated. In the given example, the hero of the work was an eponym. In the explanatory dictionaries of the English language eponymous character is defined as *eponymous hero/heroine – the character in a play or book whose name is the title of that play or book.*⁴

Literary eponyms can be divided into several types depending on their origin, meaning and usage. We have decided to classify the literary eponyms which were analyzed during our research as follows:

1. **Eponyms that refer to a personage or main hero.** These eponyms are created on the basis of the names of fictional characters in literature, they show names that reflect certain qualities, characteristics or behavior, become synonyms and are used as eponyms. For example, **Romeo and Juliet** in Shakespeare’s *Romeo and Juliet* is used to refer to a deeply romantic or tragic love story; **“Scrooge”**: refers to a miser, derived from the character Ebenezer Scrooge in the work “A Christmas Carol” by Charles Dickens. Let’s pay attention to another example. Both the title of Homer’s work “Odyssey” and the name of the main character Odysseus are taken from the Latin name “Ulysses” and used as an eponym. Also, this word can be found in the English dictionary as “1: a long wandering or voyage usually marked by many changes of fortune; 2: an intellectual or spiritual wandering or quest”⁵ a noun which is used to

describe any epic journey. It is known that after the Trojan War, Odysseus spends 20 years trying to get home, encounters various adventures, and learns a lot about himself and the world. Based on this, in our opinion, an odyssey is any long, complex journey, often a spiritual or psychological one aimed at achieving a goal.

We observed literary eponyms among Uzbek eponymous units as well. For example, in “**Alpomish**”, which is considered an example of Uzbek folklore example, the eponym *Alpomish*, like Odysseus, is used both as the main character and as the name of the work.

2. **Eponyms representing the author.** These eponyms are named after famous authors and are often used to describe specific writing styles, genres, or literary trends. For example: “**Shakespearean**”: refers to anything related to the works of William Shakespeare; “**Orwellian**”: Used to describe a dystopian or totalitarian society inspired by George Orwell’s work “1984”

3. **Mythological literary eponyms.** Some eponyms are based on mythological characters or concepts that appear in literature, that is, they are created on the basis of a myth. For example, **Achilles’ heel** refers to human weakness or weak point based on the legend of Achilles in Greek mythology; **Pandora’s box**: Originating from the legend of Pandora, it describes the source of problems or unexpected consequences, which refers to the source of unexpected and negative consequences, inspired by the legend of Pandora, who opened the forbidden box and released all evil into the world.

4. **Trans domain literary eponyms.** This type of eponym is a broader concept or word that is commonly used in more than one field beyond its original context. *Baron Munchausen/Munchausen Syndrome*, *Alice’s Adventures in Wonderland /Alice in Wonderland Effect*, *Miss Havisham/Miss Havisham syndrome*, *Othello/Othello syndrome*.

These eponyms are used as an eponym unit both in literary texts and in medicine. We will consider some of them which are given in both areas.

Table 1.

In literary text	In medicine
Alice’s Adventures in Wonderland – used as a literary eponym of the main character of the work Alice’s Adventures in Wonderland by Lewis Carroll to describe a strange, surreal, or fantastical situation or place.	Alice in Wonderland syndrome (AIWS) – is a disorienting neurological condition that affects human perception to the senses of vision, hearing, touch, sensation, and the phenomenon of time. ... It is known to occur in conditions including migraine, epilepsy, and certain intoxicants and infectious diseases ⁶ . That’s to say,

⁴ https://www.collinsdictionary.com/dictionary/english/eponymous-hero#google_vignette

⁵ <https://www.merriam-webster.com/dictionary/odyssey>

⁶ Osman Farooq, Edward J. Alice in Wonderland Syndrome: A Historical and Medical Review. *Pediatric Neurology* Volume 77, December 2017, Pages 5-11

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	a neurological disorder that impairs cognition in children. The patient’s perception of reality is disturbed; large objects appear larger than small ones. It is also noticeable in migraine and epilepsy and certain infectious diseases.
<p>Baron Munchausen – the work by the German author Rudolf Erich Raspe. In literature Baron Munchausen refers to a fictional character famous for telling extravagantly exaggerated stories about his adventures. The hero is based on the real-life historical figure Freiherr von Münchhausen (1720-1797), a German nobleman and soldier. The stories of Baron Munchausen comprise unbelievable feats of adventure and are usually humorous and satirical in nature.</p>	<p>Munchausen syndrome – a psychological disorder characterized by the intentional feigning, exaggeration, or induction of the symptoms of a disease or injury in order to undergo diagnostic tests, hospitalization, or medical or surgical treatment⁷.</p>

It should be noted that although trans domain eponyms are more common in literary texts, they are also found in other fields. For example, Shrapnel, Tesla, Morse code, Doppler Effect. *Shrapnel*, which is used in the military, can also be found in the medical field to describe fragments of metal or other foreign bodies embedded in the body as a result of an explosion or injury. Merriam Webster’s dictionary defines this word as “*bomb, mine or shell fragments*”⁸

After the bombing the walls of the house postmarked with bullets and shrapnel.

It is known that *Tesla* is an American company that produces electric cars in today’s technologically advanced automobile industry. Tesla is famous among the people for its electric cars. The company was founded in 2003 by Martin Eberhard and Mark Tarpener. The eponym *Tesla* represents the unit of magnetic field strength in the field of physics apart from the automotive industry.

So, literary eponyms have a trans domain function, and the very eponyms are considered an eponymous unit of different fields.

Although the main goal of our research is to study eponyms linguistically, we found it necessary to study the structural and syntactic features of literary eponyms. Literary eponyms are used morphologically in the language as noun, adjective, and verb phrases.

1. Adjective: **Byronic** – refers to the characteristics of a romantic hero that is frequent in Byron’s poetry and his life; “**Dickensian**” evokes

images of Victorian England, embodying conditions of poverty, hardship, or social inequality which was described by Charles Dickens

2. Noun: **Scrooge McDuck** - often refers to a humorous rich and miserly character. Scrooge McDuck is a Disney character who is famous for his great wealth and greed.

3. Verb: the number of literary eponyms with a verb feature is very small. In rare cases, eponyms can be given in the text or in a simple sentence in the form of a verb describing the action or behavior of the hero of the work. For example, **Sherlock Holmes** - a literary character created by the English writer Arthur Conan Doyle, the character of a detective-investigator is used as a verb besides the noun in the dictionary “noun.1. a detective; verb.2. to investigate (something)”⁹.

Conclusion.

Considering all the above given features of the literary eponyms it can be concluded as:

a) Literary eponyms can be classified into four types depending on their origin, meaning and usage.

b) These terms have a domain shift function, that’s to say, the same eponym can be observed in other domains.

c) Literary eponyms like other types of eponymous units possess structural and syntactic features which can be observed in everyday life.

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⁷ <https://www.merriam-webster.com/dictionary/Munchausen%20syndrome>

⁸ <https://www.merriam-webster.com/dictionary/shrapnel#dictionary-entry-1>

⁹ <https://www.collinsdictionary.com/dictionary/english/sherlock>

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Article



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IDEOLOGICAL ASPECTS OF THE PRINCIPLES OF SYMMETRY AND DISSYMMETRY IN MOLECULAR PHYSICS

Abstract: *The article considers the principles of symmetry and dissymmetry in molecular physics on the basis of ideas about the universal nature, recommends three main components in the formation of a scientific worldview in the process of teaching physics, comparative examples of the aggregate state of substances having different natures, preservation of their structure and behavior, as well as criteria for the emergence of qualitatively new formations, conditions for the emergence of self-organization and the development of systems under the influence of symmetry and dissymmetry. It is conditioned that any geometric symmetry is associated with the movement and interaction of material objects, and any dynamic symmetry is associated with the properties of space and time.*

Key words: *scientific worldview, molecular system, symmetry, dissymmetry, conservation, invariance, aggregate states of matter, entropy.*

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Introduction

In the conditions of economic and social transformations in our country, the value aspects of modern physics (the use of solar, wind, nuclear energy, the fight against atmospheric pollution and the solution of other environmental problems, etc.) are of particular importance, the role and responsibility of representatives of physical science to society are immeasurably increasing. Physics plays a special role in the formation of students' scientific worldview, as it reveals the most general laws of nature and its content considers general philosophical categories (matter and motion, space and time, cause and effect, etc.) For this reason, it must be understood that the scientific worldview of teachers can only act as a result of the entire educational process in educational institutions.

Worldviews are a system of generalized views, ideas about the world and its laws, about the phenomena of nature and society surrounding a person. According to its content and orientation, a holistic worldview can be philosophical, scientific, mythological, religious. It should be said that when analyzing any type of worldview, the characteristic of its relationship with scientific knowledge is of great

importance, since this determines the degree of scientific validity of each of the possible varieties of worldview [1].

The foundation of the worldview is a system of generalized knowledge, which is an important component of the personality structure and is formed under the influence of a large number of factors practically throughout a person's life. The analysis of educational and methodological approaches (V.G. Ivanov, G.M. Golin, V.F. Efimenko, J. Tulenov, V.N. Moshansky, V.V. Multanovsky, etc.) to the formation of a worldview in the process of teaching physics allowed us to identify three of its main components:

- formation of a system of knowledge about the basic concepts, laws and principles of physics that contribute to the creation of an idea of the scientific picture of the world and the process of scientific cognition;

- formation of views and beliefs corresponding to the dialectical understanding of nature and the process of its cognition;

- development of a dialectical style of thinking.

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One of the activities of a physics teacher is to communicate knowledge about the basic concepts, laws and principles of physics. The concepts of symmetry and their principles make a significant contribution to the formation of a scientific worldview. However, the most general principles are those of symmetry or invariance, which permeate all modern physical theories.

In teaching physics, it is important to take into account and stimulate the desire of students in the process of cognition to restore symmetry. Because the idea of symmetry in the development of physics determined the path to the ideal of a unified picture of the world, since the original meanings of the concept of symmetry correspond to the laws of the physical world, which are characterized by: order, harmony, rhythm, similarity, similarity, proportionality, coordination of parts in a holistic structure. There is every reason to consider the concept of symmetry expressing the relationship of the integral structure of cognizable matter and is accepted as a discussion of the main issue of philosophy in the school physics course. On the symmetry function of J. Newman writes: "Symmetry establishes a funny and surprising affinity between objects, phenomena and creations seemingly unrelated: terrestrial magnetism, female veil, polarized light, natural selection, group theory, invariants and transformations, working habits of bees in the hive, the structure of space, vase drawings, quantum mechanics, petals colors, interference pattern of X-rays, cell division, equilibrium crystal configurations, snowflakes, music, relativity theory..."[2, p.261].

In modern science and philosophy, symmetry means cooperative community, compromise, alternative, invariance, fractality, and asymmetry is considered as the opposite of the above. In modern science, the analysis of the processes of transition from symmetry to asymmetry and vice versa leads to the emergence of the concept of dissymmetry and this concept makes it possible to objectively know the laws of the processes of formation of the opposite sides of being [3, p.31].

We emphasize that invariance does not exist by itself, not in general, but only with respect to certain transformations. On the other hand, a change (transformation) is of interest insofar as something is preserved at the same time. In other words, without changes (movement), it makes no sense to consider preservation (rest), just as without preservation, interest in changes disappears. Symmetry expresses the preservation of something with some changes, or, in other words, the preservation of something despite changes. Thus, the concept of symmetry is based on the dialectic of conservation (rest) and change (movement).

In the middle of the XIX century, science turned to the principles of symmetry and conservation as the basic basis of the laws of physics. Thus, the law of conservation and transformation of energy reveals Yu.

Mayer. The idea of symmetry in the concept of symmetry of electric and magnetic fields was applied by P. Curie outside the framework of crystal physics. The works of A. Einstein, V. de Sitter, A.A. Friedman have become classic in the development of physical cognition. The principle of symmetry has now become the conceptual means through which the unity of the laws of quantum behavior of matter is ensured and the construction of a fundamental quantum theory that reveals the deep semantic unity of all nature.

In physics, it is generally accepted to distinguish two forms of symmetry: geometric and dynamic.

Symmetries expressing the property of space and time are referred to the geometric form of symmetry. Examples of geometric symmetries are: uniformity of space and time, isotropy of space, spatial parity, equivalence of inertial reference frames.

Symmetries that are not directly related to the properties of space and time expressing the properties of certain physical interactions are referred to the dynamic form of symmetry. An example of dynamic symmetry is the symmetry of electric charge.

Generally speaking, dynamic symmetries include symmetries of internal properties of objects and processes. So geometric and dynamic symmetries can be considered as external and internal symmetries. Thus, any geometric symmetry is associated with the movement and interaction of material objects, and any dynamic symmetry is associated with the properties of space and time.

Here are a number of examples of geometric symmetry. Suppose that all the electrons of one atom have swapped with the electrons of another atom. Since the electrons are identical (any randomly selected electron is no different from myriads of other electrons), no changes in the atoms will occur from the exchange of electrons. This is symmetry.

Let's take the aggregate states of matter known to everyone from school - solid, liquid, gaseous. For certainty, as a solid, consider an ideal infinite crystal. There is a certain so-called discrete symmetry with respect to the transfer. This means that if you move the crystal lattice by a distance equal to the interval between two atoms, nothing will change in it - the crystal will coincide with itself. If the crystal is melted, then the symmetry of the resulting liquid will be different: it will increase. In the crystal, only points that were distant from each other at certain distances, the so-called nodes of the crystal lattice, in which the same atoms were located, were equivalent.

The liquid is homogeneous throughout the volume, all its points are indistinguishable from one another. This means that liquids can be displaced by any arbitrary distance (and not just by some discrete ones, as in a crystal) or rotated by any arbitrary angles (which cannot be done in crystals at all) and it will coincide with itself. The degree of its symmetry is higher.

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The gas is even more symmetrical: the liquid occupies a certain volume in the vessel and there is an asymmetry inside the vessel, where the liquid is, and the points where it is not. The gas occupies the entire volume provided to it, and in this sense all its points are indistinguishable from one another. Nevertheless, it would be more correct to speak here not about points, but about small, but macroscopic elements, because there are differences at the microscopic level. At some points at a given time there are atoms or molecules, and at others there are not. Symmetry is observed only on average, either by some macroscopic volume parameters, or by time. But there is still no instantaneous symmetry at the microscopic level here. If the substance is compressed very strongly, to pressures that are unacceptable in everyday life, compressed so that the atoms were crushed, their shells penetrated into each other, and the nuclei began to touch, symmetry arises at the microscopic level. All nuclei are the same and pressed against each other, there are not only interatomic, but also internuclear distances and the substance becomes homogeneous.

But, there is also a submicroscopic level. Nuclei consist of protons and neutrons, which both move inside the nucleus. There is also some space between them. If you continue to compress so that the nuclei will also be crushed, the nucleons will press tightly against each other. Then, at the submicroscopic level, symmetry will appear, which does not exist even inside ordinary nuclei. It is in this state that the substance is inside the so-called neutron stars. From what has been said, we can see a very definite trend: the higher the temperature and the greater the pressure, the more symmetrical the substance becomes. This tendency turned out to be an extremely general law.

With complete and quite unambiguous certainty of the laws and uncertainty of the initial and boundary conditions, we get the whole diverse range of physical phenomena and processes. However, the most general principles are those of symmetry or invariance, which permeate all modern physical theories. Symmetry is a fundamental methodological principle of scientific and, especially, physical cognition, a conceptual form of the philosophical way of thinking. Therefore, the philosophical and methodological understanding of the formation and development of the principle of symmetry in the context of the development of science, philosophy and, in general, the entire spiritual culture, the identification of its role in the evolution of scientific ideas, the formation of scientific theories, the synthesis of scientific knowledge is of paramount importance [4].

Between symmetry and its negation – asymmetry, there is an important concept – dissymmetry. In addition to dialectics, dissymmetry correlates with synergetics. This relationship is expressed both in the involvement of dissymmetric development in the equilibrium and nonequilibrium states of the system (considered in synergetics), and in the explicit

manifestation of dissymmetry found in the main provisions of the synergetic paradigm [5, p.182-187]. In connection with the worldview aspect, attention is drawn to the congruence of another worldview conclusion, characteristic of synergetic constructions and constructions based on dissymmetry. Both points of view recognize the material unity of the world at its various structural levels. And if in synergetics in this connection the emphasis is placed on the idea of the Universe as an “integral system” (N.N. Moisev), then the view of this problem from the standpoint of dissymmetry was expressed by Louis Pasteur, and for the first time introducing the concept of “dissymmetry” into scientific circulation, who considered the world as a “dissymmetric ensemble”, explaining this by the fact that “... the properties of certain figures are not combined by simple superimposition with their mirror image” [6, p. 383]. Continuing the theory of L. Pasteur, P. Curie, in the logic of his scientific research on the influence of the environment on the bodies in it, determined that, “... they retain mainly those elements of their own symmetry that coincide with the symmetry of the environment.” According to the principle of dialectical unity of symmetry and dissymmetry, every living object has one or another form of this unity [7, p. 74].

V. I. Vernadsky also noted that “there is a dissymmetry in the world, manifested in the existence of entropy in it” [8, p. 350]. From the standpoint of the dissymmetric concept of transformation, entropy is a measure of the degree of dissymmetrization of a system, [9, p. 114] i.e., the growth of entropy in a system depends on the degree of its dissymmetrization.

There are at least four forms of entropy in the literature today:

First, entropy as a measure of the uncertainty of the state of any completely ordered physical system, or the behavior of any system, including living and inanimate objects and their functions. Physical entropy is a measure of the energy ordering of an object and is a function of the number of their possible states. Any increase in the ordering of objects leads to a decrease in their total entropy, and vice versa.

Secondly, the thermodynamic entropy of microparticles, or a molecular (microscopic) set. Thermodynamic entropy is a measure of the disorder (or disorder) of microparticles, then entropy in a broad sense is a measure of the disorder (or disorder) of an object by any signs. The value of entropy measures the degree of homogeneity of the structure of an object, has the dimension of the unit entropy –Joule per Kelvin (SI system).

Thirdly, information entropy, or uncertainty of information, i.e. information about some information system, has the dimension of a unit of time (seconds).

Fourth, entropy, or uncertainty of behavior, of any system that is not completely ordered, up to macroscopic sets. For example, biological, political, ecological, social, historical, etc.

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The physical and thermodynamic entropy and the information entropy of the system are fundamentally different. If the physical and thermodynamic entropy for closed systems does not decrease with time, but increases in accordance with the second principle of thermodynamics, then the information entropy may decrease with time for any systems instead of increasing [10, p.18].

The history of science shows that symmetry and dissymmetry can explain many phenomena and predict the existence of new properties of Nature. At the same time, one should take into account the fact that "there

is a fundamental, deep difference between the symmetry of crystal polyhedra and the symmetry of living organisms. In the first case, we are dealing with the expression of the atomic structure of a solid substance, in the second – with the desire for the organization of living matter that exists separately and separately in the stagnant environment of the biosphere alien to it" [11, p.58].

The principles of symmetry allow us to discover new laws and in this sense are correlations between laws. "If laws govern phenomena, then the principle of symmetry governs laws" [12, p.39]

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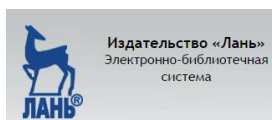
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