National transport and logistics system: navigating challenges for development until 2030

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Abstract. This scientific article explores strategies for developing national transport and logistics system, taking into account external factors. The authors analyze potential directions for market diversification and infrastructure development, focusing on cooperation with Asia, Africa, and CIS countries. The main problems and prospects for the Russian economy are also discussed in the context of inflation and the need for government investment and regulation.

1 Introduction

In light of the current sanctions policy, building a stable transport-logistics system between Russia and the countries of the Asia-Pacific region (APR), the CIS, and Africa is becoming an increasingly relevant task. The purpose of this research is to investigate possible strategic directions for the development of Russia's transport-logistics system for 2023-2025 in the context of new economic realities. The research tasks include reviewing existing studies and technologies, analyzing the current situation, developing strategies, and providing practical recommendations.

As Russia's main trading partners change, studying the transport-logistics system and its throughput capacity for the directions of APR, CIS, and African countries becomes particularly relevant. One of the main ways of delivering goods to the Russian market is by land transport. In recent years, research on this topic has paid particular attention to the development of land communications, including railway and road transport.

In [1] Russian infrastructure projects within the transport corridors "North-South" and "East-West" are discussed. The urgent search for new international routes for Russian exports

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leads to the need for accelerated development of the transport-logistics direction "North-South". The international transport corridor "North-South" consists of three routes: the first runs along the western coast of the Caspian Sea through Dagestan, Azerbaijan, and Iran; the second is a maritime route and provides interconnections between the ports of all the Caspian Sea basin states; the third route runs along the eastern coast of the Caspian Sea from Russia through Kazakhstan and Turkmenistan to Iran. The first and third routes provide both railway and road transportation.

Among the advantages of developing this direction is that many countries located south of Russia are members of the EAEU, CIS, CSTO, SCO, and BRICS or cooperate with these associations, actively develop, and also hold friendly or neutral positions in relation to Russia. To a significant extent, the infrastructure of the international transport corridor "North-South" already exists and is used for road and railway transportation. However, it does not meet the expected increase in transport volumes and requires modernization and capacity expansion.

To manage cargo flows, harmonize border control procedures, and ensure seamless passage of goods from the ports of the Persian Gulf to the Baltic and vice versa, Russia, Azerbaijan, and Iran are negotiating the creation of a trilateral transport-logistics operator for the western route of the North-South International Transport Corridor (ITC). Dredging and reconstruction of the Volga-Caspian Sea Shipping Canal are underway, as well as the development of the ports of Astrakhan, Olya, and Makhachkala in Russia. The port of Alat in Azerbaijan is being expanded. Iran is working on modernizing and integrating its ports with the country's railway system. Investments will also be made in the development of terminals and the construction of logistics centers in the ports of Bandar Abbas and Chabahar.

Fig. 1. International Transport Corridor "North-South" [2].

The authors in [3] analyze the impact of the "One Belt, One Road" project on the development of transport infrastructure between Russia and APR countries, as well as the possibilities for expanding throughput capacity. Russia's active work in this direction can become a significant stimulus for the development of transport infrastructure and an increase in trade turnover. To improve logistics between Russia and China, in April 2023, a memorandum of cooperation was signed between one of the largest private transport groups in Russia - FESCO and the Chinese logistics company Shangtex Group International Logistics. It is noted that within the framework of the agreement and the international BRI initiative, the parties plan to jointly develop regular railway transportation from Shanghai to

Moscow and back for project and chemical (including hazardous) cargo, fertilizers, as well as transportation in tank containers and refrigerated containers.

In [4] the role of the Silk Road in the development of the transport-logistics system between Russia and African countries and the possibilities for cooperation in this sphere are investigated. The author highlights the potential of international cooperation based on the Silk Road and emphasizes the importance of regular dialogue and coordination of actions to ensure mutually beneficial development.

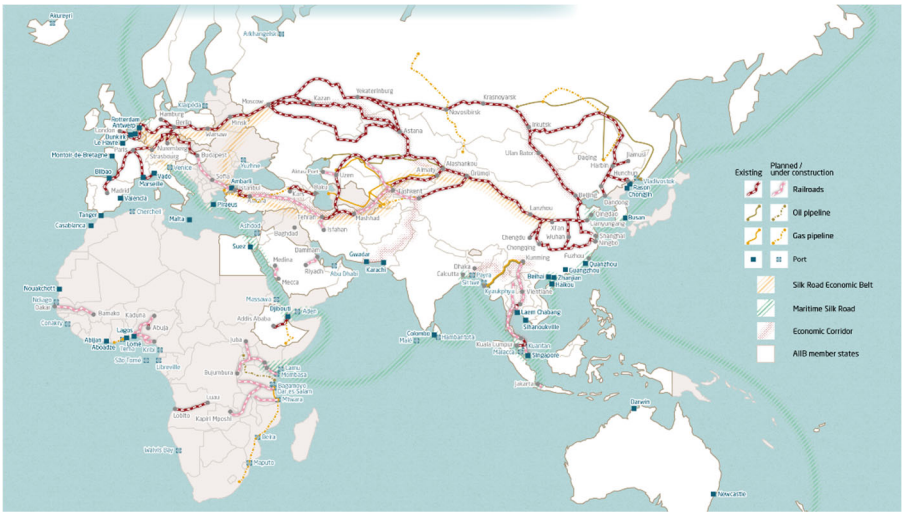

Fig. 2. International Transport Corridors [3].

The problems and prospects for the development of Russia's transport-logistics complex and its interaction with the countries of the CIS, APR, and Africa in the context of globalization are studied in [5]; the author points out the need for infrastructure modernization and improving the quality of logistics services to increase the competitiveness of Russia's transport-logistics complex. The study also emphasizes that Russia's transit potential could increase by 10-15% with the optimal integration of transport systems of the CIS, APR, and African countries.

Authors in [6] analyze Russia's competitiveness in the Eurasian transport market and assess the possibilities for increasing the throughput capacity of the transport-logistics system. They note that a 30-40% reduction in cargo delivery time due to route and infrastructure optimization can significantly improve throughput capacity indicators.

The article [7] discusses the development of transport infrastructure in the Arctic and its impact on the transport-logistics system of Russia and the countries of Northern Eurasia. The study suggests that the use of the Northern Sea Route can reduce the cargo delivery time between Europe and Asia by 40%, which, in turn, will lead to an increase in the volume of transit cargo flow.

The group of authors in [8] analyzes the possibilities of using digital technologies to optimize transport-logistics systems and increase throughput capacity. Researchers note that the implementation of digital solutions can increase the efficiency of logistics operations by 20-30%, leading to cost reductions and increased throughput capacity.

Developing cooperation with Africa is also an important research direction. In [9] the prospects for strengthening transport links between Russia and African countries are analyzed, including the role of government support and investments in infrastructure projects.

2 Materials and methods

The study is aimed at studying strategies for the development of the transport and logistics system of Russia, taking into account external factors, such as sanctions and export cuts in some industries. The objectives of the study are to analyze potential areas of market diversification and infrastructure development with an emphasis on cooperation with Asia, Africa and the CIS countries. The paper also examines the main problems and prospects of the Russian economy in the context of inflation and the need for public investment and regulation.

In this study, a mixed method of research is used, combining quantitative and qualitative methods to obtain a deeper understanding of the studied phenomena. Qualitative literature analysis is carried out using the method of theoretical synthesis, designed to integrate various theories and literary streams. This method allows you to identify common trends, differences and relationships between different studies and approaches. In addition, a systematic approach is used, which makes it possible to analyze the studied phenomena from the point of view of their interrelations and interactions.

Quantitative methods also play an important role in this study. Statistical analysis of data obtained from various sources is used to determine general trends and dependencies in the issues under study. Correlation analysis is also used to study the degree of relationship between different variables.

Data collection is carried out using document analysis, which is an effective method for studying existing scientific publications, reports and other sources of information related to the research topic. In this study, we used a variety of fresh sources by date of publication, which reflected the latest trends in the study area. Sources such as scientific articles, reports, books, statistics, research, and information from trusted websites and publishers. This approach to data collection makes it possible to obtain diverse and reliable information, which contributes to a more complete and objective analysis of the issues under study.

In this study, we strictly adhere to the principles of scientific ethics, which include honesty, objectivity, the exclusion of plagiarism, respect for intellectual property and confidentiality. All sources of information used were carefully checked for reliability, and all references to authors and sources are indicated in the text of the study. We also strive to ensure the completeness and objectivity of the analysis, based on reliable sources and presenting a variety of points of view on the issues under study. In all cases when someone else's intellectual property was used, we observed the requirements of copyright and citation.

After data collection, analysis is carried out using qualitative and quantitative methods. Qualitative data analysis is carried out using thematic analysis, which allows you to identify the main themes and patterns in the literature under study. This approach makes it possible to obtain a broad understanding of the phenomena under study and to identify general patterns and trends, which contributes to a deeper understanding of the issues under study.

Quantitative data analysis is carried out using statistical methods such as descriptive statistics, correlation analysis and regression analysis, which allows you to determine the degree of relationship between various variables, as well as predict possible changes in the future. The combination of qualitative and quantitative methods of analysis allows you to get a more complete and detailed understanding of the phenomena under study, taking into account various aspects and the dynamics of changes. Integration of the results of qualitative and quantitative analysis provides an opportunity to identify new hypotheses and directions for further research, and also allows you to test and supplement existing theories and models.

Using the data obtained, we strive to form reasonable conclusions that correspond to the goals and objectives of the study. The results of the analysis can be used to develop strategies and practical recommendations aimed at improving management efficiency and solving urgent problems in the area under study.

Possible methodological limitations of the study include the limited amount of data available for analysis, the selectivity of the sample, and potential biases in the sources presented. The impact of these limitations on the integrity and validity of the results is taken into account in the process of analysis and formulation of conclusions.

3 Results

Russia's transport-logistics system has undergone significant changes due to the changing foreign policy situation. Sanctions are reducing the volume of key non-resource exports from Russia. According to studies, the direct losses of 20 key Russian industries from sanctions affecting non-resource non-energy exports (NRNE) in 2022 will amount to $25.7 billion or 19% relative to 2021 levels. By 2030, the main part of it will be redirected to other markets [10].

By 2030, the top 20 industries will be able to redirect a significant part of the lost supplies due to sanctions to other markets — 14% ($18.4 billion) of the 2021 volume. For all industries, the substitution share will be lower, at just over 10% ($20 billion) [10]. A significant volume of lost NRNE revenues will be redistributed to the markets of the CIS countries, the Middle East (Turkey, Iran), where established relationships exist. Flows to Asian and Latin American countries will be redirected for individual commodity groups: fertilizers to Brazil, metallurgical products to China, India, and Vietnam.

Russian companies engaged in international transportation are in a suspended state regarding development markets: domestic companies cannot fully operate in the EU, there are also serious problems with throughput capacity in the Caucasus, restrictions on overloading to third countries in Asia, for example, when performing transportations on the Europe-Kazakhstan route, etc. At the same time, carriers from the CIS countries (except for the Republic of Belarus) are in a more advantageous position.

The European direction is paralyzed by sanctions. Due to EU directives, there is a variety of approaches by controlling authorities, suppliers, and banks. Only supplies of goods not included in Western sanctions remain. These supplies are limited by artificial barriers in the form of overloads and transshipments in TLC zones, as well as a ban on Russian and Belarusian carriers working in the EU market. These changes have significantly increased delivery costs and transit times. Pricing for many commodity items is now such that for some Russian consignees, it is economically more feasible to import European raw materials and goods from other countries, sometimes sacrificing quality. Future prospects will depend directly on the geopolitical situation. Most likely, the cargo flow will start to dry up, except for medical supplies and some goods of special social significance.

Southern direction can be characterized as a corridor for the supply of goods included in Western sanctions to Russia, including parallel imports. In addition, the corridor is used for the export of local products to the Russian Federation. Deliveries are made by all types of transport - road, sea containers, rail, and air transport. In addition to the exporting country, transit delivery times also affect the choice - sometimes a logistics provider or importer uses a more expensive type of transportation for their reduction. On the one hand, there is a trend towards creating large hubs in nearby countries that are loyal or neutral towards Russia for the consolidation of important commodity items intended for the Russian Federation. This will ensure the continuity of supplies (according to the schedule) and balance the load on transport infrastructure, which will gradually lead to a reduction in transit times and a decrease in transportation costs. The number of logistics providers is constantly growing, which positively affects both the pricing of services and their quality.

The Eastern direction is the most capacious, through which local goods are supplied, both not included in Western sanctions and included (with certain reservations). The main volume is supplied by sea, but the cargo flow on railways and highways is also significant. Several

problems of the eastern direction can be noted. For example, constant disruptions of export supplies to the Russian Federation due to zero tolerance for COVID-19 in China, leading to a significant increase in transit times and transportation costs. In addition, the transport infrastructure of the Russian Federation does not correspond to the volume of imports supplied along the eastern direction. This has occurred due to the reorientation of the Russian economy primarily towards China and, as a consequence, an increase in cargo flow. In addition, we believe that partners in the eastern direction have taken advantage of the complication of economic ties between the Russian Federation and Western countries, increasing the cost of their goods and services for the Russian business community. Moreover, a significant number of manufacturers of sanctioned goods important for the Russian economy refuse to supply them to the Russian Federation for fear of receiving secondary sanctions, as these companies conduct active foreign economic activity with Western countries that initiated sanctions against the Russian Federation. There are also important positive trends in such cooperation. Many Russian business participants managed to diversify their suppliers of raw materials and goods by replacing them with suppliers from, primarily, China, which allowed them to continue their business in the Russian Federation. It was also possible to agree on payments for goods and services in the currencies of supplier countries, which removed the risk of transaction blocks in euros and dollars for foreign trade participants.

At present, the main product that Russia can sell without hindrance and in comfortable currencies for the country can be considered raw materials. In particular, hydrocarbons and grain. If we consider the variation of building high-tech production on the territory of the country, which could replace the departed Western technologies (computers, scientific instruments, microchips, pharmaceuticals, aircraft and spacecraft, agricultural chemicals, etc.), we can note a number of restrictions for their external sales. In some countries - low purchasing power combined with the absence of their own similar production (African countries), and in others - high purchasing power combined with the presence of their own, often more advanced than currently in Russia, production (China, India). Partial implementation of high-tech goods can be carried out in the country, but this is likely to be insufficient. The government of the country has yet to solve this problem.

To mitigate the impact of sanctions, the Russian government has taken steps to support the transportation industry. In Russia, at the beginning of 2023, there were more than 400 federal and regional government support measures for the population and more than 85 entrepreneur support centers [11]. In addition to simplifying control rules and expanding the possibilities for lending to organizations of the transport complex, direct subsidies and other forms of support are provided. Among other things, in the field of logistics and export recovery, programs were announced to stabilize prices for agricultural products and sugar, measures to support exporters with subsidies for postal shipments, and free consultations for exporters from transport companies. Registries of manufacturing companies were expanded to facilitate import substitution processes. At the end of 2022, private entrepreneurs were given the option to create their own digital profile (simplifying access to state support measures), and taking loans for small and medium-sized businesses was simplified.

However, the current support measures were insufficient for a full recovery of supplies. Therefore, in an attempt to address internal and external challenges hampering the development of the country's foreign trade, in April 2023, the Government approved the main directions for the development of the "Single Window" system in the field of foreign trade in 2023-2024 [12]. The main task of the system is to simplify the provision and expand the availability of services for exporters and importers. To this end, it is planned:

- to form a single comprehensive list of services and support measures at the federal and regional levels in the field of foreign trade activities and to improve the work of state information systems providing access to such services;

- integrate the "Single Window" with the information systems of government bodies and organizations to promptly inform users about the available support measures and the results of services provided;
- develop a regulatory and technological basis for prompt and convenient interaction of entrepreneurs with government agencies;
- create a single register of participants in foreign trade activities to provide more efficient support to exporters and importers based on specific business situations. In addition, using the register, government agencies will be able to monitor business activity, qualitatively form a personalized environment of personal accounts of entrepreneurs, and send them relevant offers.

The system has been under development since 2018 and is intended to become the main tool for the state's interaction with the industry.

In order to restore the previous level of supplies, it is necessary, in addition to implementing state support measures, to make a large number of changes. These include:

It is necessary to develop transport hubs within Russia and co-finance the construction of road infrastructure to expand "bottlenecks" in other countries. For example, exports to China will be facilitated by the development of land corridors through Zabaykalsk, Kazakhstan, Mongolia, as well as maritime corridors and ports of Vladivostok. Trade with Turkey will be simplified by expanding port infrastructure in the Black Sea basin (ports of Novorossiysk), and trade with India will be facilitated by the development of the Trans-Caspian corridor.

To ensure the stability of financial operations, it is advisable to connect credit organizations from friendly countries to the Bank of Russia's System for the Transfer of Financial Messages (the Russian analogue of the SWIFT system, from which many Russian banks have been disconnected due to sanctions), create a new financial institution that would act as a guarantor of settlements, and expand the list of direct currency pairs. Ensuring the financial stability of operations should become a key direction of state support, as the authors of the study point out.

Businesses need help in opening representative offices, certifying products, finding partners, and promoting products in the markets of Asia, the Middle East, and Latin America. It is necessary to develop international partnerships and cooperation agreements in the field of transport and logistics, which promotes the unification of efforts and synergy between countries and organizations.

The state must provide support and financing for research projects aimed at developing innovative technologies and solutions for the transport and logistics industry.

4 Discussion

The volume of non-resource non-energy exports in the top 20 key industries of the processing industry will almost recover to the level of 2021 by 2030, as noted in [10]. However, the dynamics will vary depending on the specific industry.

Thus, by 2030, exports of metallurgical products will amount to $54.9 billion (in 2021 it was $57 billion). Taking into account expectations of the revival of the global economy after the 2023-2024 crisis, there are reasons to believe that the demand for metallurgical and chemical products in the world will recover. Not all manufacturers in the world, especially in the EU, will be able to survive the period of low prices for these products amid high energy prices. The situation in Asia will be less critical, but even there it is not excluded that individual manufacturers will have to close some capacities. This creates potential unmet demand for corresponding products from Russia. Therefore, the export recovery forecasts presented in [10] may turn out to be overly conservative, and there will actually be growth of 10-15% compared to 2021 levels.

By 2030, according to forecasts in [13], food product supplies will increase by 16%. Growth will be shown by three main groups: fish products, fats and oils (of vegetable and animal origin and products of their cleavage), as well as meat and food by-products. However, fish exports (frozen fish, crustaceans, and fish fillets), according to the forecast, will not catch up to the 2021 level by 2030. If in 2021 Russia supplied $5.9 billion worth of fish products abroad, by 2030 exports will recover only to $5.8 billion. Asia will become the key market for fish sales: by 2030, supplies there will grow by 25%.

However, there is an opinion that an increase in supplies to Asia by 25% will not compensate for the decline in exports to Europe and the US by 60 and 100% respectively, as indicated by analysts in [14] – in this case, exports will drop to $4.5 billion.

As for meat, [15] predicts an increase in its exports from $1.2 billion in 2021 to $1.8 billion in 2030. The need for global meat trade is growing due to population growth, while its production in the world is stagnating: not all countries have the necessary areas for pastures, and in Europe, production is falling due to reducing carbon dioxide emissions [16] and farmers leaving the market. Russia has an advantage thanks to its climate, sufficient land, and water resources [17]. By 2030, the supply of machinery and equipment products will increase by 1% compared to 2021 and will amount to $24.2 billion, as stated in [18], with growth observed in all major industry groups. Thus, due to the high dependence of global nuclear power on individual Russian components, the supply of nuclear reactors and boilers will increase to $11 billion in 2030 from $10.9 billion in 2021, and the competitive price/quality ratio of Russian machinery products will allow the supply of electrical equipment and land transport to reach $6.3 and $4 billion respectively against $6.2 and $3.8 billion. At the same time, barriers to the development of export-oriented engineering are the high dependence on imported components in the automotive sector, strong dependence on foreign software, and a deficit of state funding for research and development [19].

Industries in which export volumes will decrease include the chemical industry and wood processing [20]. Chemical industry supplies in 2030 will amount to $23.2 billion compared to $25.2 billion in 2021 (a decline of 8%), and wood processing will be $13.8 billion compared to $15.3 billion respectively (a decline of 10%).

Analysts attribute fertilizers, plastics and their products, as well as organic chemical compounds and pharmaceutical products to the chemical industry. Russia is one of the largest producers and exporters of fertilizers, and a large part of them is exempt from sanctions by unfriendly countries. As a result, fertilizer exports will grow by 3.2% by 2030, to $12.9 billion [21]. Exports of plastics and their products will recover only partially (by 87%, to $5.4 billion), and organic chemical compounds will decrease almost by half, from $4 billion to $2.3 billion.

The main wood processing products include wood and charcoal, paper and cardboard, and wood pulp. The export of the first category of goods will show the most significant decline: from $10.8 billion in 2021, it will decrease to $9.4 billion in 2030. Earlier, voluntary international forest certification bodies FSC and PEFC announced the suspension of trade certificates for Russian products [22].

5 Conclusion

Summarizing the results of the study, it can be concluded that the proposed strategies for the development of Russia's transport and logistics system are aimed at developing transport and logistics infrastructure, creating a new mechanism for business transactions, facilitating access to new export markets, and financing the scientific sector.

Prospects for the further development of Russia's transport and logistics system include expanding international cooperation and integration with global logistics networks through the certification of goods and adapting products to consumer needs.

We believe that in the coming years, there will be an even greater reorientation of the Russian economy towards cooperation with Asian, African, and CIS countries due to reduced cooperation with countries that have supported sanctions against Russia. Such a reorientation entails the need for significant government and private investment and state regulation. At the same time, there is no certainty that the turnover in many industries will recover to at least the 2021 level by 2030. Taking inflation into account, it becomes evident that the potential trade channels available to the country's economy and Russia's development are insufficient even with the full establishment of logistics chains with Asian, African, and CIS countries. This is a question that the country's government has yet to address.

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