ABSTRACT

Relevance of the research topic. The expansion of international cooperation and the increase in trade volumes in the context of the modern global economy requires the effective functioning of interstate transport systems. This, in turn, increases the importance of developing a modern transport and logistics infrastructure that ensures unhindered transit of cargo and passenger traffic. Kazakhstan's geographical location allows for the most efficient use of the country's transit potential and makes it a strategic hub for international transport corridors.

President of the Republic of Kazakhstan K.Zh.Tokayev paid special attention to the modernization and expansion of the country's transport infrastructure and outlined the strategic task of developing the Trans-Caspian route and internal railway lines, digitalizing transport and creating multimodal hubs. In addition, the integration of logistics and e-commerce, the introduction of automated management systems, the development of "green corridors" and international aviation hubs are considered as key factors in improving the efficiency of the transport system and active participation in global trade processes.The growth of transit traffic can not only bring great economic benefits to Kazakhstan, but also increase the efficiency of the national transport system and serve as a factor of geopolitical stability. This trend expands foreign economic relations and strengthens the role of Kazakhstan as a natural transit bridge between Europe and Asia [1].

The degree of development of the problem. International corridors occupy a special place in the processes of expanding inter-economic cooperation, deepening integration processes and increasing international trade. One of the important issues for the development of the country's economy is the development of international corridors passing through our country, taking into account the geographical location of the country, and improving their infrastructure. Domestic and foreign scientists took part in solving this problem, who conducted many scientific studies on this topic, the results of which were reflected in scientific publications. In particular, foreign scientists include V. A. Dergachev, E. Y. Vinokurov, M. A. Jadraliev, Y. A. Shcherbanin, E. M. Chernyavskaya, A. G. Kirillova, L. B. Vardomsky and M. O. Turayeva, Y. Tsui, W. Martin, H.Jeyhun, K. T. Chang, P. Georgiev, D. Watanabe, R. Shibasaki and X. Arai, N.P. Contessi, A. G. Kotenko, S. B. Sattorov, V. P. Nekhoroshkov, K.M. Timuchin, R. Shakalis, N. Batarliene, D. Calabrese, O. Hilmola, V. Khentu, K. Kartal, M. Musal-Malago, R. Kinzenkovsky, Russian scientists – I. Makarova, K. Shubenkova, P. Buivol, V. Mavrin, L. Gabsalikhova, E. Mukhametdinov, A. Romanova, A. Vygnanov, M. Vygnanova, E. Sokolova, K. V. Kholopova, L. B. Mirotina, E. L. Limonov, V. M. Nazarenko, N. A. Troitskaya, E. G. Efimova, T. A. Prokofieva, N. A. Zhuravleva and Kazakhstani scientists-researchers of international corridors K. Baizakova, G. Baykushikova, D. Zhekenov, M. Naribaev, M. Izteleuova, S. Bekzhanova, M. Laumulin, A. Arupov, K. N.Aidarkhanov and A. K. Rakhmetoldin, N. K. Isingarin, B. Byuzheeva, A.Mekekbayev and S. Turkeeva, Z. E. Kozhabekova, J. S. is widely considered in the works of Raimbekov and B. U. Syzdykbaeva. This is evidence that international transport corridors play an important role in the global economy, facilitating trade and the exchange of goods between

countries. Transport links reduce the time and cost of delivery, increasing the competitiveness of goods. International transport corridors are an essential component of the global logistics system. They make it possible to optimize trade flows between states, reduce delivery time and reduce transportation costs. However, there are a number of structural and institutional barriers to the development of these corridors, among which investment deficits, political instability, legal incompatibilities, and uneven infrastructure quality occupy a special place. For effective organization of corridors, it is necessary to unify national legislation, coordinate the interaction of transport systems and harmonize technical standards.
In addition, the development of international transport corridors in the context of geopolitical changes and digital transformation requires the study of new scientific methods. These issues are insufficiently studied in the modern scientific literature, especially there is a small amount of research on integrated models and mechanisms of infrastructure optimization. In this regard, in order to improve transport corridors in accordance with modern requirements, increase efficiency and strengthen regional economic ties, it is becoming relevant to conduct in-depth scientific analysis from a theoretical and applied point of view.

The object of the study. The object of the study was the transport and logistics infrastructure of international transport corridors passing through the territory of the Republic of Kazakhstan. These corridors are of strategic importance for realizing the country's transit potential, as they combine the main transportation routes between Europe and Asia and allow integration into the global transport system.

The study examined the current state, development trends and ways to improve the efficiency of this infrastructure. Special attention was paid to the interaction and compatibility of infrastructure elements in order to increase the transit potential of the Trans-Caspian International Transport Route.

The subject of the study. The Trans-Caspian International Transport route. It is a set of trade, economic, political and economic relations that act as a system that forms the directions of international trade. The methods, models and practical solutions aimed at optimizing the functioning of the transport and logistics infrastructure of international transport corridors, including transportation, redistribution, customs clearance, information support and logistics flow management, are considered in order to increase their efficiency, reduce costs and improve the quality of service.

The purpose of the work. INF development and implementation of integrated methods and models for optimizing transport and logistics infrastructure aimed at improving the efficiency and competitiveness of international transport corridors with an emphasis on improving transit potential through innovations in structure and management and taking into account modern challenges and opportunities of global logistics.

In addition, the Trans-Caspian study, with a special focus on the international transport route, in order to increase its transit potential, offers specific proposals and solutions through simulation and empirical research.

To test the hypothesis and achieve the research goal, the dissertation provides for the solution of several tasks.

At the same time, the following tasks must be solved.

- To consider the theoretical and methodological aspects of optimizing the transport and logistics infrastructure to increase the transit potential of international corridors;

- Analysis of the transport and logistics infrastructure of the Trans-Caspian International Transport Route;

- Development of simulation models for modeling and evaluating the effectiveness of transit flows in the areas of optimizing the infrastructure of the Trans-Caspian International Transport Corridor and the Trans-Caspian International Transport Route.

Scientific novelty. The main quality and number of indicators of the Trans-Caspian International Transport Route (TCC), the effectiveness of transport and logistics infrastructure were determined with the help of simulated modeling. Based on the results of modeling the development of scientific and practical recommendations for the planning of future projects.

- The connection of the transport corridors, the importance of transport corridors, has been proven.

- There is a desire between trade and transport infrastructure.

- The work of the vdolthkb infrastructure is optimized based on a simulated Mo del

- Methodological approaches aimed at improving the efficiency of transport corridors, aimed at improving the efficiency of transport corridors.

Conclusions proposed for protection:

- A universal simulation model has been developed for TC MTR, which makes it possible to optimize transport routes.

- The model is designed for planning and analyzing the transport process, adapted to work with real data.

- Optimization of transport and logistics infrastructure The theoretical foundations of optimization of transport and logistics infrastructure have been developed.

Research methodology. This dissertation research comprehensively examines the issues of optimizing transport and logistics infrastructure in order to increase the transit potential of international transport corridors. The research methodology is based on basic scientific approaches and methods: general scientific methods, special methods, statistical analysis, simulation modeling, mathematical modeling and empirical research methods.

In the course of the research, domestic and foreign scientific works, legislative acts, data from international organizations and statistical data were widely used. The theoretical foundations and model approaches have been developed with a special focus on the Trans-Caspian International Transport Route.

Theoretical and practical significance. The research work systematized the theoretical foundations of optimizing transport and logistics infrastructure in increasing the transit potential of international transport corridors and presented new scientific concepts. The structural and functional elements of the corridors were scientifically analyzed using the simulation method. This study forms an important theoretical basis for the development of models and methods aimed at improving the efficiency of

transport systems. The results of the study are suitable for use in making specific infrastructure decisions and planning transit routes. The proposed models and approaches to optimization along the Trans-Caspian International Transport Route make it possible to improve logistics processes, increase transit traffic volumes and reduce costs.

The following scientific concepts are put forward for protection:

- A universal model for optimizing transport routes has been developed by simulating the Trans-Caspian International Transport Route.

-A model has been developed that allows direct use of data on the state of the transport corridor components, the dynamics of demand for transportation and planned changes in infrastructure. This model can be used to analyze and plan the transportation process in a particular transport corridor.

-The theoretical foundations for optimizing the transport and logistics infrastructure of international corridors have been developed. This includes the main concepts and approaches aimed at increasing transit potential.

The research information base includes legislative and regulatory acts of the Republic of Kazakhstan, laws of the Republic of Kazakhstan, resolutions and decrees of the Republic of Kazakhstan regulating the activities of various subjects and the development of the economy, domestic and foreign periodicals, scientific articles of the Scopus database, Springer Link and others, materials of international scientific and practical conferences, data of the Committee on Statistics of the Republic of Kazakhstan, Data from Kazakhstan Temir Zholy JSC and other organizations were used.

Approbation of the results of the work. The main scientific results of the dissertation research were published at scientific conferences, symposiums and scientific journals of international and national level and discussed in the scientific community. The results of the study "were published in such publications as "Transport and Telecommunication", "Bulletin of KazATK", "Bulletin of Turan" siyakty basylymdard zharyk korip, otandyk zhane sheteldik sarapshi received a positive assessment from domestic and foreign experts.

In addition, the models and analytical conclusions developed during the work were presented in the form of practical recommendations for use in industry institutions and logistics structures.

Publications. The main research results have been published at the following international conferences and collections of scientific papers: Trans-Caspian international transport route infrastructure assessment using simulation modeling (Transport and Telecommunication, 2024, volume 25, No. 1, 11-19 https://doi.org/10.2478/ttj-2024-0002), Analysis of transport and storage capacities on the trans-Caspian railway route (KazATK Bulletin, 2023, Volume 124 no. 1, pp. 153-160), Modeling the work of transport and logistics companies in Kazakhstan (Bulletin of KazATK, 2023, Volume 125 No. 2, p. 138-146), Analysis of methods for optimizing the procurement system at enterprises (Bulletin of Turan, 2023, No. 2 (98), pp. 159-171), the introduction of global crises with cargo transportation: a comparison between Germany and Kazakhstan (Bulletin of KazATK, 2023, Volume 127 No. 4, pp. 89-100), perfection of container transportation in the Republic of Kazakhstan (KazATK

Bulletin, 2023, Volume 127 No. 4, pp. 111-118), Optimization of transport and logistics infrastructure to increase the transit potential of international corridors (KazATK Bulletin, 2024, Volume 131 No. 2, p. 128-137), access at the "last mile": bibliometric analysis (Bulletin of KazATK, 2024, Volume 131 No. 2, pp. 138-146), content of logistics development and transit potential of international corridors of the Republic of Kazakhstan (Bulletin of the University of Turan No. 4, 2024 - pp.200-212), Factors of development of international transport corridors in the Republic of Kazakhstan (proceedings of the International Scientific and Practical Conference "The paradigm of sustainable economic development in the context of global change: challenges, consequences, opportunities" April 11-12, 2023), factors of development of international transport corridors in the Republic of Kazakhstan in order to implement the SDGs (Conference on Education and 3rd mission of Universities, Sustainability and Development " by D. E. Urmanova, A. Nurgaliev, Alberto Frigerio, Aurora Diaz-Soloaga. - Almaty: KazNITU, 2024. - p. 68).

The structure of the dissertation is adjusted based on the subject, goals and objectives of the research. The dissertation work consists of an introduction, three sections, a conclusion, a list of references, and appendices. The study is presented on 193 pages, contains 27 figures, 32 tables.