Development of export logistics in the conditions of the Russian Arctic

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Abstract. Cargo delivery by water transport to the Far North and equated territories is one of the most important tasks of the national economy, as it is directly linked with revealing the economic potential of the Arctic region and improving the quality of life of the population. Those tasks are of particular importance due to the demographic situation in the region. The subject of the research is organizational and economic relations arising during cargo delivery. Regional factors, natural and climatic risks, as well as a fairly large number of participants involved in the process of cargo delivery in the implementation of Arctic cargo transportation, determine the high level of requirements for the quality of management.The most significant results of the research are as follows: the main factors determining the necessity of transforming the cargo delivery management system in the conditions of changing logistics were revealed, the key directions of transforming the development and management system of cargo delivery were determined, the conditions of effective functioning of carriers in the Russian Arctic were identified and structured, the functionality of the Northern Supply Haul Management Center was defined.

Keywords: Export · Arctic projects · Water transport · Northern Supply Haul · Logistics · Russian Arctic.

1. Introduction

The export of cargoes from the Russian Arctic for Arctic projects is one of the most important tasks for the national economy, as well as changes in logistics. The annual five percent increase in the volume of cargoes transported to the Far North by water transport also speaks in favor of this thesis (Osipova et al., 2019).

The Arctic, as a single interrelated and interpenetrating object of research, conceptually requires the integration of existing sectoral scientific knowledge based on an interdisciplinary approach, and the cooperation of available resources of the Arctic societies, states and businesses, and the knowledge of indigenous peoples in practice (Lukin, 2017). Such an approach makes it possible to methodologically obtain both a holistic system of knowledge and a full-fledged model of practical activities, to take an integrated view on the present and future of the Arctic region (Kirillova, 2014).

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Thus, the need for structural and methodological transformation of the system of development and management of cargo exports looks justified. The importance of the problem under consideration, its practical significance and insufficient efficiency of cargo export by water transport in the implementation of Northern Supply Haul (hereinafter abbreviated NSH) determined the relevance of the topic, as well as the goal and objectives of scientific research.

Problems of developing management methods, forming and developing cargo transportation, as well as theoretical and methodological foundations of economics and management in transport are presented in the works by Antipov E. O., Aronov A. M., Lukin Y. F., Osipova E. E., Chertkov A. A., Clegg S. R., Zellen B. S., etc.

The goal is to determine economically justified transformations in the system of export transportation in the conditions of the Russian Arctic when implementing the NSH by water transport.

In accordance with the goal, it is necessary to solve the following tasks:

- perform an analysis of the socio-economic characteristics of the development of the Far North and equated territories;
- research the process of management of cargo delivery during the realization of the NSH by water transport, define and structure the main issues, hampering the effective management;
- develop methodological recommendations to improve the system of export development under the conditions of changing logistics and clarify the content of the resulting economic effect.

The scientific novelty of the research results consists in the development of organizational and economic approaches, the development of methodological provisions for transforming the system of exports by water transport in the implementation of the NSH and the economic justification of the proposed structural changes implementation effectiveness.

The most significant results of the study: 1. The main factors determining the need to transform the system of cargo delivery management in the implementation of the NSH by water transport, considering the socio-economic characteristics of the development of the Arctic region, have been identified. 2. The key areas of transformation of the logistics development system of export transportation in the Russian Arctic conditions during the implementation of the NSH by water transport were determined based on the decomposition of the NSH process and on the results of the study of the relevance of the problems hindering effective management. 3. Conditions of effective functioning of self-regulated organization of sea carriers in the Russian Arctic were identified and structured. A procedure for differentiation of forwarding operators by level of their organizational and technical capacity was developed. 4. The functionality of the NSH control center is defined and the grouping of information required to support the process of management of entities that provide export transportation in the conditions of the Russian Arctic is performed. The components of the economic effect of transforming the cargo delivery management system have been determined.

2. Materials and Methods

Fundamental provisions, scientific works, and practical developments of domestic and foreign scientists in the field of economic mechanism theory, theory of socio-economic systems development, economics and management on transport are theoretical and methodological basis of the research.

Representativeness of research, substantiation of theoretical provisions and argumentation of conclusions are provided by the use of the following methods in the study: structural-logical and system analysis, content analysis, economic and statistical analysis, analogy method, graph-analytical method, structuring of processes, methods of applied sociology, modeling, mathematical modeling and analysis of the impact of maritime transport capabilities on bilateral trade (Yu, 2018), etc.

In conducting scientific research, the authors identified and ranked the problems hindering the implementation of export transportation logistics. Decomposition of the management process under study was carried out. The preferred area of application of methods of management of freight

transportation to the Far North was determined. The system of indicators for assessing freight forwarders and operators implementing the NSH was structured considering the fact that the Northern Sea Route opens up the possibility of participating in various Arctic projects and cargo transit, cabotage, and multimodal transportation (Kornienko, 2020).

The analysis of domestic and foreign theoretical works allowed determining the general methodological approaches to management. Research organizations cannot avoid changing their perceptions of reality as this reality changes (Clegg, 2002).

Management of cargo delivery is considered from the technological point of view, with the main method being the method of creating systems to implement the management of transshipment processes in the seaport. In (Chertkov et al., 2015), cargo delivery management is considered from the position of logistics systems traffic, which involves the use of recursive optimization methods.

According to the authors, due to the lack of an accepted classification of methods of cargo delivery management, the division of methods into two groups – socio-economic and organizational – is justified. Organizational methods, in turn, are divided into administrative and regulatory ones.

The transport technological system is commonly understood as a form of organization of the transport process, which ensures the unity of technical, organizational, technological, commercial, legal, and economic solutions for the transportation of goods with maximum economic efficiency (Komkov et al., 2014).

Based on the work (Komkov et al., 2014), the authors developed their own classification of transport technological systems of cargo export for Arctic projects. Distinctive features are: 1. The presence of archipelagos and islands with absent or incomplete off-port infrastructure, on which strategically important objects are located. In this regard, in maritime practice, when sailing in the waters of the Arctic basin, raid unloading of various types is widely used (Antipov et al., 2017). 2. The adjacent spatial-geographical and economic nature of cargo delivery points, which, to a large extent, facilitates the delivery of goods to several recipients (Antipov, 2016). 3. The specialization of transport means, caused by natural and technical-technological factors in the Arctic basin. According to the authors, the existing number of icebreakers is insufficient to meet the demand for ice escorting, which is described in detail in (Mitko, 2021). 4. Specifics of management of transport and technological systems of cargo delivery in the Russian Arctic. Currently, there is no single management body (center) that would effectively manage cargo delivery.

3. Results

The hypothesis of special relevance of the problem considered in the research work was confirmed during the statistical analysis. Fig. 1 shows the forecast values of cargo transportation by water transport in NSH for the period up to 2035.

The gross regional product of economic entities of the Arctic zone of the Russian Federation, according to Rosstat, has a similar growth trend of 13.2%. This dynamic is achieved through the construction and commissioning of infrastructure facilities.

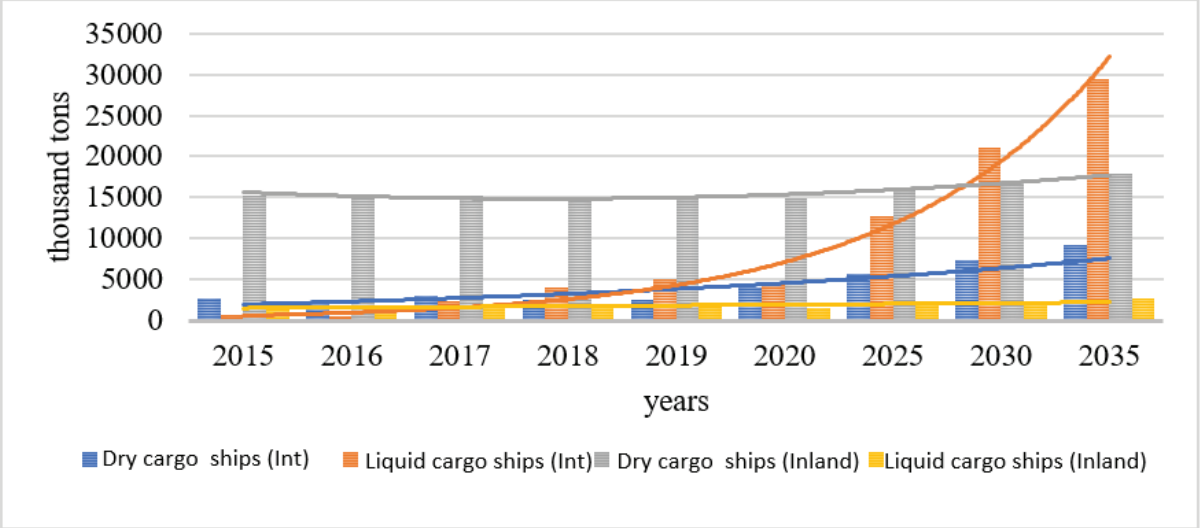

Fig. 1. Volumes of exported cargo in AR and forecast values, thousand tons. *Source*: Compiled by the authors.

Based on statistical and content analysis, the authors have identified the following key factors determining the need for transformation of the cargo delivery management system: growth of business activity of organizations (businesses); special conditions of cargo delivery due to the strict limitation of navigation time; state policy in the field of development of the Far North and equated territories; insufficient information support of the cargo delivery management process under the NSH program, etc. The results received during research of the process of cargoes delivery management indicate the various significance of existing problems, which impede the implementation of cargoes export (Table 1).

Table 1. Results of the ranking of the relevance of the problems that hinder the implementation of NSH. *Source*: Compiled by the authors.

Problem	Average value	Rank
Decentralization of the NSH management system	0.19	1.5
Untimely financing of transportation by the customer	0.19	1.5
Low level of self-regulation of sea shipping in the Russian Arctic	0.15	3
Incomplete requirements to the freight forwarding operators in the process of NSH	0.14	4
Low level of coordination of operations performed by the participants of cargo delivery process	0.11	5
Low level of organization of cargo delivery management structure	0.09	6
Low level of development of the infrastructure complex for the implementation of the Northern Supply Haul	0.07	7
The imperfection of the schemes of distribution of funds between the direct participants of the process of cargo delivery (violation of logistical links)	0.04	8

In this paper, the authors, using a process approach, decomposed the management process under study. Classes of management decisions and types of management impacts were identified in the process. Thus, the key shortcomings of the existing organizational and economic mechanism have been identified. Those include the lack of a self-regulatory body for freight forwarders and operators, low

level of information support for managerial decision-making in the export of goods, and imperfect procedures for competitive selection of freight forwarders and operators.

The authors defined the directions of transformation of the cargo delivery management system in the implementation of NSH and the content of methodological developments in the area under consideration together with the single national perspective, the rapidly changing Arctic (Zysk, 2013).

The study proves the need to improve the process of self-regulation of organizations involved in the development of exports of the Russian Arctic for the Arctic projects. The paper identifies the components of the projected economic effect arising from the implementation of the functions of the NSH Control Center. It has three levels of detail and two main directions – sectoral and regional. The economic result of the implementation of the proposed changes is presented in Table 2.

Table 2. Economic result of the implementation of the proposed changes. *Source*: Compiled by the authors.

Delivery scheme	Vessels-days spent	Vessels used, units.	Total mileage with cargo, m. miles	Delivery costs, thousand rubles.	Extra income, thousand rubles
Actual	60	5	14148	24000	-
Project	45	3	10775	18000	6000

Investment policy is of paramount importance to meet the needs of the state and business in modern engineering products (Kornienko, 2020). The developed ways allow increasing the standard of living in the conditions of economic sanctions and falling incomes (Zheleznyakov and Tarasov, 2016).

The results of the evaluation confirm the economic validity of the developed program of transformation of the export development system, which carries out NSH water transportation.

4. Discussion

Many methodological aspects of the development of export transportation logistics in the conditions of the Russian Arctic remain insufficiently disclosed. It is necessary to form a graphical model of the organizational and economic mechanism of cargo delivery management, allowing to substantiate the economically feasible choice of management methods. It is also necessary to study the relevance of problems that prevent effective export in the Russian Arctic, to use the effect assessment and optimization of the supply chain logistics model in coastal ports and provide the population of the Far North with food depending on consumption (Zheleznyakov and Tarasov, 2016).

5. Conclusion

Practical significance of the results of the study is that the results are brought to specific science-based recommendations aimed at improving the development of logistics of export transportation in the Russian Arctic, namely: 1. The results of the analysis of the socio-economic characteristics of the development of the Arctic region allowed identifying the main factors that determine the need to transform the export system of the Russian Arctic. 2. During the decomposition of the management process under study and ranking the significance of the problems, the key areas of transformation of the management system of cargo delivery by water transport were identified. 3. The organizational and economic conditions of the functioning of the self-regulated organization of sea carriers of the Russian Arctic have been defined and disclosed. The goal, objectives and basic principles of its activities have been clarified. Differentiation of freight forwarders and operators by the level of their organizational and technical potential has been carried out. 4. The components of the projected economic effect arising as a result of realization of the NSH Control Center functions have been defined.

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