

Evaluation of Russian Arctic Foreign Trade Activity

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Abstract. An analysis of foreign trade activity in the Russian Arctic framed by a discussion of the climatic, social, demographic, natural, etc. characteristics of the region is presented. From this point of view, the following limitations apply: the complexity of the Arctic area; the need to find technological solutions that take into account the climatic characteristics; an absence of the usual conditions for sustainable development; the limitation of ecological systems in the creation and use of technologies needed for the development of foreign trade activity. Theoretical approaches to the problem of foreign trade activity of territories are discussed alongside a proposed methodology for the analysis of foreign trade activity and an assessment of the foreign trade activity index of the Russian Arctic regions. The analysis is based on official data of Federal State Statistics Service of Russian Federation from 2000 to 2015. The results of the research showed that priorities for Russian Arctic foreign trade should be prioritised according to three groups, consisting of 1) regions with a high level of foreign trade activity; 2) regions with a low level of foreign trade activity; 3) regions with the least developed foreign trade activity. Each group requires a specific foreign trade development strategy corresponding to its characteristics.

1. Introduction

Foreign trade activity has a great significance for social-economic development of country. Foreign trade activity promotes the competitive advantages for countries and regions. The inefficiency of Russia's foreign trade structure is exacerbated in the Russian Arctic due to the preponderance of the raw materials sector and high dependence of the Russian economy for imported goods and services [1, 2, 3]. At the present time, the foreign trade activities of the Russian Federation are subordinated to the economic situation and at the mercy of world markets and global political decisions. The economic crisis in Russia has demonstrated a necessity for structural changes in foreign economic activity and the formation of a competitive economy based on knowledge and innovation [4, 5, 6]. The purpose of the research is therefore to assess the foreign trade activities of Russian Arctic in order to forecast and create an economic development strategy for the Russian Arctic based around knowledge and innovation.

1.1. Russian Arctic characteristics

Article I. The territory of Russian Arctic covers nine Federal Subject and includes: Murmansk Oblast; Nenets Autonomous Okrug; Chukotka Autonomous Okrug; Yamalo-Nenets Autonomous Okrug; the municipal district of Vorkuta (Komi Republic); the Allaikhovsk, Anabarsk (Dolgan-Evenk), Bulunsk, Nizhnekolymsk and Ust-Jansk uluses (districts) of the Republic of Sakha (Yakutia); the urban district of the city of Norilsk in Taymyr Dolgano-Nenets Autonomous Okrug (Krasnoyarsk Krai); the municipal formations of Arkhangelsk, the Mezensk municipal district, Novaya Zemlya, the town of Novodvinsk, Onezhsk municipal district, Primorsk municipal district, Severodvinsk



(Arkhangelsk region) [7]. For the purposes of our study, the following eight Arctic Russian Federal Subjects were selected: Arkhangelsk Oblast, Krasnoyarsk Krai, Republic of Sakha (Yakutia), Komi Republic, Yamalo-Nenets Autonomous Okrug, Chukotka Autonomous Okrug, Nenets Autonomous Okrug and Murmansk Oblast.

The analysis has shown that all of the Arctic territories have certain similar characteristics:

- Climatic features. For Arctic areas, it is common to have harsh climatic conditions and spatial gaps between the concentrations of natural resources [8, 9].
- Demographic characteristics. Only 5% of the Russian population lives in the northern latitudes. Northern territories are characterised by low density of population and multi-ethnic composition of the indigenous population.
- "Special northern subtype". The peripheral position of the Arctic regions was defined as the remoteness from the economic and cultural centres. One of the results of this spatial isolation is the high cost of transport and other associated production factors [10].
- Extensive exploitation of natural resources of Russian Arctic in Soviet period predetermined spatial organisation of the economy of the northern territories. The reclamation of Russian Arctic is characterised by continuous movement into new commodity areas. Arctic zone is represented by regions with largest deposits of natural resources: the Arctic regions of Russia account for 70% of oil, 90% of natural gas, 60% of copper, 100% of platinum group metals, as well as significant deposits of barite and apatite [11].
- Migration from Arctic regions during the period of transition from administrative-planned to a market economy. The transition to a market economy was accompanied by a decline of investment in ships and port facilities, disruption in the supply of necessary products and a reduction in maritime trade along the Northern Sea Route. Companies that were unable to reorient their business to foreign markets (forestry and fishing industry, agriculture, construction) faced a difficult financial situation. All of the above caused a significant decline in employment and an outflow of population.

1.2. Theoretical approaches to foreign trade activity

The foreign trade of different countries implies a part of foreign economic activity and includes imports and exports. Problems associated with the development of foreign trade activity in national economies have been addressed by various theoretical approaches [12, 13]. The mercantilists believed that the government should support a positive balance of trade through tariffs, quotas and other trade policy instruments. A positive balance of trade, also known as a trade surplus, occurs when exports exceed imports. According to mercantilism, the wealth of one country, which depended on the quantity of gold and silver within the country, could only grow at the expense of another country. By contrast, classical economic theory held the wealth of nations may depend on the necessary skills for producing goods and services and not on the quantity of accumulated precious metals. Hence, the main challenge is not the extraction of gold or silver but the production based on division of labour, cooperation and government non-interference in the economy. Based on the idea of absolute advantage, theory of foreign trade means that countries export those goods which they produce at lower costs (countries have absolute advantage in the production of the goods) and import those goods which are manufactured in other countries at lower costs (absolute advantages belong to their trading partners). Theory of absolute advantage has a number of assumptions, such as: a) labour is the one factor of production; b) only two goods and partners involved in international trade; c) transport costs are zero. In accordance with this approach, export is a positive factor for the national economy because it provides foreign sales for additional products that cannot be sold in the domestic market.

The theory of comparative advantage states that some countries produce goods and services at lower opportunity cost than other countries. According to the theory of comparative advantage, an opportunity cost is a benefit that could have been enjoyed but was relinquished in consequence of deciding to take a different production approach. The defining characteristic of comparative advantage theory is that international trade will be mutually beneficial for both countries even if one country has absolute advantage in goods or services production. The theory of comparative advantage relies on the following

assumptions: a) labour is the only one factor of production; b) only two goods are involved in international trade; c) transport costs are zero.

In the mid 1920s, the factor proportions theory was developed. According to this approach, two countries, two goods and two factors of production (such as labour and capital) are considered as involved in international trade. The country is an exporter of goods when there is a relative abundance of the factors necessary for producing necessary goods. If a country has a relative lack of these factors, it needs to import those goods.

Further research within the framework of international trade questioned factor proportions theory. Thus, in 1953, the American scientist V. Leontiev demonstrated that labour-surplus countries export capital-intensive products but capital-surplus countries export labour-intensive products. The Leontiev paradox has been given a rational explanation according to which the author failed to take into consideration the fact that labour can be divided into skilled and unskilled.

The current stage of economic development of the world economy has given impetus to new theories of international trade such as the theory of the product life cycle, the theory of technological gap and the theory of preference similarity.

2. Methodology

In order to conduct the research, the author suggested the following method which consists of four stages (Fig. 1).

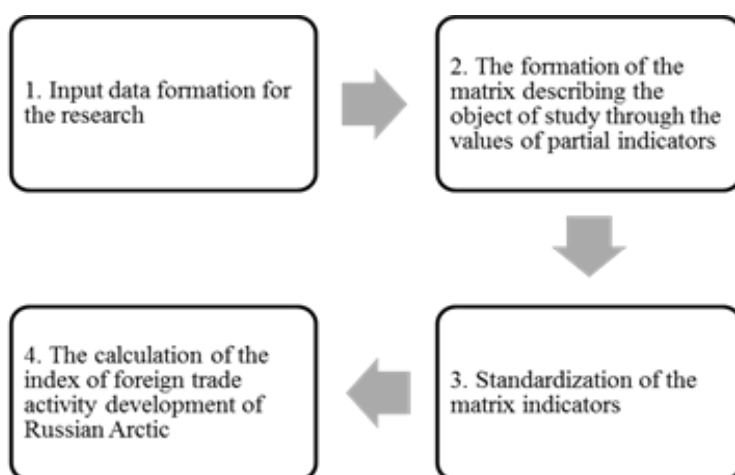


Figure 1. Method of evaluation the foreign trade activities of Russian Arctic

During the first stage, data for the object (Arctic regions of Russian Federation) is analysed.

During the second stage, the matrix (X_{ij}) is formed describing the object of study through the partial index (formula 1).

$$X = \|X_{ij}\| \quad i = 1 \dots, n; j = 1 \dots, m \quad (1)$$

where X_{ij} – value of j -th indicator of foreign trade activities for the i -th region;

n – number of analysed regions;

m – number of indicators of foreign trade activities for the regions.

The third stage is standardisation of the indicators included in the matrix (X'_{ij}). Since the indicators have different units, it is necessary to make a preliminary transformation which implies standardisation of indicators. The conversion is made according to formula 2:

$$X'_{ij} = \frac{X_{ij} - \min_j(X_{ij})}{\max_j(X_{ij}) - \min_j(X_{ij})} \quad (2)$$

where X'_{ij} – standardised value of j-th indicator of foreign trade activities for the i-th region;
 X_{ij} – value of j-th indicator of foreign trade activities for i-th region;
 $\max_j(X_{ij})$ – maximum of j-th indicator;
 $\min_j(X_{ij})$ – minimum of j-th indicator.

In the fourth stage, the index of foreign trade activity development (I_{IT}) is calculated for each region (formula 3).

$$I_{IT} = \frac{\sum_j^m X'_{ij}}{m} \quad (3)$$

where I_{IT} – index of foreign trade activity development for the i-th region;
 X'_{ij} – standardised value of j-th indicator of foreign trade activities for the i-th region;
 m – number of indicators of foreign trade activities for the regions.

The index of foreign trade activity development is changed from 0 to 1 ($I_{IT} = 1$ is the maximum; and $I_{IT} = 0$ is the minimum).

3. Empirical specification

3.1. Data for the research

In order to carry out the research, statistical data were collected for the period from 2000 to 2015. The data were taken from the following sources: Federal State Statistics Service of Russian Federation.

The indicators show the state of foreign trade of Russian Arctic at the moment t :

- 1) Exports, US dollars (X_1);
- 2) Imports, US dollars (X_2);
- 3) Foreign trade quota (X_3);
- 4) Export quota (X_4);
- 5) Import quota (X_5);
- 6) Export-import coverage ratio (X_6).

3.2. Empirical specification

According to the proposed method, the author constructed two matrices for original and standardised indicators and calculated the index of foreign trade activity development.

Stage 1. The data were collected for the research.

Stage 2. A matrix was formed which describes the analysed object through the values of partial indicators (Fig. 2). A separate matrix was constructed for each period (t) from 2000 to 2015.

$$\begin{pmatrix} X_{11} & X_{12} & X_{13} & X_{14} & X_{15} & X_{16} \\ X_{21} & X_{22} & X_{23} & X_{24} & X_{25} & X_{26} \\ X_{31} & X_{32} & X_{33} & X_{34} & X_{35} & X_{36} \\ X_{41} & X_{42} & X_{43} & X_{44} & X_{45} & X_{46} \\ X_{51} & X_{52} & X_{53} & X_{54} & X_{55} & X_{56} \\ X_{61} & X_{62} & X_{63} & X_{64} & X_{65} & X_{66} \\ X_{71} & X_{72} & X_{73} & X_{74} & X_{75} & X_{76} \\ X_{81} & X_{82} & X_{83} & X_{84} & X_{85} & X_{86} \end{pmatrix}$$

Fig. 2. The matrix with the indicators by line (from X1 to X6) and regions by column (from X1 to X8) for period t

Stage 3. A standardised matrix was created for the period (t) from 2000 to 2015, describing the analysed object through the values of partial indicators (Fig. 3).

$$\begin{pmatrix} X'_{11} & X'_{12} & X'_{13} & X'_{14} & X'_{15} & X'_{16} \\ X'_{21} & X'_{22} & X'_{23} & X'_{24} & X'_{25} & X'_{26} \\ X'_{31} & X'_{32} & X'_{33} & X'_{34} & X'_{35} & X'_{36} \\ X'_{41} & X'_{42} & X'_{43} & X'_{44} & X'_{45} & X'_{46} \\ X'_{51} & X'_{52} & X'_{53} & X'_{54} & X'_{55} & X'_{56} \\ X'_{61} & X'_{62} & X'_{63} & X'_{64} & X'_{65} & X'_{66} \\ X'_{71} & X'_{72} & X'_{73} & X'_{74} & X'_{75} & X'_{76} \\ X'_{81} & X'_{82} & X'_{83} & X'_{84} & X'_{85} & X'_{86} \end{pmatrix}$$

Fig. 3. Standardised matrix with indicators by row (from X1 to X6) and regions by column (from X1 to X8) for period t

Stage 4. The author calculated the index of foreign trade activity development of Russian Arctic for the period from 2000 to 2015. Data are summarised in table 1.

Table 1. The index of foreign trade activity development of Russian Arctic for the period from 2000 to 2015

№	Regions of Russian Arctic	2000	2001	2002	2003	2004	2005	2006	2007
1	Murmansk Region	0.28	0.56	0.49	0.56	0.38	0.32	0.69	0.67
2	Krasnoyarsk Krai	0.70	0.62	0.61	0.71	0.52	0.37	0.72	0.73
3	Arkhangelsk Region	0.25	0.40	0.44	0.35	0.28	0.24	0.59	0.42
4	Komi Republic	0.37	0.51	0.59	0.58	0.27	0.29	0.35	0.34
5	Nenets Autonomous District	0.14	0.41	0.45	0.15	0.04	0.03	0.00	0.22
6	Yamalo-Nenets Autonomous District	0.35	0.57	0.63	0.65	0.17	0.15	0.22	0.14
7	Republic of Sakha (Yakutia)	0.39	0.51	0.44	0.44	0.44	0.42	0.66	0.50
8	Chukotka Autonomous District	0.00	0.00	0.05	0.12	0.78	0.78	0.42	0.36

№	Regions of Russian Arctic	2008	2009	2010	2011	2012	2013	2014	2015
1	Murmansk Region	0.58	0.62	0.38	0.55	0.59	0.66	0.64	0.59
2	Krasnoyarsk Krai	0.69	0.63	0.56	0.42	0.52	0.37	0.43	0.34
3	Arkhangelsk Region	0.52	0.82	0.62	0.42	0.39	0.31	0.36	0.39
4	Komi Republic	0.35	0.37	0.30	0.28	0.36	0.50	0.57	0.36
5	Nenets Autonomous District	0.26	0.17	0.57	0.61	0.53	0.48	0.33	0.33
6	Yamalo-Nenets Autonomous District	0.21	0.08	0.12	0.20	0.25	0.05	0.11	0.26
7	Republic of Sakha (Yakutia)	0.36	0.38	0.33	0.37	0.53	0.52	0.66	0.60
8	Chukotka Autonomous District	0.34	0.25	0.27	0.22	0.25	0.30	0.34	0.25

The results of calculation of foreign trade activity index are represented graphically in Figure. 4.

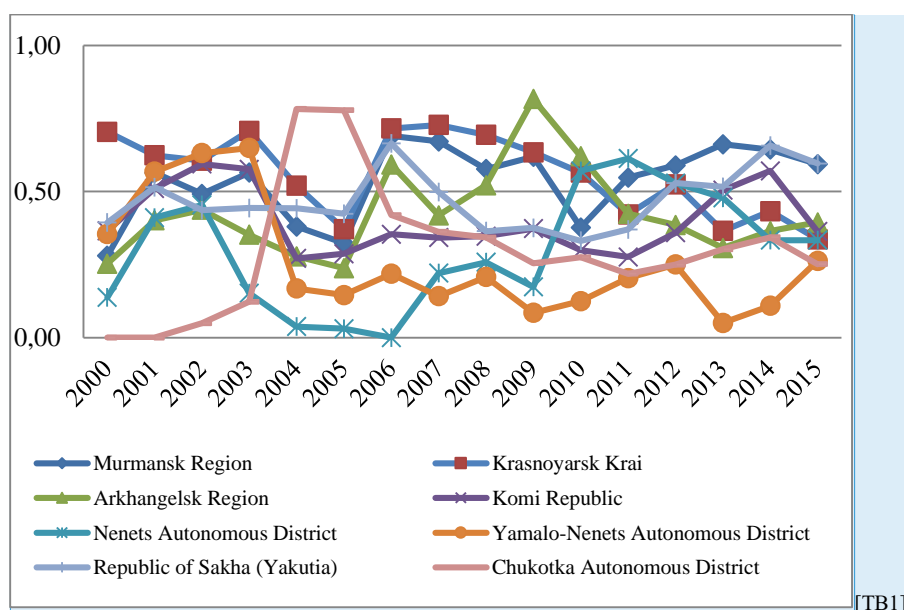


Figure 4. The index of foreign trade activity development of Russian Arctic for the period from 2000 to 2015

4. Conclusion

The analysis showed that there were significant variations in the level of development of foreign trade activities across the regions of the Russian Arctic. Thus, in 2015, the maximum index (0.6) was applied in the Republic of Sakha (Yakutia). The Murmansk Oblast demonstrates a slight lag from the maximum (0.59). Krasnoyarsk Krai, Arkhangelsk Oblast, Komi Republic and the Nenets Autonomous Okrug are at about the same level in terms of the development of foreign trade activities (0.34; 0.39; 0.36; 0.33).

The Yamalo-Nenets and Chukotka Autonomous Okrugs were the least developed in the sphere of foreign trade activities (0.26 and 0.25, respectively).

The results of research showed that Arctic regions may be divided into three groups as follows: 1) regions with a high level of foreign trade activity (Republic of Sakha (Yakutia) and Murmansk Oblast); 2) regions with low level of foreign trade activity (Krasnoyarsk Krai, Arkhangelsk Oblast, Komi Republic, Nenets Autonomous Okrug); 3) the least developed regions (Yamalo-Nenets and Chukotka Autonomous Okrugs). A specific strategy of foreign trade activity, which should be created for each group of Russian Arctic regions, will be the object of further research.

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