Logistic factors as a mechanism for the development of the transport and logistics sector in Astrakhan region

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Abstract. The Astrakhan region is a significant geopolitical and geocultural zone. It is a major transport and transit hub. A special economic zone (SEZ) is known as a territory the state has granted a special legal status and economic benefits to. However, the lack of efficient logistics makes the efforts of zone residents futile. It is necessary to strategically manage supply chains with access to international organizational interaction, both for individual participants and for the SEZ as a whole. The criteria that determine the effectiveness of LPI logistics both at the level of countries and at the level of individual territories (SEZ) are discussed. A comparative assessment was carried out and the current situation was modeled in terms of the effectiveness of logistics management in the Caspian states. An analysis of the dynamics of six logistics performance indicators for the Caspian countries was carried out. A way of optimizing the development of the SEZ is proposed. The hypothesis about the possibility of using the LPI modeling system to assess the prospects for the development of the territory is confirmed.

1 Introduction

The Astrakhan region is a territory with significant reserves of natural resources. Being in a favorable position, it has taken advantage of exceptionally favorable external conditions. The socio-economic development of the Astrakhan region in 2022 can be assessed as dynamic, which is proved by the increase in such indicators as GRP, industrial production index, the amount of work by type of activity “construction” [1].

The significance of the Caspian region due to its important strategic geopolitical, geoeconomic and geocological significance is obvious and evident. The increased interest of the leading countries of the world in the region is significant, which is proved by a desire for dominance in the region.

Large transnational corporations and joint ventures operate in the Caspian Sea, and international programs are being implemented. The Caspian region, which has developed as a qualitatively new type of territorial community – transboundary, includes both states and individual lands of states as factors.

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The appearance of the Caspian region didn’t mean that it was formalized as a single system. It took time for the multidirectional interstate and interregional cooperation of the countries of the Caspian basin to lead to the appearance of the outlines of the region, to lay the foundations for the creation of an integration association.

Currently, the region is an emerging new economic, political, socio-cultural space, emerging in nation-states and developing in the sphere of relations between them. The construction of the Caspian as a transboundary region is due to the challenge of the time itself, the process of globalization. In a globalizing world, regional integration is becoming increasingly important, giving a powerful cumulative effect in shaping the world's poles of economic and technological development. Cross-border regional cooperation is one of the promising areas of international integration.

1.1 Problem Statement

Obviously, the share of the transport component in the sectoral structure of the GRP of the SFD and the NCFD is extremely insignificant. Considering the favorable geographical position and potential of the Southern macroregion, as well as the strategic importance of the development of the transport industry for ensuring the economic security of the regions of the South and the country as a whole, this state of affairs in the industry can rightfully be considered paradoxical.

The creation of a port special economic zone in the Astrakhan region will give a great impetus to the development of the port area in terms of cargo handling. The main cargo flow in the Caspian may be container traffic between India, Asian countries and Russia.

It is assumed that the creation of a new Caspian cluster will increase the competitiveness of Russian ports and will attract cargo flows from neighboring countries.

Despite the difficulties, the privileged conditions of the special zone, favorable location and ongoing efforts to develop the zone have a positive effect on attracting additional interested production organizations. For example, “Lotos” SEZ JSC” is actively cooperating with the United Shipbuilding Corporation within the framework of a signed cooperation agreement and is considered as the most promising platform for localizing industrial production for the needs of domestic shipbuilding. According to the report of the Ministry of Economic Development of Russia on the results of the work of special economic zones in 2021, the Lotos special economic zone was recognized as effective, being in 7th position out of 19 among industrial-production type SEZs with a consolidated efficiency indicator value of 89.1%. In this case, in accordance with the approved methodology, the assessment was carried out according to more than 25 criteria. The activities of residents, the profitability of investing funds from the federal and regional budgets in the creation of infrastructure, the work of government bodies, etc. were taken into account.

Currently, residents of the special zone are implementing projects in various industries: the production of geosynthetics, fish feed, household chemicals, bioprotein, the construction of ships and components. The residents are companies from Iran, Italy and other countries. The volume of investments made by residents amounted to 3 billion rubles, the number of jobs created – 429, the volume of taxes and social contributions paid – more than 1 billion rubles.

Three plants are operating, new enterprises are being built, including those with foreign capital, among them – the first Iranian household chemicals plant in Russia; it is planned to complete the construction and put into operation a large plant for the production of feed for fish and pets; the production of the “Heksa-Lotos” company is expanding, which is completing the construction of the second stage of the plant for the production of geosynthetic materials.
In July 2022 the international industrial exhibition INNOPROM completed its work in Yekaterinburg. The partner country of the event was the Republic of Kazakhstan. Representatives from 51 countries and 79 regions took part in the exhibition. As part of the exhibition, representatives of “Lotos SEZ JSC” held negotiations with manufacturers of industrial equipment and companies from Belarus, Kazakhstan, China, Turkey and other countries interested in supplies via the international transport corridor “North-South”.

In addition, in the summer of 2022 Chairman of the Federation Council Committee on Economic Policy Andrey Kutepov held a meeting on the development of the North-South international transport corridor in terms of the infrastructure of the Caspian Basin, which was attended by Deputy Minister of Transport of the Russian Federation Alexander Poshivay, Deputy Head of Rosmorrechflot Zakhar Dzhioev, Head of USC Alexei Rakhmanov, Sergey Milushkin, General Director of “Lotos SEZ JSC”, representatives of the Astrakhan Region, the Republic of Dagestan, Kalmykia and others.

Problems were voiced and measures were discussed at the meeting to ensure the development of the port infrastructure of the Caspian Basin, taking into account the increase in cargo traffic and changes in the range of goods, and the issue of determining the operator of the sea part of the Trans-Caspian route of the “North-South” ITC from the Russian side was considered.

One of the problems of insufficient efficiency in the operation of the port area is the processes of shallowing of the Volga-Caspian sea navigation channel. In the current situation, the work of the ITC “North-South”, the growth of cargo turnover through the Astrakhan region and the implementation of investment projects in the port SEZ directly depend on high-quality dredging.

Through the joint efforts of Rosmorrechflot, USC, STLC, the leadership of the Astrakhan region, JSC SEZ Lotos, a project was implemented to create modern dredging vessels to solve these problems. As one of the results of the implementation of this project — at the Lotos shipyard of the Southern Center for Shipbuilding and Ship Repair (part of USC) the ceremony of launching the lead ship from a series of four self-propelled dredgers with a rotary ripper, the construction contract for which was signed in 2020 with STLC JSC, took place in the summer of 2022.

This is an innovative vessel with technical characteristics that far exceed the current dredging fleet. A comparative analysis showed the economic efficiency of the new type of dredgers in relation to multi-bucket dredgers by 2.3 times, to dredgers – by 20%.

In addition, special attention is paid to the need to organize the reorientation of cargo flows in the current sanctions conditions and, accordingly, to the development of the North-South ITC as one of the key solutions to this problem. This route may be of interest to a number of regions of Russia, the potential of which has not yet been unlocked, including due to the imperfection of the legislative framework, infrastructural restrictions, and an insufficient number of vessels.

At the same time, against the background of a decrease in cargo traffic in the northwestern ports of the country, there is a reorientation to the southern ports. The “North-South” ITC, which previously caused many doubts among logisticians, is now becoming one of the most popular routes, as evidenced by the growth in cargo turnover in Russian ports on the Caspian Sea (according to experts, the increase in Astrakhan ports in the first half of 2022 amounted to 30% ). Thus, one of the priority projects at the moment is the large-scale reconstruction of the Volga-Caspian sea shipping channel, the construction of modern container and other terminals in the port SEZ of the Astrakhan region.

At present, the engineering preparation of the territory of the first stage is underway in the port SEZ to accommodate the infrastructure on a total area of 39.6 hectares, the design of the first stage of the modern port complex (berths No. 8 and No. 9 of the port of Olya) is being carried out, the capacity of which will be 3.2 million tons of cargo. This territory will
house the container, grain and oil terminals of Caspiy PLC LLC and a potential resident with investments from Iran (September 2022).

The anchor resident of the port SEZ is the company “PLK” Kaspiy” with a project to build a modern port with a container terminal. The total investment in the project will amount to more than 27 billion rubles, the planned cargo turnover by 2031 is about 8 million tons. Foreign partners are involved in the implementation of the project.

At the first stage, berths No. 8 and 9 of “Olya” port and the adjacent territory will be equipped with the installation of loading and unloading equipment, the capacity of which will be 3.2 million tons of cargo per year. At the second stage, it is planned to build container and other terminals in the area of Zaburunny ilmen (seven kilometers south of the port of “Olya”).

Thus, the port SEZ with a modern port is a key link in the Russian part of the international transport corridor “North-South”, the Astrakhan region plays an important role in the implementation of Russia's policy in the Caspian macroregion, both in terms of the development of unique mineral and biological resources, environmental protection, and on the use of transport transit potential and the development of international cooperation, which certainly contributes to the growth of the political influence of the Russian Federation.

### 2 Materials and methods

The ways one can predict the development of a territory or SEZ and, as a result, give a high probability of return on investment are discussed. The modern world experience of the largest investment organizations, particularly, the International Bank for Reconstruction and Development (IBRD), suggests using the Logistics Performance Index (LPI) for these purposes. Statistics for calculating this indicator for 160 countries of the world have been conducted since 2007.

To develop the SEZ, it must be integrated into international cooperation and trade not only with domestic producers, but also with representatives of all neighboring countries. The multidimensionality of assessing the effectiveness of logistics, as a supply management system, shows the degree of simplification of trade, transportation, storage procedures, and also assesses the quality of logistics services and transport infrastructure.

The LPI index includes six indicators: “Customs” – the efficiency of customs, “Infrastructure” – an assessment of the quality and availability of infrastructure, “International shipments” – the level of specificity of transportation prices, “Logistics quality and competence” – the level of competence and quality of logistics providers, “Tracking and tracing” – tracking the movement of cargo across the territory, “Timeliness” – the number of deliveries that arrived at the destination on time [2].

The Logistics Performance Index (LPI) is an interactive benchmarking tool created by the World Bank to help countries identify the challenges and opportunities they face in their logistics operations and what they can do to improve their performance.

LPI is a country rating published by the World Bank every 2 years. However, the last publication of the rating is dated 2018.

The LPI is the weighted average of the six indicators shown above. Table 1 presents the top ranking of the top 5 positions in comparison with the countries of the Caspian Community.

| Table 1. Logistics Performance Index (LPI) [3]. |
logistics operations and what they can do to improve their performance.

It is necessary to consider the multidimensionality of assessing the effectiveness of logistics, as a supply management system, which certainly contributes to the growth of the political influence of the Russian Federation.

The creation of a port SEZ will also attract investors for the construction of modern port infrastructure and the development of related processing industries, which will contribute to the creation of new jobs and increase revenues to the budgets of all levels.

According to preliminary estimates, the cargo turnover through the port SEZ can reach 8 million tons by 2029. It is estimated that at least 2,000 jobs can be created in the port SEZ.

The creation of the SEZ in the area of the seaport of Olya in the Astrakhan region will become the starting point for the development of the transit potential of the ITC “North-South” and will increase the efficiency of the Russian ports in the Caspian Sea. In order to include private carriers in the ITC system, it is necessary to raise the technical and technological level and achieve the necessary organization of communication for all modes of transport along all cargo escort routes. The increase in cargo turnover along the ITC “North-South” has probable opportunities for investment in the creation of a port SEZ on the territory adjacent to the port of Olya presented in Figure 1.

Annual revenues of the state within the framework of the project – 3.33 billion rubles:
1.8 billion rubles – taxes of residents of the port SEZ;
0.23 billion rubles – income from the use of VKMSK;
1.3 billion rubles – proceeds from the Platon system.

Additional annual income:
2.5 billion rubles – taxes of residents of the SEZ “Lotos”.

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI</th>
<th>Customs</th>
<th>Infrastructure</th>
<th>International shipments</th>
<th>Logistics competence</th>
<th>Tracking &amp; tracing</th>
<th>Timeliness</th>
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<tr>
<td>Germany</td>
<td>4.20</td>
<td>4.09</td>
<td>4.38</td>
<td>3.83</td>
<td>4.26</td>
<td>4.22</td>
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<td>3.97</td>
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<td>3.76</td>
<td>4.12</td>
<td>4.08</td>
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</tr>
<tr>
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<td>3.95</td>
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<td>3.88</td>
<td>4.04</td>
<td>4.02</td>
<td>4.32</td>
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<td>3.74</td>
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<td>4.10</td>
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<td>Singapore</td>
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<tr>
<td>Turkmenistan</td>
<td>2.41</td>
<td>2.35</td>
<td>2.23</td>
<td>2.29</td>
<td>2.31</td>
<td>2.56</td>
<td>2.72</td>
</tr>
</tbody>
</table>

Note: compiled by the authors based on the Global Rankings Logistics Performance Index 2018
Fig. 1. Annual revenues and necessary expenses of the state for the creation of a port special economic zone.

In addition, creation of a logistics center that will provide services for the transshipment and transportation of containers and other cargoes passing through the port SEZ being created is relevant. The Astrakhan Region is a key link in the North-South international transport corridor.

The availability of high-quality and efficient port infrastructure that meets international standards is one of the important factors for attracting cargo carriers. The work experience will allow assessing and identifying the prospects for cargo flows and the possibility of including the port special zone in the North-South corridor for its maximum use.

The companies with which the agreements have been signed intend to invest heavily in the creation of the Astrakhan Port SEZ. Particular attention in the formation of the ITC should be paid to the development of multimodal transportation and the organization of effective interaction of all modes of transport [4].

3 Results

The creation of a network of information and logistics centers – automated control centers for the preparation and mutual coordination of schedules, the approach of vehicles, interacting modes of transport can become the main direction for improving the interaction of different modes of transport in these processes.

The need for highly qualified personnel is essential. However, the problem is not only in finding suitable personnel, but also in maintaining their high qualifications in an ever-changing market. The dynamism of the industry is quite high. Business conditions, customer requirements and the situation with carriers have changed here significantly for several years. The situation requires constant improvement of the educational level and competencies of employees [5].

It is expected that by the end of 2030, at least 26 residents will operate in the PSEZ, which will create at least 1,000 jobs. The draft resolution on the creation of a port SEZ and the Caspian cluster in the Astrakhan region was submitted by the Ministry of Economic Development of Russia to the Government of the Russian Federation.
4 Conclusion

1. The SEZ is unable to efficiently develop without transport and logistics. The creation of a logistics infrastructure, particularly, a port SEZ, a dry port SEZ, an intermodal container terminal is an integral element of the synergy of the development of an industrial SEZ and the economy of the region as a whole. The products of the residents of “Lotos” SEZ enterprises of the Astrakhan region and enterprises of the Southern Federal District (SFD) will be able to enter the international market.

2. It is the quantity and quality of the presence of major international players in the transport and logistics market in the SEZ that can serve as an indicator of the speed of its development.

3. The development of the transport and logistics infrastructure of the Astrakhan region, including ports and an intermodal container terminal, will contribute to the transformation of the “Lotos” SEZ and the Astrakhan region as a whole into a major transport hub and, in the medium term, into a logistics portal.

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