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# Impact of the Ports of the Northern Sea Route on the Development of Focal Zones of the Russian Eastern Arctic

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**Abstract.** An attempt is made in this work to identify the mechanisms of the influence of the ports of the Northern Sea Route (NSR) on increasing the efficiency of the formation of focal zones for the development of the Eastern Arctic. The propulsive potential of the transport infrastructure is considered; the importance of the NSR for the integration of the southern and Arctic regions of the Far East is indicated. The methodology of the work is based on the theory of cumulative growth, in which the ideas of the formation of "growth poles" occupy a decisive position. The work uses methods of grouping, logical and comparative analysis. The information base of the study was the data of Rosstat. It is shown that the state's activity on the development of the NSR stimulates the development of the North Yakutsk and Chukotka support zones, enhancing the transport and raw materials specialization of the Eastern Arctic as a whole. The paper substantiates that in the Far Eastern Arctic, the traditional view of ports as the most important infrastructure assets, which are the business and economic center of territorial development, is insufficient for the recognition of transport infrastructure as a propulsion industry. Transport is a necessary but insufficient condition for the emergence and accelerated development of local "growth poles" in the Arctic. The propulsive effect of the port economy is low and is mainly of an induced nature, when capacities for product processing are created in the port territories, or when the transport infrastructure stimulates the emergence of transport-intensive extractive industries.

## 1. Introduction

The Eastern Arctic covers over a third of the area of the Russian Far East (RFE) includes 13 Arctic uluses of Yakutia and the Chukotka Autonomous District. It is the northernmost, least populated and economically poorly developed part of the Far East. At the beginning of 2020, 164 settlements were located in the Far Eastern Arctic and 160 thousand people lived. In fact, there are no factories or large cities, and the population of the largest settlement (Anadyr) is only 15.6 thousand people [1].

The presence of large reserves of natural resources (precious metals, diamonds, rare earth metals, tin, tungsten, coals) creates favorable conditions for the development of the mining industry and, at the same time, forms a raw mono-sectoral economy in the region.

In addition to the availability of natural resources, two more circumstances stimulate interest in the development of the eastern Arctic. First, according to scientists, already in 2050 the NSR will become accessible to non-ice-class ships, although the length and thickness of ice will continue to complicate navigation [2; 3; 4]. In turn, the Northwest Passage, which runs through the Canadian Arctic, will remain limited in terms of the navigability of sea vessels due to the preservation of Arctic ice off the coast of



Canada and Greenland [5]. As a result, the importance of transport logistics along the Asia-Europe route through the NSR is increasing. According to the Decree of the President of the Russian Federation No. 204 of May 7, 2018 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024"), the volume of cargo transportation along the NSR should increase from 31.5 million tons in 2019 to 80 million tons in 2030.

The second circumstance is associated with issues of national security in the context of the sanctions war. The substantiation of theoretical views on the functioning of the economy under sanctions is widely discussed in the scientific literature. A number of economists note, first of all, the negative impact of sanctions [6], some authors speak of the positive nature of this process (concentration of Russian producers on the conquest of regional markets) [7; 8]. As a result, within the framework of regional policy in the Arctic, it becomes important to search for internal mechanisms to ensure economic growth. Particular importance is given to the scale of production activities and the formation of mechanisms for the socio-economic development of territories in order to include their potential in economic circulation, since in the northern regions the resources of the territory often bring significant economic results not within the regions themselves, but on the scale of the country as a whole.

It is assumed that the intensification of Russia's activity in terms of the development of the Northern Sea Route, the development and reconstruction of Arctic seaports, can act as a catalyst for the development of local growth poles in the eastern Arctic and contribute to the integration of the southern and Arctic regions of the Far East. Let's try to understand how realistic these expectations are.

## **2. Methods and statistics**

To substantiate the research results, the authors used the ideas expressed in the scientific works of domestic and foreign scientists in the field of territorial cumulative growth, regional development management based on the theory of the formation of "growth poles". The methodological basis of the study was general scientific methods such as formalization, grouping, analysis, synthesis and comparison. The information base of the study was the data of Rosstat.

## **3. Propulsive potential of the port infrastructure**

The transport infrastructure determines the development of the region and its economic complex, acting as the backbone, the basis for the development of any region. The current configuration of the transport network of the Far Eastern Arctic is quite simple: the Northern Sea Route is the main latitudinal highway, to which meridional (water and land) routes go from the south, requiring connections to each other.

The main difference between the present moments in the Russian Arctic, in comparison with the situation of the late Soviet period, is the reliance on maritime logistics in the implementation of most of the new resource development projects in this region [9]. There are great difficulties in all aspects of the Arctic transport infrastructure. The northern seaports of the Far East do not have access to the country's railway network. Most of them are not capable of accepting vessels with large deadweight, although the prospects for the development of Arctic shipping are associated with the use of large-tonnage vessels [10].

In fact, it is the ports of the NSR that are the "reference points" of the transport system of the North of the Far East, and the development of the Arctic regions, due to the vastness of space and low population density, clearly fits into the concept of polarization, which states that the economic development of any macro region is always accompanied by significant regional polarization.

A theoretical substantiation of the inevitability of regional polarization was given in the middle of the 20th century by the French researcher F. Perroux, who departed in his constructions from the principle of homogeneity (uniformity) of territorial development [11]. This approach allowed him to interpret the "growth poles" as points of concentration of economic and investment activity that form around "propulsive" industries and are capable of generating economic growth over vast territories [12]. In the model of the "growth pole" formation, F. Perroux classified the branches of production according to development trends into three groups: degrading, with a tendency to decrease their share in the

structure of the regional economy; with a high growth rate, but not significantly affecting the development of other sectors of the territory; propulsive industries, which are characterized by both a significant increase in production and the generation of a chain reaction of the growth of industrial centers, stimulation of the industrial development of the region [13, p. 123-138].

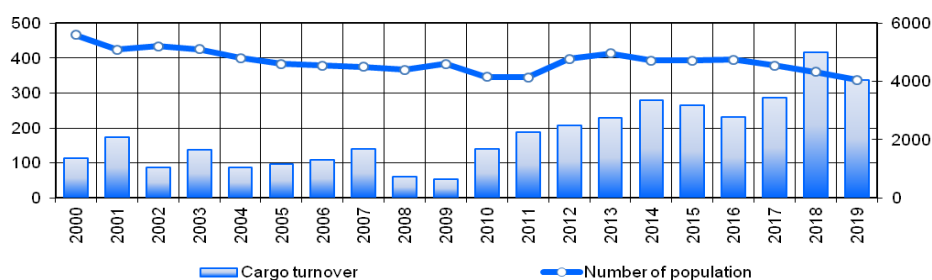
According to F. Perre, it is the propulsive industries that determine the character of the emerging growth pole. The world experience in the implementation of the ideas of the theory of "growth poles" showed that the right choice of propulsive industries or their combinations was of key importance for their successful implementation [12; 14].

In modern Russian scientific literature and economic practice, a dynamically developing industry is recognized as propulsive, which is the leading one in this cycle of economic development and is characterized by a high level of technology and an extensive market, which provides an induced (polarization) effect [8]. In other words, the fact that the port and port infrastructure are the business and economic center of the location is not enough for the recognition of the transport infrastructure as a propulsion industry. In the Arctic, the transport and logistics infrastructure has historically always been the center of economic activity in the region, and ports have traditionally been assigned the role of nodes of polarization of economic life.

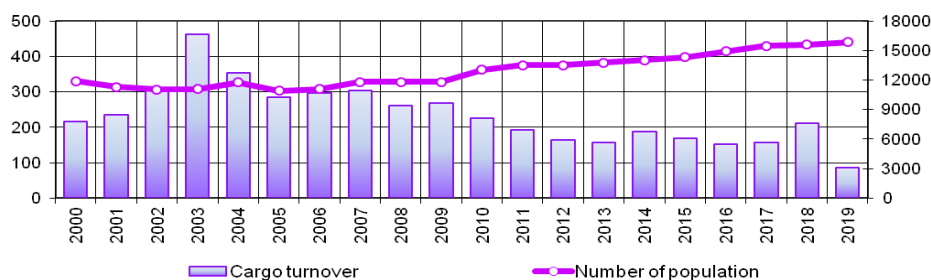
For the formation of a potential "growth pole", it is extremely important to have a propulsive potential in anchor, head projects located on the territory. If we consider this situation in terms of the theory of F. Perroux, then the presence of transport and logistics infrastructure in the territory should be perceived rather as a necessary but insufficient condition for the emergence of a real growth pole in the region.

Far Eastern practice confirms this statement. So, contrary to the traditional approach that considers [15; 16; 17] that ports, as the most important infrastructure assets, serve as a catalyst for the economic growth of port regions, in the eastern Arctic there is a phenomenon of a decrease in the contribution of ports to the creation of gross regional product. A comparative analysis of the dynamics of the GRP of the Chukotka Autonomous Okrug and the cargo turnover of the ports of Pevek and Anadyr, which are the main ports of Chukotka, does not reveal a correlation between the increase in the overall scale of cargo turnover and the region's GRP.

The dynamics of the population and cargo turnover in the ports of the Eastern Arctic shows multidirectional trends. The growth in the cargo turnover of the port of Pevek is observed against the background of a decrease in the population, for the port of Anadyr the opposite trend is characteristic—an increase in the population with a decrease in the port's cargo turnover (see Fig. 1,2).



**Figure 1.** Pevek. Population size (people, right scale) and cargo turnover of the ports of the Eastern Arctic (thousand tons, left scale).



**Figure 2.** Anadyr. Population size (people, right scale) and cargo turnover of the ports of the Eastern Arctic (thousand tons, left scale).

This situation is explained by the regional features of the specialization of the economy of the Arctic regions. In the Chukotka Autonomous Okrug, the structure of the GRP growth is dominated by gold mining and mining, and the contribution of port activity is gradually decreasing.

As a result, in Anadyr, there is a decline in the port's cargo turnover with an increase in the population associated with the developing industry of specialization, and Pevek's prospects are associated with the development of the Bayum GOK, which will develop one of the largest copper deposits in Russia (9.5 million tons of copper).

The current situation shows that, in reality, the propulsive effect of the port economy itself is small and rather has an induced character when, for example, capacities for processing products are created in the port territories, or when the transport infrastructure stimulates the emergence of transport-intensive extractive industries in the region [18; 19].

The state of the ports and the prospects for the development of cargo turnover in the Far Eastern Arctic. According to WPI (World Port Index), the port infrastructure of the world Arctic is 82 seaports, of which 85 % are small ports, and about 15 % are medium ones. Only one port is large – Murmansk (Russia). There are no large and medium-sized ports in the Far Eastern Arctic (see Table 1).

**Table 1.** Russian and foreign Arctic seaports as of 2019.

Country	Large (20-60 million tons)	Medium (1-20 million tons)	Small (less than 1 million tons)	The number of Arctic ports in the entire aggregate of ports of the considered countries
Total	1	11	70	82 / 1197
Russia	1	6	13	20 / 68
including: Eastern Arctic	0	0	6	6 / 68
Canada	0	2	2	4 / 286
USA	0	0	3	3 / 666
Greenland*)	0	1	16	17 / 17
Iceland	0	1	21	22 / 22
Norway	0	1	12	13 / 135
including: Spitsbergen	0	0	3	3 / 135

\*) autonomous territory of the Kingdom of Denmark

Source: calculated by the authors based on data from the World port Index 2019.

The peculiarity of the development of seaports in the Russian Arctic basin is that 98 % of cargo turnover falls on the western sector. At the same time, the main cargo turnover in the western Arctic

falls on a relatively small number of efficiently operating ports – Murmansk (58 %), Sabetta (17 %) and Varandey (7 %). The rest of the ports of the western Arctic account for a small, and in some – zero share of the cargo turnover (for example, Vitino, Dikson, Igarka). The ports of the eastern sector handle about 2 % of the Arctic cargo turnover, which is explained by the low level of development of the region and low domestic demand. The situation was not even changed by a significant increase in the cargo turnover of the ports of the eastern Arctic over the past three years (from 0.6 to 1.1 million tons), since the increase in cargo in the western segment of the Arctic was more active than in its eastern segment. All ports of the Eastern Arctic (Tiksi, Pevek, Provideniya, Egvekinot, Anadyr, and Beringovsky) are classified as small ones [20].

Half of the cargo turnover in the Eastern Arctic is processed at the port of Beringovsky. The port is focused on transshipment of coal cargo intended for residents of Chukotka and Kamchatka. Since 2017, the Bering coal processed at the seaport has been exported.

The port of Tiksi is located on the coast of the Laptev Sea, on one of the most inaccessible sections of the NSR. Through it, the transshipment of industrial and food products, construction materials, fuel and equipment for settlements on the banks of the Khatanga, Olenek, Yana, Indigirka and Kolyma rivers is carried out.

The port of Pevek is located in the Chaunskaya Bay of the East Siberian Sea. It is the northernmost seaport in Russia. The port handles general, timber, mineral construction cargo, coal and containers for residents of the Chaunsky district. In recent years, the port has acquired handling equipment for the export of coal cargo to China.

The ports of Providence and Egvekinot have been in a difficult technical condition for many years.

The port of Anadyr specializes in transshipment of general, bulk and liquid cargoes to the headwaters of the Anadyr basin. The port has central repair and mechanical workshops for the maintenance of low-tonnage vessels. This is the only port in the Chukotka Autonomous Okrug that serves river transportation of goods for the settlements of Yary, Snezhnoe, Ust-Belaya, Krasnoneno, Kanchalan and Anadyr estuary.

According to forecasts [21], by 2030 the volume of cargo transportation along the NSR may reach 80 million tons. The cargo base of the NSR will be formed through the implementation of large projects for the development, development and processing of mineral resources of the Arctic zone of Russia. The main sources of cargo formation will be LNG projects, oil production at the Novoportovskoye field, but only a small share of cargo in terms of solid minerals (ore, coal) in the regions of the Republic of Yakutia and the Chukotka Autonomous Okrug will form an increase in cargo turnover in the eastern part of the NSR.

#### **4. The focal development of the Eastern Arctic and the role of transport infrastructure**

In order to increase the socio-economic sustainability of the development of the Arctic of the Far East, the Russian Government proposes to create two support zones for development (North Yakutsk and Chukotka), which are complex projects aimed not only at significantly strengthening the economy of the Arctic sector, but also at achieving strategic interests and ensuring national security of Russia in the eastern Arctic. The Ministry of Development of the Far East and the Arctic has identified the development priorities for each of the named support zones. For Chukotka, this is the Baimskoye field and the creation of a university. For Yakutia – the development of the regions of the Anabara, Lena, Indigirka and Kolyma rivers [22].

The underdevelopment of the transport and energy infrastructure is the main problem of both eastern supporting Arctic zones, slowing down their systemic formation and sustainable development [23]. Therefore, in the aforementioned support zones, as anchor, backbone, projects are identified that provide for advanced reconstruction and development of transport and energy infrastructure, which plays an important role in the economic integration of two neighboring Arctic territories. The transport and energy infrastructure will "pull together" these regions into an economically sustainable spatial formation – the Far Eastern Arctic.

## 5. Summarizing, we note

1. The revitalization of the state's activity in the Eastern Arctic enhances the transport and raw material specialization of the region, stimulates its focal development, complements the system of Arctic ports of the Northern Sea Route with meridional transport routes, positively affects the growth of the economic potential of the Far East and stimulates the growth of interaction between the southern and Arctic regions in order to increase connectivity of the national economic space.

2. Transport is a necessary but insufficient condition for the accelerated development of focal zones in the Eastern Arctic. The traditional view of ports as the most important infrastructure assets, which are the business and economic center of territorial development, is insufficient for the recognition of transport infrastructure as a propulsion industry. The propulsive effect of the port economy is low and is mainly of an induced nature, when capacities for product processing are created in the port territories, or when the transport infrastructure stimulates the emergence of transport-intensive extractive industries.

3. For the North Yakutsk and Chukotka Arctic support zones, the transport infrastructure, along with the energy infrastructure, is a necessary condition for development and an important backbone project that "pulls together" these regions into an economically sustainable spatial formation – the Far Eastern Arctic.

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