

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2023 Issue: 10 Volume: 126

Published: 06.10.2023 <http://T-Science.org>

Issue

Article



Saveliy Ruslanovich Bilich

Institute of Service Sector and Entrepreneurship (branch) DSTU
Bachelor

Victoria Sergeevna Belysheva

Institute of Service Sector and Entrepreneurship (branch) DSTU
associate professor

Artur Aleksandrovich Blagorodov

Institute of Service Sector and Entrepreneurship (branch) DSTU
master

Vladimir Timofeevich Prokhorov

Institute of Service Sector and Entrepreneurship (branch) DSTU
Doctor of Technical Sciences, Professor,
Shakhty, Russia

Galina Yurievna Volkova

LLC TsPOSN «Ortomoda»
Doctor of Economics, Professor,
Moscow, Russia

CRITERIA FOR ASSESSING THE SUPPORT SETTLEMENTS OF THE RUSSIAN ARCTIC TO ENSURE BOTH EXTERNAL AND INTERNAL SECURITY OF THE POPULATION OF THE ARCTIC ZONES AND THE SOCIO-ECONOMIC DEVELOPMENT OF THE REGIONS OF THE RUSSIAN ARCTIC

Abstract: The article reflects the result of a detailed analysis of all Arctic settlements in Russia with a population of more than 500 people, taking into account not only standard statistical parameters, but also specially collected data on the location of medical and educational organizations, logistics infrastructure (including the largest civilian warehouses of fuels and lubricants), proximity to licensed areas for mining, etc. The research work carried out is a basis for identifying the supporting settlements of the Russian Arctic. The detail of the analysis allows us to form a flexible system of criteria for support settlements in the field of external and internal security, as centers of socio-cultural support for the population of the Arctic, centers of service and administrative support for the implementation of resource projects.

Key words: competitiveness, demand, quality, accessibility, innovation, digital technology, economic policy, industrial policy, union of federal, regional and municipal branches of government; profitability, profit, financial stability, stability, purchasing power.

Language: English

Citation: Bilich, S. R., Belysheva, V. S., Blagorodov, A. A., Prokhorov, V. T., & Volkova, G. Yu. (2023). Criteria for assessing the support settlements of the Russian Arctic to ensure both external and internal security of the population of the Arctic Zones and the socio-economic development of the regions of the Russian Arctic. *ISJ Theoretical & Applied Science*, 10 (126), 77-92.

Soi: <http://s-o-i.org/1.1/TAS-10-126-7> **Doi:** <https://dx.doi.org/10.15863/TAS.2023.10.126.7>

Impact Factor:

ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 1.582	ПИИИ (Russia) = 3.939	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

Scopus ASCC: 2000.

Introduction

UDC 332.19:333.34

In modern conditions, the general global trend of spatial development is to concentrate the population and economy in the largest cities. Cities are the drivers of innovative development. The spatial development strategy of the Russian Federation is based on the fact that the largest cities and urban agglomerations are the main centers of economic growth.

However, the situation in the Arctic has a number of specific features that require a special approach. These specific conditions do not allow general trends in the spatial development of Russia and the world as a whole to be extended to the territory of the Russian Arctic. In particular, the thesis about the exclusive role of large cities as the main drivers of the economy does not work in the Arctic, and it is not surprising: both in the Russian and global Arctic, the population of the largest cities does not exceed 300–350 thousand inhabitants (Murmansk and Arkhangelsk in Russia, Anchorage and Reykjavik in the foreign Arctic), and more often 100–150 thousand people. The focus of the economy primarily on the extraction of natural resources, the low population density and undeveloped network of settlements, the weak level of development of the land transport network - all this determines the special role of which relatively small settlements (small and medium-sized cities, and in some cases also permanent or temporary settlements) play in socio-economic development and ensuring national security in the Arctic. They serve as centers for the location of bodies and organizations performing functions of ensuring national security (state, information, environmental, etc.), including those related to the functioning of the Northern Sea Route, and are also bases for geological exploration and/or mineral resource centers. Improving the system of government policy measures aimed at ensuring national security in the Russian Arctic and the socio-economic development of the Russian Arctic regions requires an objective understanding of the role of the Russian Arctic settlements in these processes. For this, it is necessary to adapt general methodological approaches to the spatial development of Russia and the formation of public policy measures to the specific conditions of the Arctic. First of all, this is the task of determining the role and specific functions of settlements in the socio-economic development of the Arctic, which is the subject of a significant part of the presented research work, namely:

the first section reflects theoretical approaches to scientific understanding of the features of the development of settlements in the Arctic, as well as their interaction with each other in the settlement system;

the second section presents characteristics of the

characteristics of Arctic cities (in Russia and, for comparison, abroad), and formulates a hypothesis regarding possible options for their role in the settlement system in the context of the formation of a system of support settlements in the Arctic zone of the Russian Federation;

The third and fourth sections reflect the applied part of the study - the methodology for identifying support settlements and proposals for the formation of criteria and a list of support centers. settlements of the Russian Arctic.

Conceptual approaches to carrying out research work are based primarily taking into account the specifics of the Arctic zone of Russia, defined in the Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period until 2035, including: extremely low population density and a weak level of development of transport and social infrastructure (due to harsh natural and climatic conditions); stable geographical, historical and economic connections with the Northern Sea Route; uneven industrial and economic development of individual territories of the Arctic zone of the Russian Federation (hereinafter referred to as the Russian Arctic); the economy is focused on the extraction of natural resources, their export to industrialized regions of the Russian Federation and export; high resource intensity of economic activity and livelihoods of the population, their dependence on fuel supplies, food and other vital goods from various constituent entities of the Russian Federation; growth of conflict potential in the field of international relations in the Arctic.

During the work, primary data were analyzed, many of which were introduced into scientific analysis for the first time. A total of 256 populations were included in the analysis. localities of the Russian Arctic with a population of at least 500 people (at the beginning of 2023), for which a total of 57 indicators were collected (including indicators of the development of the mining industry within a radius of 150 km from the settlement - for licensed areas; characteristics of transport infrastructure, location of government organizations, the presence of medical organizations, warehouses for fuels and lubricants (hereinafter referred to as fuels and lubricants) and food depots, etc.). Additionally - only in connection with the analysis of transport development - permanent settlements with a smaller population were considered, in which large fuel warehouses and/or large transport enterprises, hospitals and clinics are located, as well as a number of rotational camps with large cargo or passenger turnover of airports. The uniqueness of the collected primary data forces us to present them in an appendix containing a large amount of information on certain areas of development of settlements in the Russian Arctic; a significant part of

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

the data is presented in cartographic display (both primary data and proposals for the formation of a list of reference settlements of the Russian Arctic). The final list of settlements proposed for inclusion in the list of support centers included 180 settlements in the Russian Arctic (including 12 key ones, with the maximum range of impact on the development of the Russian Arctic).

Main part

When moving from a specific city at the level of the city network, the problem of zones of influence arises. In the space around each city, the population and enterprises receive innovative development impulses, but also, as a rule, a variety of goods and services from their center city, for which the recipients of innovation are the periphery. At the same time, a complex system of supporting the city's innovative activities is actually being formed between the center and the periphery. Cities do not generate innovation "on their own"; in fact, they are regional economic centers, serving as focal points of economic and social life of the entire region, customers for the production of raw materials and producers of services for the entire region. Citizens - generators of innovation - are in close contact with all participants in the process, and especially with consumers, serving, as it were, as controllers of the quality of innovation (a number of scientific schemes have been proposed to explain this phenomenon - this is the concept of regional innovation systems, and cluster theory, and the "triple helix", which explains the interaction of science, government and business in the innovation process, etc.). Thus, we have the second sign of a "normally functioning city" - a regional "support system".

At the same time, cities - the centers of regions - interact not only with their periphery, but also with each other. Here, on the one hand, they literally divide zones of influence, and on the other, they exchange the products of their regions. Depending on the zone of influence, different hierarchical systems of cities develop (the spatial pattern formed by centers of different orders is classically explained by Walter Christaller's theory ("Christaller's grid"), which in turn has various modifications). The highest level of the urban network in the second half of the 20th century increasingly began to be viewed as a network of global (another term used is world) cities. Each global city has (according to Friedman) its own zone of influence, on the one hand, and on the other hand, close ties with other global cities.

The simplest system of urban development, which forms the theoretical basis for managing spatial development, includes three main elements, namely:

— hub cities as a place of concentration of significant volumes of various types of activities (places of generation of innovations as an engine of economic development that);

— regional economies How systems supporting

the economy of hub cities (suppliers, consumers, not only ensuring the proper market volume, but also performing the functions of "consumer control" of innovation);

— global networks of hub cities through which regional economies interact interaction with each other.

There are, however, several atypical cases, especially important for understanding the situation in the Arctic.

The first exception is network regions. Economic history has repeatedly described the phenomenon of the European "city belt" - a network of cities involved in close economic exchange processes (in the modern situation it is inherited by the main economic axis of Europe, figuratively called the "blue banana" - from Northern Italy, through Switzerland to the mouth of the Rhine and Benelux countries). It is this relationship that is believed to have formed the basis of the modern urban system. Unlike the system described above, cities - the main elements of this system - did not have full-fledged support regions. Often these were city-states (Genoa, Venice); Fernand Braudel emphasized that the cities of the "city belt" were almost deprived of "sponsored" agricultural territory and purchased food from outside. However, the lack of regional support networks was compensated by the closest (especially by historical standards) transport connections, which provided local producers (and innovators) with both the proper market volume and diversity. Relatively small cities have become the main drivers of economic development, but what is important here is that they did not develop on their own, but rather in a system of dense interactions that apparently replaced the regional support system, and even provided advantages to the cities of the "city belt" over classic regional capitals (such like Paris, Madrid, Berlin, which historically were the clear focal points of respectively France, Spain, Prussia, etc.).

In a sense, analogues of the European "urban belt" are systems of cities connected through waterways - the Mediterranean and the Hanseatic League of Cities. In modern history, an analogue of this kind of dynamically developing areas, consisting of many interacting small centers (often they do not have city status) instead of a centralized system "nodal city - periphery", are the so-called Becattini areas (a classic example is Northern Italy), as well as, apparently the famous Silicon Valley in California. In all cases, high connectivity and total permeability of the network region compensate for the lack of size (or even simply the absence) of a large hub city: in fact, the hub city appears to be dispersed in the space of the regional support network, the boundaries between the hub city and the region are blurred.

The network region model has a parallel in the system of global cities, which thus have a double advantage: on the one hand, most of them have "their"

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИЦ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

region, their own zone of influence, on the other hand, they take advantage of close connections with each other (in particular, provided by the network of the largest international airports connected by direct flights).

The second exception is supplier cities. The phenomenon is described by J. Jacobs and consists of a manufacturer entering the global market without its own regional support system that would ensure diversity and innovation (although she described this process for regions without large cities). As a rule, the share of such manufacturers in their industry is small, which ensures the “banana republic” effect: the manufacturer depends on the global market, but due to its small weight, it cannot influence it. In a number of cities, this is a type of classic single-profile cities that supply a limited range of products to the world market and are strictly dependent on its market conditions. Please note that the type of city here is not related to its size: often a small city, serving as a “node” for its district and having in the suburbs and surrounding countryside a stable circle of consumers of services and goods of its producers (post office, hospital, bakery, tax office, college, etc.), is more resilient than a larger population a mono-profile manufacturer of, say, paper or ore.

Supplier cities often minimally connected with the surrounding area: even the simplest services for its population (district hospital, administration) may be located not in the supplier city, but, for example, in the nearest regional center. This usually happens when a regional center is historically the hub of a territory and a new industrial center is being built nearby. This, it should be noted, is the worst option for a single-profile city, when its narrow industrial specialization is not “diluted” by at least providing the simplest services for residents of the surrounding area, or even for the townspeople themselves.

Let us note one exception, a special type of supplier cities. At the present stage, development benefits are gained not only by large regional centers, but also by small cities specializing exclusively in scientific developments - science cities, technopolises. In fact, these are also mono-profile suppliers. However, they “supply” innovations directly and this sets them apart from the general range of suppliers that do not influence the market as a whole: such cities are quite capable of setting the fashion for new directions of technological development. Are the basic patterns of innovative development, the high level of exchange of ideas and the large volume of the market, violated here? Upon closer examination, it turns out that it is not. In Soviet times, in remote cities - science cities, despite the secrecy regime, a very high level of access to specialized information was purposefully maintained: the best databases were created, the best scientists were gathered (and the exchange of knowledge was supported between employees of different science

cities); Even global information flows were often connected to the powerful exchange of information between science cities (relevant intelligence data flowed into them). Thus, the effect of ease of knowledge exchange, which is formed by itself in large cities, was artificially supported in science cities. And since such cities were created within the framework of priority areas of the economy (primarily the military-industrial complex), the introduction of innovations was largely guaranteed by the customer of the research: they went (contrary to the theory of cluster advantages) not to the local consumer, but directly to the national level.

Paradoxically, the phenomenon of remote science cities is relevant to modern problems in the Arctic: it proves that it is possible to maintain “normal” urban tasks by artificially strengthening the main urban functions - an active exchange of ideas and a capacious market.

In general, if we take a simplified approach, the roles of cities in the world system can be reduced to the following types, namely:

A. The largest hub cities (for brevity let’s call them “alpha cities”) are the “engines” of large regional innovation systems, generators of innovation on a global scale. They are included simultaneously in two systems of mutual exchange of innovations, goods and services, namely:

- a global network of world cities;
- an exchange system within the

macroregion, which concentrates the main consumers of financial, managerial, information and other services of the alpha city, and also supplies it with personnel, raw materials, etc.

An essential condition for the functioning of alpha cities is their highest transport accessibility (physical and economic): at their service are the world's most important airports, the best highways in the world, etc. Let us note: in such cities certain industrial enterprises can be located, but for the development of cities this is not the main thing, the main thing is management functions, it is the “control levers” that are concentrated here » - company headquarters.

B. Secondary hub cities are hub cities on a regional and local scale, with a smaller area of influence. They are included in the following systems and have:

- connection with the nearest alpha city (or a nodal city of a higher order) according to the center-periphery type;
- regional exchange system.

An important condition for their development is good transport and information connectivity with their region, as well as with a “higher” city in the hierarchy (an alpha city or a hub city of a higher order than this one). Interaction with cities of equal size is somewhat reduced.

B. Partner cities are cities included in

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

close network exchanges within network regions. This type of urban network is not common and could be considered an exception if the network regions were not associated with the most powerful breakthroughs in economic development (the European central “urban belt”, Silicon Valley, etc.). Here, populated areas are included in networks of more or less equivalent exchange with nearby cities.

The condition for the existence of such exchange networks is excellent transport connectivity, which allows, in general, the efficient functioning of transport flows on the principle of “everyone with everyone”, which is possible only in densely developed areas of the planet.

D. Supplier cities: cities that are “alone” drawn into networks of global exchanges, but do not have the resources to influence the global market (unlike global cities that are strong players, legislators in fashion in the global market). The connections are narrow, one-sided and vulnerable (with the collapse of the industry).

All of the above reflects, in the most simplified form, the functioning of urban systems in “normal” “under the conditions” - more precisely, in those conditions in which the basic postulates of urbanism were developed. However, in relation to the Arctic, these conditions turn out to be inapplicable - mainly due to the lack of more or less stable transport connectivity between cities in the Arctic, their small numbers, large distances between settlements, which prevent the formation of exchange networks usual for cities (the specific conditions of the Arctic are well known and enshrined in documents of Russian state policy in the Arctic).

However, the functions of cities in the Arctic (as opposed to the functions of cities in general) have not been adequately studied - what is clear is that they do not work (or are they work wrong) general principles of urban development, which often gives rise to talk about the general futility of Arctic urbanization. In foreign works, on the contrary, Arctic urbanization is considered as a specific phenomenon that requires special attention. The last decade has seen a virtual explosion of research interest in this topic.

In general, the situation is so ambiguous that the formation of state policy regarding Arctic cities must, of course, be preceded by study of the features of their development.

City dwellers make up about 3.3 million people in the global Arctic, or slightly more than half of the total population (if we conventionally count as city dwellers residents of settlements with a population of more than 5 thousand inhabitants), but cities in the Russian Arctic are especially important - they are inhabited by, according to official data, 89% of the population of the Arctic zone of the Russian Federation. It is noteworthy that there is no such level of urbanization anywhere else in Russia: in the Central Federal District the share of city residents is 82.3%, in

the Northwestern Federal District - 84.5%, in the industrial Sverdlovsk region 84.9% live in cities, in the Moscow region - 81.5%.

The differences between the settlements of the Arctic in general and the Russian one in particular from the settlement network of the temperate zone can be characterized by five main features: benefits, namely:

*the first feature of the Arctic is that there are no big cities in its birth: the population of the largest cities in the region does not exceed 350 thousand people - this circumstance does not allow the application of national principles of spatial policy in the Arctic, aimed at supporting primarily large urban agglomerations. The cities of the foreign Arctic are generally smaller: the largest cities of the Canadian Arctic, Yellowknife and Whitehorse, are smaller than the “out of the ordinary” Yamal city of Muravlenko. In other words, against the backdrop of the foreign Arctic, the Russian Arctic is a zone of large and even “very large” cities, although against the backdrop of the main settlement zone there are 50–100 thousand cities that form the main backbone of the urban network of the Russian Arctic (Norilsk, Novy Urengoy, Noyabrsk, Salekhard, Nadym, Monchegorsk, Vorkuta), are comparable, perhaps, with the suburbs. This is perhaps the main paradox of Arctic urbanization;

*second feature— the urban population of the Arctic is very concentrated. In essence, Arctic urbanization is a piecemeal number of local urban systems. As researchers have already noted, only five urban systems that have developed around the largest urban centers of the Arctic make up more than half of the official urban population of the Arctic: these are Arkhangelsk, Murmansk, Anchorage, Norilsk and Reykjavik with their suburbs. Almost a third of the world’s Arctic citizens and approximately half of the Russian Arctic live in Arkhangelsk and Murmansk and their surrounding areas alone.

Due to the high concentration of urban population it seems that most of the Arctic territory is devoid of not just large cities, but generally any significant urban centers. Conversely, cities located in sparsely populated areas have a virtual monopoly on city services: they are often the only points of receiving medical care, access to cultural institutions, banks, and sometimes even to the Internet for hundreds of kilometers around;

*the third feature, which further enhances the effect of the second, is that the largest Arctic cities are located along the southern border of the Arctic (and taking into account the fact that the Arctic border is a rather arbitrary concept, most of them will be Arctic with some degree of convention). So, Reykjavik is located on the 64th parallel - like Arkhangelsk. Alaskan Anchorage unexpectedly turns out to be the southernmost of the large Arctic cities: located at 61 degrees latitude (61.159591), it is only slightly north

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

of St. Petersburg (to be completely precise, its geographical latitude corresponds to the northern tip of the Vyborg district of the Leningrad region) and practically at the latitude of Siberian Surgut (by the way, similar to Anchorage in both size and a period of rapid growth due to the discovery of oil fields). And only Murmansk and Norilsk can be considered “truly Arctic” large cities (more than 150 thousand inhabitants).

*the fourth feature of the Arctic is instability of population cities and a large scale of migration (increased proportion of both incoming and outgoing). Arctic cities of different countries are characterized by multidirectional population dynamics.

While the population of Arctic cities is growing in the world as a whole, in Russia over the past three decades, is declining, and in some places very significantly, while the population of both large and small settlements is declining. For example, during the period since the last census of the USSR in 1989, dozens of cities in the Russian Arctic have lost from 20 to 50% of their population, and some (Igarka, Pevek, Bilibino) - more than 50%. At the same time, 5 Arctic cities of Russia have grown by more than 20%, and the population of one city founded in 1986 (Gubkinsky in the Yamal-Nenets Autonomous Okrug) has increased by more than 50% and now reaches 28 thousand people. The population decline in settlements was especially intense in the Arctic part of the Republic of Sakha (Yakutia) and in Chukotka outside the year-round land transport network - where the decline was especially dramatic, as well as in the cities and towns of the Murmansk region. So, for the period from the 2002 census to January 1, 2023.

The reduction and/or loss of an Arctic village in most cases is due to the following circumstances, namely:

- objective depletion of a deposit, the development of which was associated in the past with the growth of a city or town;
- changes in shipping conditions, technologies, etc., leading to a loss of economic efficiency activity in the same place (for example, the disappearance of the need for coal for ships traveling along the Northern Sea Route, as well as changes in the shipping conditions themselves);
- relocation of enterprises and organizations related to ensuring external security (military units), concentration of activities (geology, where there was an almost complete removal of expedition bases from remote villages), the liquidation of some administrative-territorial units (districts);
- unprofitability of continuing production during the transition from conditions of socialist management to market ones.

The latter circumstance deserves special attention: in some cases, the resumption of work can

be (hypothetically) restored if there is a change in external economic conditions (for example, an increase in the cost of extracted raw materials) and/or with the development of infrastructure (which will lead to a reduction in transport costs). It is the inaccessibility of transport in a significant number of cases that determines the ineffectiveness of continuing work. For example, the conditions for the development of tin-bearing rocks in the north of Yakutia are as follows: “The inaccessibility of the Deputatskoye deposits and their remoteness from tin producing enterprises lead to a low turnover rate of invested funds - from the start of lending to the receipt of finished products, it takes 1.5 years. With high interest rates for loans and transport tariffs, the competitiveness of domestic metal is low, and the cost of its production in the 1990s exceeded world prices. Tin from the rich Churpunnya ore deposit (content above 2%, one of the deposits in the Deputatskoye area) was transported by a winter road 250 km to the village. Nizhneyansk, then transported 4,100 km by winter road or by water with two transshipments to the port of Osetrovo on the Lena, and then another 1,800 km by rail to Novosibirsk.”

In the case of urban population growth, the following circumstance attracts attention. In the world in the Arctic, mainly the largest, multi-functional cities, as well as administrative centers at the regional level, are growing. In light of these trends, the population growth of Salekhard and Naryan-Mar corresponds to global trends. However, the population growth in oil and gas producing cities observed in Russia, on the contrary, runs counter to them. True, the rapidly growing “oil and gas” cities of Novy Urengoy and Gubkinsky can be considered unique: despite the lack of administrative status and general specialization in servicing the oil and gas industry, both cities are distinguished by relative diversification. The key role, apparently, is played by the fact that both cities are bases for the development of relatively young, effective for the development of fields (Novy Urengoy is the development base for, among other promising fields in the north of the Yamal and Gydan peninsulas; Gubkinsky - the Komsomolsk gas field, etc.), both are centers for the location of a number of oil service enterprises. At the same time, Gubkinsky, with a population of just under 30 thousand people, is a unique (for the Arctic) example of maintaining its own branch of a higher education institution (Udmurt State University), has its own television and radio company and the production of dairy products (using imported milk). We can confidently say that in both cases, population growth reflects the city fulfilling its full function as a base for the development of promising deposits; both cities can be considered exemplary/pilot examples of the development of support settlements - bases for the development of mineral resource centers.

For many other cities, recent decades have seen

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИЦ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

a decline in diversity economy. In a number of cases, this trend developed back in the 1970s, when specialization was encouraged in the economy (for example, in Igarka, experimental cultivation of vegetables was practically lost, a technical school was transferred to Krasnoyarsk, etc.). The narrowing of specialization was largely facilitated by the development of rich oil and gas reserves in Western Siberia (the mechanism of this process is essentially identical to the “Dutch disease” on a local scale). For example, Salekhard has now in practice lost its function as an experimental base in agriculture (now planned for restoration).

Fifth specificThis feature applies to the Russian Arctic: the Russian specificity of Arctic cities against the backdrop of the global Arctic lies precisely in their narrow specialization - paradoxically narrow for relatively large settlements. Abroad, in the Arctic there are 13 university cities (with a total population of more than 770 thousand people, or 52% of the total urban population of the foreign Arctic) out of 50 (with a population of more than 5 thousand people), in Russia - only 4 out of 55 (including Norilsk , where the Norilsk Industrial Institute was transformed into a university literally in 2021, and the city of Apatity without its own university, but with the Kola Scientific Center of the Russian Academy of Sciences). Russia stands out sharply against the global background due to the proliferation of “cities near oil fields” - this category is easily calculated by the method of exclusion: if you do not count cities with universities, capital cities and ports, then “all that remains” these will be industrial, essentially single-profile cities: Novy Urengoy, Noyabrsk (with the remote suburb of Muravlenko), Vorkuta, Gubkinsky, Zapolyarny... Their number is a total of 17% of the urban population of the Russian Arctic, while abroad such cities are rare: in essence , this is only Labrador City and Sodankylä (industrial Kiruna is also an administrative center - like Nadym, but only more than half its population - about 17 thousand people, although it is located in milder climatic conditions). Both among national capital cities (Reykjavik, Tórshavn) and regional level (Tromsø, Bodø, etc.), and among non-capital cities abroad, port cities stand out: Harstad, Mu i Rana, Alta, Sitka, Kenai, Happy Valley-Goose Bay, Homer and others. Against, in Russia there is a disproportionately high share of intra-continental cities not connected to the sea, which is especially paradoxical in light of Russia’s Northern Sea Route. At the same time, there was actual degradation and liquidation of ports on the Northern Sea Route and approaches to it due to the destruction of infrastructure (primarily due to exceeding the standard terms of its operation), the water areas of the ports are polluted by abandoned and sunken ships and other objects (Amderma, Dixon, Igarka, Tiksi).

As the situation develops, there is a contradiction between the strategic objectives of ensuring national

security for the long term and the economic interests of individual companies. A striking example is the decommissioning of the Gazprom PJSC railway line to Yamburg, the only one connecting the country’s railway network and the Northern Sea Route (shallow depths in the Yamburg area limit the possibilities for port development here, but the same problems are present in other ports, for example in Novy Porto, in the Varandey area, etc.). A similar situation is repeated on a smaller scale in the areas where departmental winter roads operate: for example, a winter road from Igarka to Vankor was laid during the period when it was necessary to transport large cargo to the field, Along the way (as an externality), he provided the opportunity to import relatively cheaper products from Novy Urengoy to Igarka. With the disappearance of the need for the delivery of goods from the Yenisei, the need to maintain the winter road for Rosneft has disappeared, but its value still remains for Igarka, and the municipality is not able to maintain the winter road on its own. The port of Dikson is practically not used at present.

In areas of new development, the construction of cities (which continued in Russia until the 1980s, when the youngest Siberian cities of Muravlenko and Gubkinsky were created) was replaced by rotational camps. Information on rotational camps is fragmentary, but we can confidently say that the socio-economic development of the Arctic is greatly hindered by the narrowness of their functions. De facto, such villages are like centers of civilization for the surrounding area, including for the indigenous peoples of the North: this is a place where you can make purchases in a store or sell your products, charge your mobile phone and other devices (which have long become necessary in life). only city residents, but also reindeer herders), use cellular communications, etc. Sociologists and anthropologists even record changes in the migration routes of reindeer herders, as well as the specialization of their farms - so as to ensure the possibility of close contact with “counterparties” in cities and in the fields. The problem is that such contacts are most often illegal. Resource mining companies cannot officially provide services, for example, supplying local consumers with electricity - as a result, high-tech rotational camps and semi-legal settlements of local residents that do not have the status of settlements and/or municipalities often coexist (for example, the Varandey port area). In some cases, residents of such villages actively fight to receive additional benefits and services from resource companies, which creates social tension.

However, if rotation campsexpansion of functions is closed by their departmental affiliation, then stationary cities sometimes lack additional functions due to weak connections with each other, not only transport, but also institutional, due, for example, to administrative boundaries, routing of hospital patients, etc.

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

In the future, tourism, including cruise tourism, concentrated in cities, should become one of the sectors of specialization in the Arctic.

Comparing the volume of cruise tourist flow in Alaska with current and planned the number of cruise tourists in the Russian regions of the Far East (up to 20–30 thousand people), we have to admit that an economically significant effect from cruise tourism is possible only if the tourist flow increases by at least an order of magnitude. At the same time, you can build on the guidelines calculated using the example of Alaska:

- 1 workplace on the territory per 800–900 tourist visits;
- potential up to 6–8 thousand rubles of revenue per one cruise tourist visiting the location;
- potential up to 25–30 million rubles of added value in one location per 10 thousand cruise ships/rists who visited the location.

In addition to their role in ensuring production itself, cities in the Arctic play a key role in ensuring a decent quality of life and safety.

It is in the cities of the Arctic that the main points of medical care (including emergency care), control centers for regional divisions of all resource-extracting companies, main training centers for the Arctic.

Due to the location of medical infrastructure (including maternity hospitals) in cities, cities play a key role in ensuring the reproduction of the population of the Russian Arctic, and this function of cities is especially pronounced in resource development areas, where the share of births in cities is higher than the share of deaths in cities. Thus, in the Arctic zone of the Krasnoyarsk Territory, cities account for 87% of births and 78% of deaths, in the Nenets Autonomous Okrug - 56% of births and only 44% of deaths, in Chukotka - 47% and 40%, respectively. In other words, in the Arctic, “they are born in cities, die in the tundra,” the role of cities in ensuring safe births and thereby ensuring population reproduction and national conservation in general is unprecedented.

Of all the regions of the Russian Arctic, only in the Murmansk region the share of cities in the number of births is slightly less than the share of cities in the formation of mortality, which is primarily due to the fact that here almost the entire population of the region lives in cities, and the high mortality rate is ensured by the existing age structure population, characteristic not so much of the Arctic as of old-developed areas in general (a high proportion of the elderly population in cities).

In addition to the industries considered, cities provide a contribution to the economy of the Russian Arctic through the implementation of so-called development services: they are insignificant in direct value expression in comparison with the cost of mineral resources mined in the Russian Arctic, but are critical for the functioning/development of the entire

economy of the Russian Arctic as a whole (including extractive industries, shipping along the NSR, etc.). For such industries, a conditional name is proposed - “veto industries”: disruption of the work of these industries will cause a shutdown of production in the main industries of the Russian Arctic. Veto industries include:

- security/hydro-meteorological monitoring and forecast in the Arctic Ocean, hydrographic and synoptic support for shipping, air navigation;
- geological and related studies;
- information support and communication services;
- specific knowledge-intensive services related to monitoring and preventing the risks of the impact of the natural environment (in particular permafrost degradation) on the construction and operation of buildings and structures;
- veterinary services (for reindeer husbandry) and some others.

Objective restrictions on the development of many areas of socio-economic development in the Arctic (identified in the Strategy for Socio-Economic Development of the Arctic Zone of the Russian Federation and other documents) also affect the specific role of Arctic settlements in socio-economic development. Many of the functions that most Russian cities perform are ineffective in the Arctic. First of all, these are labor-intensive and material-intensive production in the manufacturing industry, including even many types of raw material processing. For example, in the Arctic (by the way, not only in Russia, but also in the world), despite widespread oil production, there are no large oil refineries due to the inefficiency of transporting refined oil products and the narrowness of the market for their consumption in the Arctic itself. However,

In the context of economic/For the development of the Arctic as a whole, the function of the base for the development of the territory is especially important. The theory of development bases, developed back in Soviet times and updated in the works of Russian scientists, implies that the Arctic economy is essentially a push-pull: the main product is created in the areas where raw materials are extracted (in modern conditions, mainly at a considerable distance from large populated areas), however, the possibility of developing resources in new areas is ensured by the activities of enterprises and organizations in base cities. In general, this support activity is designated as the category of “development services”; we are talking about services in the field of production services, information support for mining activities (geological, geodetic work), ensuring the operation of transport and communications, etc.

Despite the fact that in recent decades, dozens of scientific works have been carried out both in Russia and abroad on the features of the development of

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

Arctic cities, detailed studies regarding the inventory of the functions of Arctic cities have not yet been carried out.

The reason for this gap is obvious. Function analysis of settlements in the Russian Arctic is objectively difficult due to the following circumstances, namely:

- existing statistical data do not allow us to see the specifics of how cities perform a number of functions of the base due to the fact that some of the functions are distributed in space between the city and fields and other economic objects outside the city limits: city residents are often employed in production outside the city (daily or regular rotational trips);

- For many settlements (in which no municipal formation at the city district level has been formed), statistical data are very poorly presented.

To fill the existing gap, a special study was conducted based on SPARK text about enterprises and organizations, registered in the largest Arctic cities (33 cities in total, 36,828 operating enterprises and organizations; 140 types of activities according to the OKVED classification (up to the fifth digit inclusive) as of May 2022.

Conducted (for the first time in the practice of social analysis but economic development of the Russian Arctic), the analysis made it possible to identify the key functions of Arctic cities, including those that determine their role as bases for the development of the surrounding territory, ensuring the development of mining and other industries outside the territory of the cities themselves.

Often, service provision that affects the development of the surrounding area is not explicitly identified. However, practice shows that the presence of newly developed cities and towns in areas simplifies the organization of supplies to rotational camps and production facilities, and also increases the living comfort of employees of such facilities. An indicative (albeit private) example is the advice of a shift worker-blogger to take a shift near large cities, where, according to him, there is a better supply of food.

In general, the analysis of enterprises in the SPARK database allowed to identify the range of activities that are hypothesized to be technically connected with the development of the surrounding territory - the degree of this influence in each specific case is supposed to be determined in the process of compiling a list of support settlements according to the parameters of specific enterprises.

Data analysis allows us to identify the following new areas of activity of enterprises, size of enterprises in cities and towns of the Arctic zone of the Russian Federation, which potentially influence the development of territory outside populated areas, namely:

- transport and logistics services (including delivery, storage and redistribution of food, fuel and

lubricants), communications;

- higher and secondary specialized education, including training of professional personnel;

- scientific activities, including those related to ensuring the process of development of resource areas (geological exploration, geodesy and cartography) and the economy as a whole (meteorological service, study of permafrost processes, etc.);

- medical support for the population of the Russian Arctic and employees of enterprises working on a rotational basis (in emergency cases);

- services for the extractive industry (in particular, oilfield services, industrial and roadnew construction);

- sociocultural services (including for indigenous minorities);

- administrative and managerial activities (including administrative and management activities in relation to extractive industry enterprises engaged in mining and related activities outside populated areas);

- food industry, suburban rural farming (production of vegetables, milk, eggs).

To one degree or another, the development of territory outside the populated area may be related (depending on specific enterprises): financial and banking activities, wholesale and retail trade, personal services, hotel business and catering establishments, etc. Among the types of activities, aimed, as a rule, at domestic consumption within cities and towns - housing and communal services, real estate transactions, primary and preschool education, etc., which nevertheless constitute a significant part of those employed in Arctic cities and towns.

In addition to the analysis of the SPARK database, an analysis of the placement of individual key types of enterprises, in particular fuel and lubricants warehouses and wholesale foodbases, cargo and passenger turnover of ports, etc. The results of the analysis clearly showed that a number of cities perform functions to support activities in areas of development of mineral resource centers outside the city territory proper: the volume of production activity in the selected areas in such cases significantly exceeds the average volume of activity required to provide for the city's own population. Here are some striking examples of cities performing the function of a base in relation to the adjacent territory:

1. Airports of New Urengoy, Igarka, Pevek (airport Keperveem port) and some other cities (especially in off-road areas) carry a significantly larger number of passengers than other cities and towns of similar size. In particular, Novy Urengoy has surpassed Murmansk and Arkhangelsk in terms of passenger turnover, whose population is 3 times larger. The reason for this disproportion is the exclusive role of Novy Urengoy in the development of fields in the north of the Yamal-Nenets Autonomous Okrug: the city serves as a transport hub

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

for rotation crews and cargo transshipment.

2. In a number of cities and townssimilarly, powerful fuel and lubricant warehouses are concentrated, although the needs of their population and the own volume of the urban (village) economy do not require such volumes of fuel. This is especially noticeable in the example of small population settlements in a roadless zone: for example, the villages of Anyuisk and Rytkuchi in the Chukotka Autonomous Okrug. Thus, we have received clear evidence that the economic (as well as sociocultural) significance of settlements in the Arctic is not determined by the size of their population: many even small settlements can be important bases for the development of the surrounding territory (especially in the sparsely populated, roadless part of the Arctic) Therefore, when determining the criteria and list of support settlements, it is advisable to focus on the parameters of the enterprises and organizations located in them.

During the work, 14 interviews were conducted with experts who had work experience or were directly working in the cities of Norilsk, Nadym, Salekhard, Kovdor, Apatity, Kirovsk, as well as in the fields of the Khanty-Mansi Autonomous Okrug-Yugra and Yamal-Nenets Autonomous Okrug, as well as with expert scientists working in the cities of Salekhard and St. Petersburg (with many years of research experience in the Yamal-Nenets Autonomous Okrug). According to the anthropological study, Arctic cities perform (or, in the opinion of respondents, should perform) a number of special functions related to ensuring national security in the difficult conditions of the Arctic. Some of these functions are necessary to ensure national security, but are currently not fully performed by Arctic cities, so government support for these areas is paramount.

The peculiarity of the functions of Arctic cities to ensure national security is due to theirproperties that allow you to soften/levelnegative properties of the Arctic natural and socio-economic environment (absent in the main settlement zone), posing a threat to national security and/or inhibiting socio-economic development, namely:

- low transport connectivity;
- harsh natural conditions requiring physicalsocial and psychological adaptation;
- sparse settlement network and low transport development;
- high economic needand a rational system of environmental management in complex, knowledge-intensive technologies (arising from difficult natural and climatic conditions).

Support settlements have/should have specific properties that ensureanswerto specific challenges of the natural and socio-economic environment, to mitigate or overcome their negative impact, namely:

1 .“Proximity of help”: strongholds as the nearest accessible center for providing medical care

(and other measures to counter emergency situations). The Arctic is characterized by a sparse network of settlements and a high probability of interruption of transport communications due to weather conditions, therefore the standard system of distributing medical institutions at different levels and routing patients in the Arctic leads to an increased risk of harm to the health of citizens and/or death and, as a result, an increase in overall mortality in the Arctic and failure to meet the country's national conservation goals.

A typical example is the case on the Yamal Peninsula (tundra, north of Se-Yakhi, second half of the 2010s). The patient needed to be transported to a specialized medical facility in an emergency (childbirth requiring surgical intervention - caesarean section). In accordance with the existing system of hierarchy of medical centers, the required medical care was to be provided at the district hospital in Salekhard, where all medical personnel certified to carry out the relevant operation were available. Yamalo-Nenets Autonomous Okrug is a region with a well-established air ambulance system. However, in this case, even here, despite the almost exemplary organization of the air ambulance service, due to bad weather in the south of the peninsula, transportation to Salekhard was impossible.

In the hospital in the village of Se-Yakhi, where the woman in labor could be taken, there was no doctor who could perform this operation. The only surgeon the helicopter could take the woman to was at a medical facility at a nearby oil and gas field, but he was not certified to perform such operations. The delay in providing medical care endangered the lives of the woman and child. After lengthy negotiations with the chief physician of the Yamal Sanitation Aviation, the doctor at the medical facility at the field agreed to provide assistance, thereby giving the mother and child a chance to survive, although due to the lack of appropriate certification in the event of complications, he could be held criminally liable for the intervention performed. The story ended happily

It is obvious that the network of support settlements in the Arctic (and, more broadly, in sparsely populated areas) should provide the ability to provide emergency medical care of a wide profile (injuries, appendicitis and other life-threatening inflammations, obstetrics, etc.) at the shortest distance from the potential place where the need for medical care arises. medical care. At the same time, the emergency medical care system should include not only medical institutions subordinate to the Ministry of Health of the Russian Federation, but also departmental medical institutions of resource-extracting (and other) companies.

The difference between the Arctic and the main settlement zone is that space is less connected and there is a high risk of interruption of transport communications (snow drifts, bad weather), therefore there is a need to develop a network of support

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

settlements as centers for providing emergency medical care and, as a result, saving people.

2. "Safe for personnel": support settlements contribute to the preservation of valuable (adapted) assets/population.

Both from the work on the adaptation of migrants in the Far North since the 1960s, and from the interviews conducted, it becomes obvious that permanent residents of the Arctic are bearers of additional qualities that distinguish them from the rest of the country's population. This is a high level of adaptation to Arctic conditions, consisting, in particular, in the readiness and ability to cope with the negative psychological impact of the polar night, severe frosts, etc. Strictly speaking, these skills can be equated to a kind of additional education and thus be considered in context of the quality of human capital.

"If you are in the Arctic, you must have some kind of clearance. It's like an additional training that I received from birth. I know how to behave in the north. <...> If you know the north, if you know how to behave with the local population, how to behave in cold weather, how to start a car, what not to do in low temperatures, etc., naturally, you have a better chance of doing everything more efficiently, save your life, prevent accidents at work, make the right decision if you are a commander. It's impossible without this specificity" (Salekhard).

Accordingly, new employees, to those arriving to work in the Arctic, not only professional training is required, but also "training" to live in the Arctic and adapt to specific Arctic conditions. It is widely known that not everyone undergoes such adaptation: a high proportion of those employed in the Arctic return to more southern regions, which traditionally, both in Soviet times and today, leads to poor survival rates for new settlers in the Arctic, to high staff turnover and, consequently, to additional costs of attracting more and more new personnel and preparing them for life in the Arctic.

Therefore, when attracting labor in the Arctic in the Russian zone, it is advisable to prioritize people with experience of living in the Arctic, local natives. The preservation of stronghold settlements in the Arctic helps to increase the share of local natives among workers employed in the Russian Arctic, which means an increase in the human capital of Arctic companies and a reduction in company costs for recruitment, additional recruitment and adaptation of personnel.

3. "Infrastructure deposit". When developing new territories, the value of existing infrastructure facilities at the time of development increases: the presence of an airport, port infrastructure, fuel warehouses, roads or winter roads significantly reduces the company's costs for field development. Therefore, pre-existing cities are often used as logistics hubs when developing vast territories; this allows to reduce costs, even if the fields being

developed are located at a great distance from the hub. A striking example is the city of Novy Urengoy, which plays the role of NOVAT-EK's corporate base for the development of new fields in the north of the Yamal-Nenets Autonomous Okrug. Respondent: Look, Novy Urengoy is a city with 110 thousand people. I was in Perm, we had 1.1 million - 10 times more. With Basargin, Perm has barely reached the city of 1.07 million passengers. But Urengoy, at the expense of shift workers, he already has a million now.

Interviewer: The largest passenger turnover in the Arctic.

Respondent: And they don't attract shift workers from Moscow or St. Petersburg. It takes you by rail to Novy Urengoy, built a base city there and carries it on the "short shoulder" with airplanes. He has planes flying from Moscow, but these are business trips, it's like this: pay the money and fly. And he flies his own watch on the "short shoulder", and there are no questions.

Interviewer: Are they from Novy Urengoy?

Respondent: Of course. <...> Urengoy has everything. There is a road, there is a railway, Vekselberg has now bought the port from them and is rebuilding it, building palaces. In principle, everything is there.

This city was formed from the development of all this infrastructure around. And rightly so. Mikhelson is now building factories there, and what not he does there. Well, there were different factories there. And there are service centers. Urengoy is a growing center.

Property of communication permeability.

Current Research in the field of regional science convincingly show the important role of the so-called non-codifiable, or implicit, knowledge (tacit knowledge) for the development of innovative industries. If for mass production technology can be transferred through standard instructions and diagrams, then for the development of modern innovative activities (from the production of computer components to creative industries), a necessary (albeit insufficient) condition is the possibility of face-to-face communication between participants in the innovation process.

The development of economic activity in the Arctic often requires innovative approaches due to specific conditions for its implementation: permafrost, extreme temperatures, etc. Often technologies have to be created from scratch, since standard technical and technological solutions developed in temperate climates are not applicable in the Arctic.

Partially, innovative solutions are in demand due to the complexity of technological processes used at enterprises in the main industries of the Arctic - non-ferrous metallurgy, underground mining, oil services, offshore work and a number of others.

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

The implementation of complex technological processes in the Arctic (certain types of work in metallurgical production, in mines, in oil services) requires permanent work teams, as well as mentoring practices. To do this, either special programs are needed to retain shift workers in the company, or to attract residents of Arctic cities to work, who, other things being equal, are more likely to have a stable job at their place of residence.

An important result of the study is to obtain an idea of the general disorientation of respondents regarding the desired strategy for the development of the Arctic cities. Meet polar opinions: from "cities are not needed and should switch to a shift method of work" to "we need to return to Soviet mechanisms for the development of the Arctic." Taking into account the fact that the survey involved decision makers (members of the management of large companies), as well as high-class specialists, such disorientation is fraught with the risk of slowing down almost any measures of state support for the development of the Arctic, if they are not provided with clear and consistent information explaining state strategy regarding the development of Arctic settlements. In this regard, one of the general measures should be a well-thought-out information campaign to highlight the program for the creation and development of human settlements in the Russian Arctic zone. In particular, the following ideas should be conveyed, namely:

- stronghold settlements will remain for a long period of time;
- support settlements will be centers of pro-living of the permanent population;
- the most important functions of support settlements - provision of emergency assistance, retention and training of personnel, infrastructure and logistics base, innovative development of the Arctic.

Next, priority measures to support support systems localities can be organized in accordance with the identified specific properties of support settlements, leveling the negative impact of specific Arctic conditions on ensuring national security and socio-economic development.

Support settlements as centers of provision emergency assistance and emergency response.

Specialized measures: reconfiguration of the network and functions of health care institutions.

Due to the high risks of interrupting transport links, a number of industries that require a quick response (primarily the provision of emergency assistance, etc.) are difficult to spatially optimize; Small towns play roles typically found in larger cities. Therefore, instead of a hierarchical network of distribution of functions in the field of medicine, etc., a network of relatively universal centers for the provision of emergency medical care (surgery and

general obstetrics, traumatology, etc.) should be organized, sufficiently densely covering the territory of the Arctic and ensuring safety in the immediate area. The prototype of such a network is a network of relay communication towers that provide coverage of the territory with a communication signal at any point.

To ensure the most complete coverage of the territory, the emergency medical care system should include both general medical institutions located under the Ministry of Health of Russia and specialized medical institutions (dispensaries, etc.), as well as departmental medical institutions of companies, if they are the only medical institution over a sufficiently large area (to be determined separately). The result of this approach will be a reduction in mortality in general and the preservation of Russia's human potential. Emergency response services should be organized in a similar manner.

Support settlements as centers for training, retraining and retention of adapted personnel.

Traditional measures: support for secondary vocational and higher education organizations as institutions for retaining personnel in the Arctic, initially adapted bathrooms for living in harsh conditions.

New (promising) measures identified during research:

- launching institutions to attract remigrants (persons having both experience living in the Arctic and experience working/studying outside it) - by analogy with Chinese practice, as well as the practice of some private companies;
- stimulation development in the Arctic of training bases and training grounds for educational institutions of various profiles that prepare personnel for work in the Arctic. Practicing in the Arctic will allow adaptation and selection of personnel already at the training stage, and, in addition, already at the training stage the process of transferring so-called "tacit knowledge" to students as a component of mastering the most complex professional skills can begin.

Support settlements as infra centers structural development.

In key settlements in areas of promising resource projects, it is advisable to develop new infrastructure based on PPP or other mechanisms: investments in infrastructure, as well as geological exploration, will simplify the launch of projects that will bring significant tax revenues. However, significant investments in infrastructure and further development of support settlements as centers of permanent residence in the areas of mineral resource centers are advisable if the following conditions are met, namely:

- the resource base in the area of the support settlement will ensure the maintenance of production for a long period (at least 50 years);
- the development of a mineral resource center requires the use of particularly complex technologies

Impact Factor:

SISRA (India)	= 6.317	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 1.582	ПИИИ (Russia)	= 3.939	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.771	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 7.184	OAJI (USA)	= 0.350

(for which maintaining a permanent workforce is critical meaning);

— the prospects for the development of the core population have been proven a new point in the area of the mineral resource center, not only as an infrastructure and logistics base, but also as a base for the integrated development of the area.

In other cases, it is advisable to develop the infrastructure of mineral resource centers on a temporary basis with servicing by labor attracted on the basis of a rotational method of labor organization.

Supporting settlements as centers of innovation development.

Traditional measures, namely:

— promoting the conservation of Arctic cities through improvement and comfort of the urban environment, improvement of the transport situation;

— assistance development institutions mentoring in order to simplify the adaptation of new personnel.

New (promising) measures, namely:

— development of a system of measures that promotes greater decentralization of decision-making both within companies (for example, encouraging the allocation of independent divisions and subsidiaries of large subsoil users - with their subsequent registration in the Russian Arctic).

In addition, anthropological research has shown the need to develop a special system of measures (including through amendments to the law on local self-government) with the allocation of a special category of municipalities of the Russian Arctic (preferably not for the entire Arctic territory, but only for remote territories outside the land transport network or with other special development conditions), for which a special regime is provided municipal management, taking into account transport isolation, low population density and other specific factors.

For populated areas Arctic regions that will not receive the status of support centers, it is advisable to develop a special system of measures to support socio-economic development, including through the organization of new channels of interaction with support settlements (for example, in support settlements there may be demonstration facilities and consultation points in the field of use of alternative sources energy adapted for remote areas, etc.).

Key role in Alaska's tertiary sector game There are cities, although the concentration of the economy is small: the three largest cities - Anchorage, Fairbanks and Juneau - collectively employ just over 50% of the state's workers, and all cities with a population of more than 3 thousand people employ about 62% of Alaska's workers. The cities' industries are primarily service-based, with Anchorage primarily focused on wholesale trade and professional and scientific services, Fairbanks on retail, and Juneau on government (it is the state capital) (see Table 6).

Thus, to the most pronounced functions Cities in Alaska with a population of more than 3 thousand people function as trade, administrative, educational and information centers, as well as transport hubs and business service centers. In the case of a coastal location, the function of a fishing center with a developed infrastructure for fish processing is added. Mining, which is Alaska's specialty in the US economy, is carried out outside cities by over 3 thousand people, and mainly on a rotational basis in remote temporary settlements. Among the relatively new functions of Arctic cities, such areas as film tourism, maintenance of testing grounds for transport equipment, and others stand out.

One of the specific features of the Arctic economy is the widespread use of rotational and seasonal work, and this is often work in the service sector, in tourism, and not in the resource industries, as is usually the case in Russia. Since seasonal workers in tourism are employed mainly in cities, a rather specific phenomenon arises: Arctic settlements of foreign countries often have population sizes that fluctuate greatly depending on the seasons of the year (in Russia, a similar phenomenon also exists, but mainly in areas of fish processing, alluvial gold mining, etc.d.).

For example, in Alaska, about 21% of those employed are nonresident workers and they account for about 15% of the salary fund. The high proportion of rotational (temporary) workers among those employed in Alaska is primarily due to the seasonality of such activities as fish processing, hotel business, catering, retail trade, and construction. A large proportion of rotational workers are also concentrated in industries such as mining, transportation and storage, health care and social security.

Thus, despite its post-industrial nature, the economy of Alaska has a pronounced Arctic specificity, and it is also expressed in cities: seasonality manifests itself mainly in urban, post-industrial sectors of the economy (tourism services, trade, health care and social security).

This feature serves as additional confirmation of the need for a special approach to Arctic cities as management objects.

The importance of cities in various territories, including coming to the Arctic zone of the Russian Federation varies. This is due to many factors: history of development, resource base, settlement system and others. As part of the work, an attempt was made to conditionally divide the Arctic zone into "two Arctics" based on the transport accessibility of the territories. The purpose of the division is to consider how pronounced the quantitative differences are in the role of cities in the "transport-accessible" Arctic ("Arctic-1") and in the "transport-inaccessible" Arctic ("Arctic-2"). For this purpose, Arctic settlements were divided into three categories, namely:

— settlements with high transport accessibility -

Impact Factor:

ISRA (India)	= 6.317	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 1.582	ПИИИ (Russia)	= 3.939	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.771	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 7.184	OAJI (USA)	= 0.350

the presence of a year-round road;

— settlements with limited transport accessibility – availability seasonal road and/or railway;

— settlements with low transport accessibility - water and/or air transport.

For analysis purposes, two grouping options were carried out, namely:

— group 1: “Arctic-1” includes settlements with high and limited transport accessibility, “Arctic-2” includes settlements with low transport accessibility;

— grouping 2: to “Arctic-1” include settlements with high transport accessibility, “Arctic-2” includes settlements with limited and low transport accessibility.

Indicators reflecting the importance of the cities “Arctic-1” and “Arctic-2” in both grouping options were calculated. For many indicators available statistics at the level of municipal districts and urban districts as a whole. If settlements with different levels of transport accessibility are located on the territory of a municipality, this territory was assigned the level of transport accessibility that characterized the settlements with the majority of standing population. In difficult cases (Priuralsky, Tazovsky municipal districts) the “average” category of limited transport accessibility was assigned. Categories of transport accessibility assigned to municipalities of the Russian Arctic for calculation purposes.

Significant differences between the two regions of the Arctic with different degrees of transport accessibility (especially clearly manifested in the second option for grouping municipalities) require a differentiated approach when determining the criteria for supporting settlements of the Russian Arctic.

Conclusion

The conducted research convincingly shows that the patterns of urban development, as well as their functions, are unique in the Arctic, mainly due to poor connectivity between populated areas due to harsh climatic conditions.

Arctic cities and settlements demonstrate a number of paradoxes or special cases of the development of urban interactions that must be taken into account when forming a specialized system of supporting settlements in the Arctic.

1. In the Arctic, a special type of network interactions between cities and settlements is being formed (“extended network region”), in the absence of high transport connectivity, it is held together according to a problem principle: cities interact within this system in order to solve common, region-specific problems.

Analysis of the functions of Arctic cities allowed you to reveal there are not many activities based on intra-Arctic networking. This is the training of specialized personnel (pilots, doctors, etc.) with specific

competencies; this is ensuring security, where the network principle is most clearly manifested (in the entire Russian Arctic, for example, there are only two marine rescue and coordination centers of the Russian Ministry of Emergency Situations - in Murmansk and the village of Dikson). Within the network region, the “division of labor” (mutual complementarity) between Murmansk and Arkhangelsk is clearly visible. This is a phenomenon that can be confusing when the stereotypical approach about the “correct” model of the region’s structure as a centralized one is extended to the Arctic, however, in the practice of urban development, such complementarity of the functions of urban centers (provided they closely interact with each other - commodity, information) is quite a normal phenomenon. Moreover, historically, such forms of urban systems are associated precisely with the most dynamically developing areas with high innovative potential. What is noteworthy is the “underconstruction” of this network in the eastern part of the Russian Arctic, and here it is logical to complete the construction of our own subcenters of the general Arctic urban network. Norilsk has the greatest potential to become the third key center of the Arctic network region, and ideally it could be an urban agglomeration of key population centers in the north of the Krasnoyarsk Territory, each of which would also perform its own function in it. This: and here it is logical to complete the construction of our own subcenters of the overall Arctic urban network. Norilsk has the greatest potential to become the third key center of the Arctic network region, and ideally it could be an urban agglomeration of key population centers in the north of the Krasnoyarsk Territory, each of which would also perform its own function in it. This: and here it is logical to complete the construction of our own subcenters of the overall Arctic urban network. Norilsk has the greatest potential to become the third key center of the Arctic network region, and ideally it could be an urban agglomeration of key population centers in the north of the Krasnoyarsk Territory, each of which would also perform its own function in it. This:

· Dixon (main specialization in the field of security research on the safety of navigation on the Northern Sea Route, a historically powerful meteorological research center, as well as an obvious center of concentration of cultural heritage, including the as yet undocumented);

· Dudinka (port and sociocultural functions);

· Turukhansk (nave activity support centers mining industry and sociocultural center);

· Igarka (logistics and sociocultural center, location of a unique permafrost museum and potentially an agricultural production center for the population of the agglomeration).

Norilsk in this system can play the role of a hub educational, medical, scientific and cultural center, a

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

logistics platform based on airports that and the existing food base, as well as a management and organizational center.

Of course, a condition for the successful development of the Taimyr region agglomeration as the main core of development of the eastern Arctic of Russia is to ensure internal connectivity between all these centers: only under this condition, the interaction of enterprises of the listed settlements could give a synergistic effect for the development of both the north of the Krasnoyarsk Territory and the eastern Arctic as a whole. It is obvious that the specialization of this “third capital” of the Russian Arctic should be most effectively associated with solving problems that are most specific to the eastern part of the Arctic. These are problems of permafrost and climate change, pioneering geological development of the territory, but first of all, ensuring safe navigation and forecasting ice conditions (which was historically provided from Dikson, where the headquarters of the NSR maritime operations was located). Problems with the delivery of goods in difficult ice conditions, which appeared on the NSR in the fall of 2021 (they were called the “Pevek crisis” in the press), make us think about creating an integrated system for ensuring navigation along the NSR. Taking into account the existing division of the Northern Sea Route into the western and eastern parts, it would be advisable to locate such a center in Taimyr.

2. Instead of the classical hierarchical regional system of cities, specific roles are being formed in settlements in the settlement network, namely:

— base cities, being intermediaries between large cities of the main settlement zone, providing the Arctic with a whole range of services, which in urban studies are usually characterized as “large urban” (research and development, personnel training, etc.),

— island cities that provide the population and economic agents in hard-to-reach areas with the necessary set of vital and socially significant services (medical care, government services, communications, etc.). Although many activities are not competitive from a cost perspective, they have a competitive advantage based on uniqueness. As a rule, it is these cities that are the main bases for providing urban services to mineral resource centers.

3. In the Russian Arctic there are many so-called supplier cities with a narrowed range of types of economic activity (cities near fields that do not have the status of district or regional centers, inter-district

social facilities, educational and scientific institutions, etc.). Many of them, however, formally (and often informally) perform the functions of providing social services for residents of the surrounding territory (residents of smaller settlements, including representatives of indigenous peoples, rotation workers who use such cities for recreation, families of military personnel stationed in military camps outside cities, etc.). To increase the resilience of such cities, it is advisable to take measures to expand them into multifunctional support centers, especially given the convenient transport location in relation to areas with a relatively dense rural population and active activity of resource extraction companies. An example of such a settlement is Vorkuta: with a reduction in coal mining, the functions of socio-cultural, transport and logistics and information and innovation support for the development of the surrounding territory should come to the fore, and Vorkuta already performs these functions in relation not only to the adjacent regions of the Komi Republic, but and in relation to the eastern, most inaccessible part of the Nenets Autonomous Okrug, as well as to some areas of the Yamalo-Nenets Autonomous Okrug.

An assessment of the potential for mining within a radius of 150 km from all Arctic regions carried out during the work on populated points, as well as in licensed areas, the licenses for which belong to large companies stationed in Arctic settlements, makes it possible to determine the priority of measures to “complete” the functions of support settlements in cities and towns with raw material specialization. This measure is also important from the point of view of relieving social tension.

The work done represents a possible range of applied measures implementation which appropriate in support settlements of different categories and undercategories (according to the proposed list). All measures are aimed at strengthening the functions of support settlements that are already represented in Arctic cities and towns of the corresponding category (these are the majority), or in rare cases, at completing the functions of ONP in highly specialized settlements that have the potential to develop as support centers. In addition, it is advisable to develop a system of economic, informational and sociocultural interaction between support and other settlements of the Arctic for the sake of effectively ensuring national security in the Arctic zone of the Russian Federation.

References:

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИЦ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

1. Baburin, V. L., & Zemtsov, S. P. (2015). Evolutioncity systemssettlements and dynamics of natural 230 and socio-economic processes in the Russian Arctic. *Regional studies*. T. 50, 2015.
2. Gunko, M. (2020). Cities of the Russian Arctic in a constant cycle of change. *Urban Research and Practice*, 5(1), 7-8.
3. Zamyatina, N. Yu., & Goncharov, R. V. (2020). Arctic urbanization: phenomenon and comparative analysis. *Bulletin of Moscow University*. Episode 5: Geography. — 2020 No. 4, pp. 69-82.
4. FilingSov, A. N. (2019). Cities of the Russian Arctic: comparison by economic indicators. *Bulletin of Moscow University*. Episode 5: Geography. — 2019. No. 4, pp. 64-69.
5. FaUzer, V.V., & Smirnov, A.V. (2018). Russian Arctic: from stockades to urban agglomerations. *EKO*. — 2018 No. 7 (529), pp. 12-130.
6. (2020). *Regions of Russia. Socio-economic indicators 2019*. 02/1/2020. Retrieved from https://gks.ru/bgd/regl/b19_14p/Main.htm
7. Zamyatina, N. Yu. (n.d.). *Arctic cities: the will to diversity*. Retrieved from <https://goarctic.ru/society/arkticheskie-goroda-volya-k-raznoobraziyu/>
8. Zamyatina, N. Yu., & Goncharov R. V. (2020). Arctic urbanization: phenomenon and comparative analysis. *Bulletin of Moscow University*. Episode 5: Geography. — 2020 No. 4, pp. 69-82.
9. Pilyasov, A. N., & Kibenko, V. A. (2020). Reindeer herders-entrepreneurs: the difficult path to gaining economic independence. *Scientific Bulletin of the Yamalo-Nenets Autonomous Okrug*. — 2020 No. 1 (106), pp. 20-46. DOI 10.261 0/ARCTIC.2020.106.1.003.
10. Pilyasov, A. N. (2016). Development of city centers - outpost bases of the northern frontier. *Bulletin of the North-Eastern Scientific Center of the Far Eastern Branch of the Russian Academy of Sciences*. — 2016 No. 1, pp. 107- 118.
11. Fauzer, V. V., Smirnov, A. V., Lytkina, T. S., & Fauzer, G. N. (2019). Economic and social changes: facts, trends, forecast, 2019 T. 12. No. 5, pp. 25-43. DOI: 10.15838/esc.2019.5.65.2.
12. Goncharov, R.V., Dankin, M.A., Zamyatina, N.Yu., & Molodtsova, V.A. (2020). Cathedrals in the desert or support bases? Typology of settlements in the Russian Arctic according to the nature of the relationship with the surrounding territory. *Urban Research and Practice*. 2020, 5 (1), 33-56. <https://doi.org/10.17323/usp51202033-56>