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Conceptual, Organisational and Technological Solutions for Development of Digital Platforms for Managing Transportation along International Transport Corridors

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ABSTRACT

Creation and development of ecosystems in the field of transport and logistics is inextricably linked with development of digital platforms that integrate information exchange processes and ensure interaction of participants in these business ecosystems. In this context, modern business ecosystems in the field of transport and logistics are becoming a new form of organising participants in the transportation process (participants in the supply chain), and digital platforms underlying them are becoming a digital tool for ensuring their coordination and effective management.

Currently, development of digital platforms within the framework of building business ecosystems in transport and logistics, including international transport corridors, is taking place in the EU states, several Asian states, as well as in the Eurasian Economic Union (EAEU). The implementation of these projects requires the development of scientifically based approaches in terms of determining the principles for building these digital platforms, as well as of the development of organisational and technological solutions to ensure their creation and operation.

The objective of the study presented in the framework of this article was to study organisational, technological and legal issues of multimodal transportation along international transport corridors (ITC), aimed at developing conceptual, organisational and technological solutions that ensure construction, operation and development of digital platforms for managing transportation along the ITC, corresponding to the real needs of the transport and logistics system, the current legal norms, the modern and future developments of digital technologies in transport industry.

The authors of the article proposed a set of refined principles for formation of digital platforms to ensure development of international transport corridors, including within the ecosystem of digital transport corridors of the EAEU. The study has resulted in development of top-level architectural solutions, key parameters of information exchange between digital platforms of the ecosystem of digital transport corridors of the EAEU as part of the project currently being implemented to form a digital platform of international transport corridors.

Keywords: digital transport and logistics systems, digital platforms for formation and development of international transport corridors.

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INTRODUCTION

The ongoing digital transformation of transport and logistics systems determines the need to change the scientific paradigm of transport systems management, to search for new approaches to organising the transportation process and effective interaction of all participants in the supply chain, from the component supplier, product manufacturer, logistics and transport companies, and ending with the marketplace operator and the end consumer of the product. The key trend in this digital transformation is formation of business ecosystems, primarily in the field of e-commerce, as well as in related sectors of the economy.

The most important principle of such business ecosystems, in our opinion, is the departure from the model of direct competition and the transition to a model of balanced competitive coexistence and mutually beneficial partnership.

Besides, formation and functioning of business ecosystems is impossible without the development of digital platform solutions, which today are turning into a new type of business process integration tool and formation of new organisational forms of «digital monopolies». Entry into this ecosystem of a new company, product or service is associated with a significant entry barrier (including on the principle of «friend or foe»). Even more problematic is the exit from the ecosystem that provides promotion of products and services, including the issues of ordering, delivery and payment for goods or services, after-sales maintenance, and customer service.

International scientific sources contain a significant number of publications on formation and development of business ecosystems. However, as a rule, these publications deal with processes related to ecosystems in the field of banking, telecom, and entertainment. At the same time, there are practically no publications related to development of business ecosystems in the fields of transport and logistics. The issues of development of these business ecosystems, as well as key factors related to their formation and functioning, including creation and use of digital platform solutions, in our opinion, are not disclosed in full.

Insufficient development of conceptual approaches to formation of business ecosystems in transport and logistics, the use of digital transportation management platforms, including those along international transport corridors, slow down digitalisation processes in the domestic transport and logistics system and make it difficult to develop design solutions for the use of digital transportation management tools.

Key Trends and Vectors of Development of Global Transport and Logistics

Currently, the global transport and logistics system, the key element of which is the network of international transport corridors (ITC), is undergoing a period of fundamental transformations associated with the manifestation of the following key factors:

1. The ongoing geopolitical changes, sharp politicisation of international relations and introduction by individual countries of unilateral unreasonable restrictions, freezing (in fact, confiscation) of assets, a ban on activities, including organisation of transportation.

The global and long-term nature of this trend is beyond doubt, as well as the depth of its influence on yesterday's unshakable «rules of the game», including in terms of organising transportation along the ITC.

2. The impact of the COVID-19 pandemic on the global economic system in general and the transport and logistics industry in particular.

The seemingly «insignificant» outrage turned into a «perfect storm» that radically changed not only the structure of goods transportation flows and the cost of transportation along the ITC, but also led to long-term and sustainable changes in the global transport system, including reorientation of cargo flows to alternative modes of transport and directions of transportation.

3. The development of information and communication technologies, digital services has laid the foundation for a fundamentally new way of organising, managing and controlling the transportation process, ensured creation of innovative channels and communication tools between the customer and the manufacturer, between the client and the carrier, making them «closer» to each other and changing the composition and established roles of absolutely all participants in the transportation process.

The totality of these primary factors and cardinal reasons has become the basis for formation and development of new mechanisms and methods for rational organisation of transportation, including along international transport corridors. The actual manifestation of these changes was:

1. Significant changes in the general system and in the rules of organisation of international

economic relations against the background of the maximum growth of their «polarisation».

The ongoing changes in the rules and conditions for organising international transportation, often accompanied by a direct actual ban or restrictions on certain types of international traffic (such as a ban on Russian road transport companies to carry out transportation in the European Union) or a ban on the use of infrastructure (a similar ban on the entry of Russian ships to European ports).

2. Increasing changes in the structure and directions of commodity and transport flows, as well as in the conditions of transportation, including along international transport corridors, a significant trend towards the use of land modes of transportation and the transfer to land routes of more and more significant volumes previously transported by sea.

3. Mandatory use of digital tools to organise and ensure implementation of the transportation process, including construction of digital network platform solutions and formation of business ecosystems involving all the participants in the supply chain: commodity producers, transport and logistics companies, infrastructure operators and end users.

It should be noted that due to the high dynamism of these processes, scientific developments in the field of theory and methodology for creating digital transport and logistics systems that support organisation and rational management of cargo transportation along international transport corridors do not keep pace with applied solutions implemented in practice. The small number of scientific publications on this issue are mainly of an applied nature.

At the same time, the conceptual foundations of such changes in the mechanisms and methods of organising transportation along international transport corridors, fundamental scientific research are necessary to determine the future shape of not only the global transport industry, but of the entire global economic system. In this regard, to elaborate scientifically based approaches to development of international transport corridors under modern conditions, as well as to integration of the Russian Federation into the updated system of transport corridors, there is the need for an in-depth analysis of key causes and main consequences of ongoing global transformations of the world transport and logistics system, including of the problems of formation of digital platforms to ensure rational transformation of international transport corridors.

The research conducted by the authors of this article comprised the study of organisational, technological and legal issues of multimodal transportation along international transport corridors (ITC). Its purpose was to develop conceptual, organisational and technological solutions that ensure construction, operation and development of digital platforms for managing transportation along ITC, and corresponding to the real needs of the transport and logistics system, the current legal norms, the modern and future developments of digital technologies in transport industry.

RESULTS

One of the most striking manifestations of ongoing changes in the global transport and logistics system is associated with formation of digital business ecosystems, including within the framework of transportation processes along international transport corridors, and, in general, in supply chains going from a commodity producer to the final consumer of goods. Moreover, there is an accelerated development of the processes of creating such business ecosystems in different states and regional associations, as well as their integration with related ecosystems, including in the areas of e-commerce, finance, manufacturing, and others.

The most frequently used and, perhaps, the most capacious definition [1] interprets a business ecosystem as «a set of own or partner services united around one company (structure)».

Other researchers interpret [2] the business ecosystem as dynamic and constantly evolving communities that create new value through cooperation and competition.

Within the framework of the domestic regulatory field, the following definition of a business ecosystem[1] has been accepted: this is a set of complementary services that, through joint integration, form additional value for consumers using them.

Regardless of the definition used, the key feature of this economic phenomenon (business ecosystem) is that during formation and development of business ecosystems, there is a transition from a model of direct competition to a model of coexistence and mutual development of market participants. These processes, among

[1] The concept of general regulation of the activities of groups of companies that develop various digital services based on one ecosystem. May 2021. [Electronic resource]: https://www.economy.gov.ru/material/file/cb29a7d08290120645a871be41599850/koncepciya_21052021.pdf. Last accessed 10.09.2022.

other things, are accompanied by a transition from a linear form of organisation of interaction to the formation of network structures characterised by multiple links between business structures (participants in economic relations).

Currently, one can witness an accelerated formation of business ecosystems, including in the segment of international transportation, characterised by participation in these ecosystems of all the participants in the transportation process, including transport, forwarding companies, manufacturing companies, cargo owners and transportation customers. At the same time, under the conditions of modern turbulence in world economic relations, ecosystem participants dynamically complement each other, providing alternative links and supply channels in a changing business environment.

According to the researchers of the DCG, a global consulting company [3], modern business ecosystems have significant common features, including:

1. The modular principle of the structure, when, unlike traditional hierarchical structures, client services or products are developed independently by their various manufacturers, but function as a single coherent whole.

2. Customisation, significant adaptation of products and services to the end user.

3. Networked, multilateral relationships between ecosystem participants, replacing the traditional bilateral interaction.

4. Ecosystem participants are coordinated not by an «administrative centre», but through the implementation of common rules, standards, and processes.

Revealed features of emerging business ecosystems in the field of transport and logistics, including in the field of functioning of international transport corridors, in terms of the use of modern means and methods for digitalising the interaction of participants in the transportation process include:

1. Widespread use of information management systems at various hierarchic levels of management of the transportation process along international transport corridors, as well as of management of the entire transport business.

2. Transition from paper workflow to the exchange of legally significant data, information and documents in electronic form, recognised by various parties to the transportation process from the legal aspect.

3. Creation and use of an information environment of trust that provides information exchandge and interaction in electronic form between participants in the transportation process in the course of organising and managing cargo and passenger flows, as well as between clients and customers within the transportation process.

4. Development and adoption of technical requirements for information management systems and their components, as well as agreed protocols for information exchange, acting as open standards, as well as their continuous development and improvement.

World Projects of Digitalisation of International Transport Corridors

The described trends and vectors of development of global transport and logistics have been practically embodied through digitalisation projects of international transport corridors being implemented in the world. The most striking examples of projects for formation of international business ecosystems in the field of transport and logistics comprise:

1. The project to create the National Public Information Platform for Transport and Logistics of the PRC (LOGINK[2]).

2. The project of building a regional NEAL-NET[3] platform to ensure interaction between the national logistics systems of China, Japan and South Korea.

3. The project of the European Union to build the Federated Network of Information eXchange in Logistics (FENIX)[4].

4. The project referring to formation of an ecosystem of digital transport corridors of the Eurasian Economic Union[5].

This list can formally be complemented with the projects announced in the Russian Federation for creating a digital logistics loop, as well as of a digital platform for the transport complex, which

[2] National Transport and Logistics Information Platform in China (LOGINK). [Electronic resource]: https://www.logink.cn/. Last accessed 10.09.2022.

[3] Cooperative Mechanism on Northeast Asia Logistics Information Service Network (NEAL-NET). [Electronic resource]: https://english.neal-net.net/. Last accessed 10.09.2022.

[4] FENIX Network. A European Federated Network of Information eXchange in LogistiX. [Electronic resource]: https://fenix-network.eu/. Last accessed 10.09.2022.

[5] Order of the Eurasian Intergovernmental Council dated January 31, 2020, No. 4 «On formation of an ecosystem of digital transport corridors of the Eurasian Economic Union». [Electronic resource]: https://www.alta.ru/tamdoc/20mr0004/. Last accessed 10.09.2022.

are included in the «Strategy for digital transformation of the transport industry of the Russian Federation»[6] and in the Detailed Schedule for implementation of this Strategy.

The key aspects of implementation of these projects are considered in detail by Russian and international researchers [4–11], including the authors of the article. At the same time, it is worth noting that formation of digital platforms within the business ecosystems in the field of transport and logistics significantly depends on the regulatory framework in force in a particular state or regional association, as well as on the accepted rules and norms for doing business, which, being often unofficial, make any of the projects listed above essentially unique, excluding simple copying of technological developments and organisational principles created during its implementation.

A significant impact on the conceptual foundations of formation of business ecosystems, including the definition of goals, objectives, principles of organisation, as well as the composition and functionality of the created platform solutions, is exerted by the existing legal norms and organisational mechanisms in various countries. At the same time, a correct, scientifically based definition of conceptual provisions and solutions for formation of digital platforms of international transport corridors is a necessary condition for construction and viability (implemented demand) of a transport and logistics business ecosystem that ensures construction, rational organisation, and development of international transportation.

The results of our research, the analysis of official materials on international projects for the formation of business ecosystems in the field of transport and logistics, as well as scientific publications on these issues [12–19] show that currently the following conceptual models for building digital transport and logistics systems are used in world practices:

1. The LOGINK system (PRC) is implemented with a clearly built vertical of interaction «city–province–centre» with a focus on creating a mechanism for centralised state regulation of digital transformation processes. The consequence of this conceptual approach is the vertically oriented construction of the LOGINK system in the PRC, based on centralised planning and implementation (top-down model). At the same time, as is typical for these models, the requirements for the structure and formats of information exchange, methods and methods for processing and using data within the system are determined and established at the top level. Besides, within the framework of the LOGINK system in the PRC, centralised data exchange is provided from lower levels of the system to higher levels and vice versa, as well as the information exchange is built according to the «centralised star» type.

2. The European project FENIX largely translates the political structure of the European Union and is based on building horizontal relationships between ecosystem participants within the framework of a «federated» model. In this design, the emphasis is on peer-to-peer interactions of «each with each». This model reflects the structure of the European Union, the formal equality of all its member states within the common market and political union. At the same time, due to the lack of a functional central component, information exchange is carried out directly between the ecosystem participants within the FENIX project, without the participation of the central segment.

Obviously, the conceptual, organisational and technological solutions used in these projects for formation of digital transportation management platforms cannot be fully used to form an ecosystem of digital transport corridors of the entire Eurasian Economic Union, either of the Russian Federation, as of a member state of the Union, in particular.

It should be noted that both the legal status and the economic structure of the EAEU differ significantly not only from the PRC as from a unitary state, but also from the EU as a political and economic union with a significant degree of economic centralisation and a common market for goods and services, with a single currency. Obviously, in the legal, organisational and economic realities of the Eurasian Economic Union, as well as considering established business practices, simply copying these models for organising transport and logistics digitalisation projects will not work and will not give the expected results.

Besides, the practical implementation of the concept model of digital platforms of international transport corridors in the EAEU space invariably faces acute issues of ensuring digital sovereignty, as well as the problem of respect, both in the architecture of digital platforms and in the implemented schemes for information exchange and interaction, of organisational and legal

[6] Passport of the Strategy for digital transformation of the transport industry of the Russian Federation. [Electronic resource]: https://mintrans.gov.ru/documents/8/11374?type=. Last accessed 10.09.2022.

structures enshrined in the rules of law of the Eurasian Economic Union.

It is also worth noting that according to paragraph 2 of Art. 1 of the Treaty on the Eurasian Economic Union[7], the Union is an international organisation of regional economic integration with international legal personality. Within the framework of the Union, the paragraph 1 of Art. 1 of this Treaty provides for the freedom of movement of goods, services, capital and workforce, the conduct of a coordinated, coordinated or unified policy in the sectors of the economy, including in the field of transport. In other words, formation of a common market and creation of a single economic management (administration) system within the EAEU remains a matter of a fairly distant future. The same refers also to formation of a single full-featured digital platform for coordination and management of transportation within the EAEU space.

In this regard, and considering also the transition of the project for formation of an ecosystem of digital transport corridors of the EAEU, implemented by the Eurasian Economic Commission as part of the digital agenda of the EAEU[8], to the stage of direct implementation, the issue of developing scientifically based conceptual provisions and proposals for choosing design solutions for formation of digital platforms of international transport corridors, including within the EAEU space, is quite acute. At the same time, these approaches can also be used for construction of digital transport and logistics platforms in the Russian Federation, as in a member state of the EAEU.

Key Architectural Solutions for Formation of an Ecosystem of Digital Transport Corridors of the EAEU

Based on the results of the research work on the topic «Development of the concept of the ecosystem of digital transport corridors of the Eurasian Economic Union», carried out in 2018–2019 with participation of the authors of this article for official use by the Eurasian Economic Commission, the following definition was formulated: «Ecosystem of digital transport corridors of the EAEU Member States (the EAEU DTC ecosystem) is a self-developing set of participants, information systems and digital platforms used in the transport and logistics sector of the Union, which is characterised by sustainable information interaction and data exchange between its main objects and subjects at the national and supranational levels, and which is purposefully formed within the regulatory and information space of the EAEU».

At the same time, the main goals of forming the EAEU DTC ecosystem are to create conditions for:

1. Increasing the attractiveness of the international transport corridors of the EAEU, accelerating integration into the global transport system.

2. Increasing the capacity of international transport corridors passing through the territory of the EAEU member states, including by reducing unproductive downtime.

3. Improving the efficiency of the transport infrastructure of the EAEU member states.

4. Improving the efficiency of the activities of control and supervisory bodies.

Based on the results of the designated research work, proposals were developed on the key provisions for formation of an ecosystem of digital transport corridors of the EAEU, as well as on the key provisions for building platform solutions at the supranational and national levels.

However, considering the above significant factors affecting the current vectors of development of the global transport and logistics system in general and development of international transport corridors in particular, as well as taking into account development and deepening of Eurasian integration and ongoing digitalisation processes, introduction of digital platforms in various sectors of the economy, at the present stage of formation of the ecosystem of digital transport corridors of the EAEU, development of conceptual approaches needs significant clarifications regarding previously formulated conceptual provisions.

Considering the above mentioned studies, as well as taking into account the approaches formulated earlier by the authors of this article regarding building digital tools for managing the Russian Federation–China international transport corridors [20], the authors have proposed a set of refined key principles for formation of digital

[7] Treaty on the Eurasian Economic Union (as amended on October 1, 2019) (version effective from April 5, 2022). [Electronic resource]: https://docs.cntd.ru/document/420205962. Last accessed 10.09.2022.

[8] Decision of the Supreme Eurasian Economic Council of October 11, 20176 No. 12 «On the Main Directions for Implementation of the Digital Agenda of the Eurasian Economic Union until 2025». [Electronic resource]: https://docs.cntd.ru/document/555625953. Last accessed 10.09.2022.

platforms to ensure development of international transport corridors, including within the ecosystem of digital transport corridors of the EAEU, which should include the following core principles:

1. Openness. It is necessary to provide the possibility of information exchange based on open software protocols (Application Programming Interface, API) with related external digital platforms, including at the supranational, national state and national corporate level.

2. Standardisation of information exchange. Development, harmonisation at the international level and consolidation at the level of regulatory and technical acts (technical regulations and standards) of key protocols for information exchange, including between state and corporate digital platforms of international transport corridors, referring to legally significant data, information, and documents in digital form on the progress of transportation and related transport and logistics processes.

3. Compatibility (interoperability). When building digital platforms for international transport corridors, the principle of compatibility (interoperability) must be observed. It requires solving the problems of regulatory, organisational, semantic (documentary) and technical interoperability, including at the international level.

4. Information integration. It is necessary to provide information integration with state, public and corporate digital platforms and information systems, including international ones, as well as with related functional information systems, including digital trading platforms and hubs, to improve the quality and efficiency of their functioning.

5. Use of the digital environment of trust. The construction and operation of digital platforms of international transport corridors should be carried out using a digital trust environment that ensures the exchange of legally significant data, information, and documents in digital form.

6. Independence from imports. When building digital platforms for international transport corridors, domestic developments should be mainly used, maximum independence from foreign software and hardware should be ensured.

It should be noted that the proposed principles for building digital platforms for international transport corridors, including the digital transport corridors of the EAEU, are basic, pre-determining the subsequent technical implementation and regulation of digital business ecosystems in the field of transport and logistics, including for the ITC.

Considering the principles formulated above, the top-level software architecture of digital platforms of international transport corridors should be formed according to a hierarchical principle and include, among other things, the following levels of software architecture of digital platforms of the ecosystem of international transport corridors of the EAEU (Pic. 1):

1. Supranational level: providing interaction and information exchange both between ecosystem participants and with external ones, including international digital platforms of international transport corridors, as well as the formation and maintenance of centralised general directories and metadata, monitoring availability and performance of services at the national level.

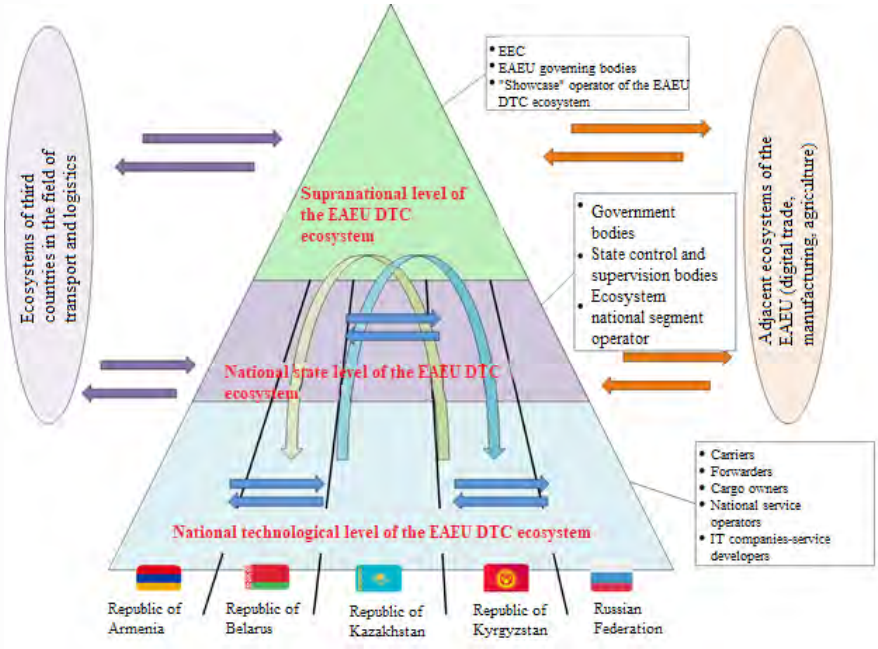
2. National state level: ensuring, among other things, direct provision of public services in digital form, provision of control and supervision activities in the field of transport using digital tools, as well as the maintenance of local (national) directories.

3. National corporate level: the level of end-users of services and data sources of digital platforms of international transport corridors, which ensures provision of digital services to end-users (cargo owners, transportation customers, including individuals), as well as telematic exchange of digital data by end devices (navigation terminals, sensors, information gathering tools, etc.).

The proposed top-level architecture for building digital platforms for international transport corridors within the EAEU DTC ecosystem at the supranational level, which ensures compliance with the requirements of the EAEU law, provides for the introduction of a showcase of functional national services that performs the following functions:

1. Maintaining common directories and the regulatory framework used in the operation of digital platforms of the ecosystem of digital transport corridors of the EAEU.

2. Publication of supranational and national services, standard software modules and components for their subsequent replication, as well as control of the coordinated functionality of supranational and national services of the ecosystem of digital transport corridors of the EAEU.



Pic. 1. Conceptual model of the digital transport and logistics platform of the international transport corridors of the EAEU [compiled by the authors] [21].

3. Current control of availability and performance of supranational and national services of the ecosystem of digital transport corridors of the EAEU.

4. Formation of statistical data on functioning of the ecosystem of digital transport corridors of the EAEU, as well as analytical support for the transport and logistics industry of the EAEU and its member states.

5. Organisation of information interaction and information exchange between the components of supranational and national services of the ecosystem of digital transport corridors of the EAEU, as well as with information systems of the EAEU, including the Integrated Information System of the Union (IIS).

6. Organisation of information interaction and information exchange with external IT systems in the field of transport and logistics, related ecosystems, and digital platforms of international transport corridors.

The proposed option for building digital platforms for international transport corridors of the EAEU is shown in Pic. 2.

The model of information exchange and the composition of data exchanged between the digital platforms of the international transport corridors of the EAEU at the supranational and national levels is shown in Pic. 3.

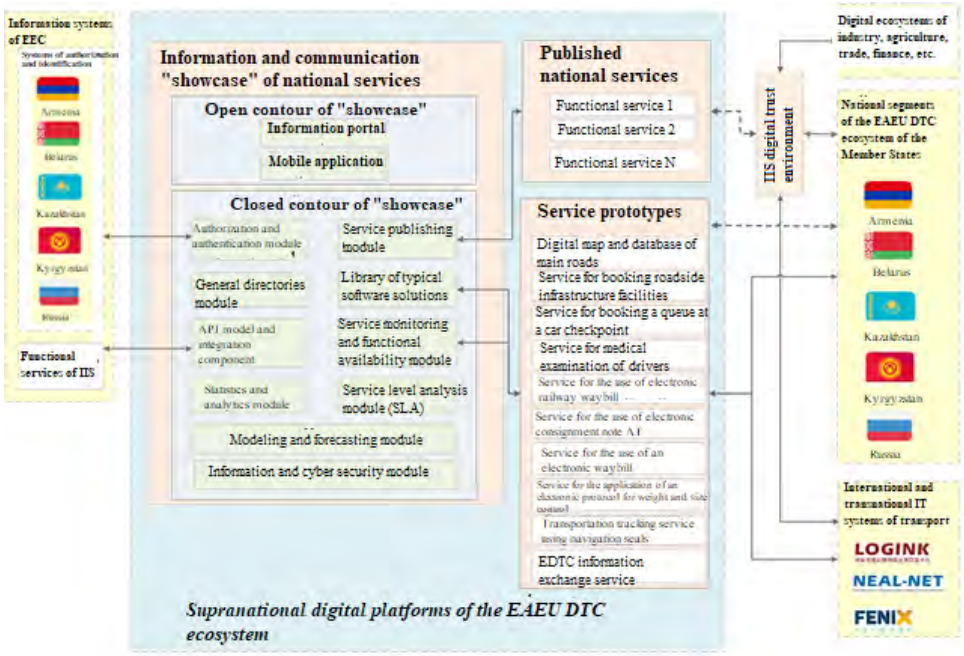
It is to note that the implementation of the shown information exchange should be based on open software protocols (API), which, in turn, should be openly published and available to all participants in the ecosystem.

The top-level architecture of digital platforms of the international transport corridors of the EAEU developed by the authors of this publication in the framework of the scientific study was approved and accepted by the EAEU authorities for implementation. In particular, as part of the implementation of the EAEU Digital Agenda, at the initial stage of formation of the ecosystem of digital transport corridors of the Eurasian Economic Union, it is planned to create an information and communication «showcase» of national services, designed to test and publish national services, monitor their availability and performance, as well as collect statistical information about their operation.

In addition, the planned project for formation of an ecosystem of digital transport corridors of the EAEU provides for creation of several prototypes of national services, including:

1. Digital map and database of main roads and infrastructure facilities of international transport corridors passing through the territories of the member states.

2. Service for booking roadside infrastructure facilities.



Pic. 2. The proposed architecture of digital platforms for international transport corridors of the EAEU at the supranational level [compiled by the authors] [21].

3. Service for booking a queue at a vehicle checkpoint of a member state.

4. Service for conducting a medical examination of drivers of vehicles remotely (including the prevention of COVID-19 coronavirus infection).

5. Service for the application of an electronic international consignment note (for railway transport).

6. Service for the application of an electronic international consignment note (for road transport).

7. Service for the use of an electronic waybill.

8. Service for the application of an electronic protocol for weight and size control.

9. Transport tracking service using electronic navigation seals (for agreed modes of transport).

10. Information exchange service of the ecosystem of digital transport corridors of the Union with systems of third countries.

Earlier, during development of the project for formation of an ecosystem of digital transport corridors of the EAEU and creation of digital platforms, estimates were made of the target performance indicators achieved during project implementation. However, considering geopolitical changes, the composition of these indicators needs to be adjusted, and their values need to be reassessed.

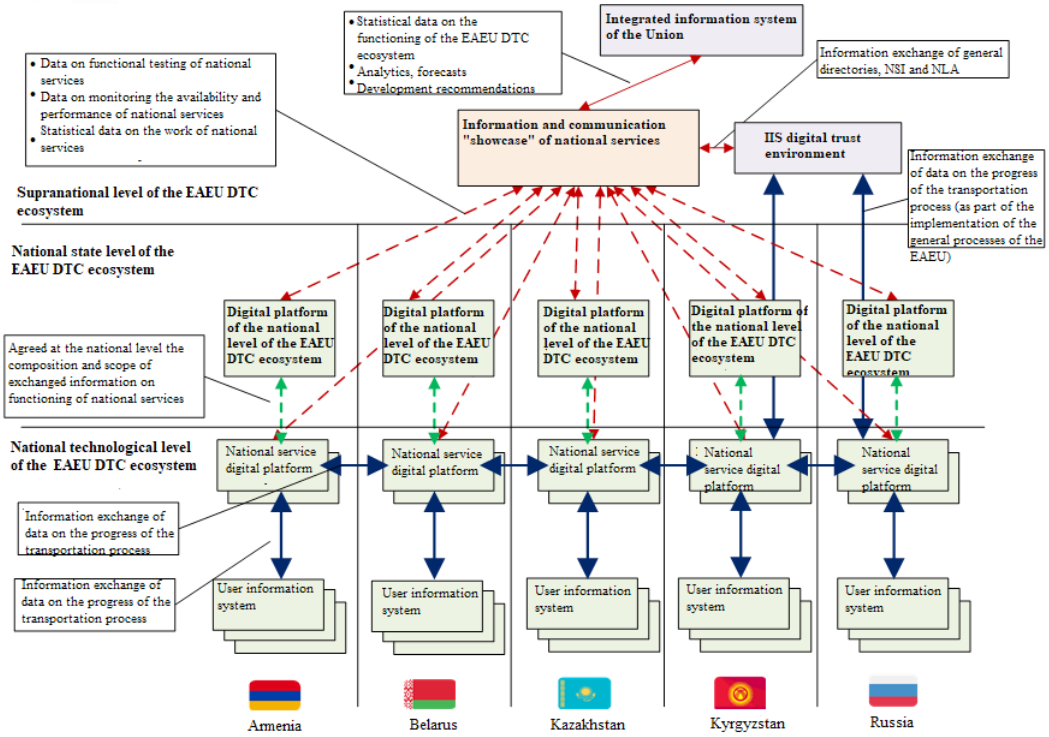
According to the authors of this publication, the key systemic effects will be associated with the use of digital transportation management tools. At the same time, the most important indicators of the effectiveness of creating digital platforms for international transport corridors of the EAEU in modern conditions will be:

• Creation of legal, technological and organisational conditions to ensure the attractiveness of transportation along international transport corridors passing through the territory of the Russian Federation and the Eurasian Economic Union, including ensuring the best and predictable (stable) terms, costs and quality of transportation while ensuring safety of transportation.

• Ensuring technological independence and digital sovereignty of the Russian Federation in terms of critical digital infrastructure, including information and control systems for organising and controlling transportation along international transport corridors.

• Ensuring the implementation of the transport transit potential of the Russian Federation and the EAEU member states, increasing the income of the transport industry.

• Creation of conditions for accelerating the formation of a single transport market of the EAEU, ensuring the transparency of transportation and a harmonised system for monitoring the transportation process using risk-based approaches in control and supervision activities.



Pic. 3. Model of information exchange between digital platforms of international transport corridors of the EAEU at the supranational and national levels [compiled by the authors] [21].

• Increasing the tax base, the growth of tax payments to the budget from the income of the transport industry.

Determining the values of target indicators requires in-depth research, updating and analysis of a significant amount of statistical data, including in the field of foreign trade.

CONCLUSION

Given the dynamic global changes in the world economic system, the growth of its polarisation, as well as development of new technological, digital, methods and tools for managing transportation, the issues of accelerating the initiation and practical implementation of projects to create digital platforms for international transport corridors are of significant relevance. At the same time, a deep scientific study is required, combining analysis of the world experience in the implementation of similar projects and of the features of building such systems in accordance with the rules of law and accepted business practice in the Russian Federation and within the EAEU space.

The conceptual approaches to formation of digital platforms of international transport corridors and the solution of problematic issues related to implementation of these projects proposed by the authors could ensure the achievement of geopolitical and economic results, including the technological independence and digital sovereignty of the Russian Federation, and implementation of its transport transit potential.

At the same time, according to the authors, the most significant risk factors associated with formation of digital platforms of international transport corridors lie in the organisational and legal plane, including numerous bureaucratic procedures for interdepartmental approvals.

REFERENCES

1. Moore, J. F. The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems. New-York: Harper Paperbacks, 1996, 315 p. ISBN 0-88730-850-3.

2. Kelly, E. Business ecosystems come of age. Part of the Business Trends series. Deloitte University Press, 2015, 120 p. [Electronic resource]: https://www2.deloitte.com/content/dam/insights/us/articles/platform-strategy-new-level-business-trends/DUP_1048-Business-ecosystems-come-of-age_MASTER_FINAL.pdf. Last accessed 10.09.2022.

3. Pidun, U., Reeves, M., Schüssler, M. Do You Need a Business Ecosystem? Boston Consulting Group, 27 September 2019. [Electronic resource]: https://www.bcg.com/publications/2019/do-you-need-business-ecosystem. Last accessed 10.09.2022.

4. Bubnova, G. V., Boreyko, A. E. Digital transport corridors as a key factor in development of the international transport system: Topical issues in the economy of high-speed transport [*Tsifrovie transportnie koridory kak klyuchevoy*

faktr razvitiya mezhdunarodnoi transportnoi sistemy: Akrualnie voprosy ekonomiki transporta vysokikh skorostei]. *Collection of scientific articles of the national scientific and practical conference. Ed. by N. A. Zhuravleva*, 2020, pp. 24–31. [Electronic resource]: https://www.elibrary.ru/item.asp?id=44612347. Last accessed 27.07.2022.

5. Bubnova, G. V., Kurenkov, P. V., Nekrasov, A. G. Digital logistics and supply chain safetyy [*Tsifrovaya logistika i bezopasnost tsepei postavok*]. *Logistika*, 2017, Iss. 7 (28), pp. 46–50. [Electronic resource]: https://www.elibrary.ru/item.asp?id=29751354. Last accessed 27.07.2022.

6. Bubnova, G. V., Lyovin, B. A. Digital logistics as an innovative mechanism for the development and effective functioning of the transport and logistics systems and complexes. *International Journal of Open Information Technologies*, 2017, Vol. 5, Iss. 3, pp. 72–78. [Electronic resource]: https://www.elibrary.ru/item.asp?id=28426696. Last accessed 27.07.2022.

7. Kupriyanovskiy, V. P., Klimov, A. A., Sokolov, I. A., Pokusaev, O. N. EU digital transport corridors – 5G, platooning, ITS and Maas. *International Journal of Open Information Technologies*, 2019, Vol. 7, Iss. 8, pp. 70–86. [Electronic resource]: https://www.elibrary.ru/item.asp?id=39256163. Last accessed 27.07.2022.

8. Zubko, I. A. Digital transport corridors [*Tsifrovie transportnie koridory*]. EE «Belarusian State Economic University», Minsk, Belarus. [Electronic resource]: https://rep.bntu.by/bitstream/handle/data/87085/256–259.pdf?sequence=1&isAllowed=y. Last accessed 27.07.2022.

9. Zubko, I. A. Digital transport corridors: concept and approaches to construction [*Tsifrovie transportnie koridory: ponyatie i podkhody k postroeniyu*]. [Electronic resource]: https://www.смарт-скиллс.рф/load/global_sceince_2019/zubko_i_a_cifrovye_transportnye_koridory_ponjatie_i_podkhody_k_postroeniju/5–1–0–127. Last accessed 27.07.2022.

10. Boreyko, A. E., Bubnova, G. V. Methodological approaches to the formation of the strategy of development instruments for management of international transport corridors. *Ekonomika zheleznykh dorog*, 2020, Iss. 5, pp. 43–50. [Electronic resource]: https://www.elibrary.ru/item.asp?id=42895893. Last accessed 27.07.2022.

11. Bubnova, G. V., Boreyko, A. E. Digital transport corridors as a key factor in development of the international transport system [*Tsifrovie transportnie koridory kak klyuchevoi factor razvitiya mezhdunarodnoi transportnoi sistemy*]. Topical issues of the economy of high-speed transport. Collection of scientific articles of the national scientific and practical conference. Ed. by N. A. Zhuravleva, 2020, pp. 24–31. [Electronic resource]: https://elibrary.ru/item.asp?id=44612347. Last accessed 27.07.2022.

12. Vorona, A. A. The concept of creating an ecosystem of digital transport corridors of the Eurasian Economic Union [*Kontseptsiya sozdaniya ekosistemy tsifrovykh transportnykh koridorov Evraziiskogo ekonomicheskogo soyuza*]. *Issues of economics and management*, 2019, Iss. 4 (20), pp. 17–20. [Electronic resource]: https://www.elibrary.ru/item.asp?id=38540810. Last accessed 10.09.2022.

13. Miasnikova, O. V., Tabolich, T. G. Development of Approaches to an Organizational and Functional Structure Creating of the Eurasian Economic Union Digital Transport Corridors Ecosystem. *Digital Transformation*, 2020, Iss. 1, pp. 23–35. DOI: 10.38086/2522-9613-2020-1-23-35.

14. Ksenofontova, E. M. Formation of the ecosystem of digital transport corridors of the EAEU. Collection of article resulting from 15th International scientific-practical conference. Ed. by E. A. Gorbashko, I. V. Fedoseev. St. Petersburg, 2020, pp. 968–974. [Electronic resource]: https://elibrary.ru/item.asp?id=44237644. Last accessed 10.09.2022.

15. Melnikova, T. E., Melnikov, S. E., Makurina, V. M., Kahramanova, S. Problems of creating a regulatory framework in the digitalisation process of road transportation. *Transport: science, technics, management. Scientific information collection*, 2021, Iss. 9, pp. 49–52. DOI: 10.36535/0236-1914-2021-09-9.

16. Chepernaty, A. V., Petrov-Rudakovsky, A. P. Ecosystem of digital transport corridors of the Eurasian Economic Union [*Ekosistema tsifrovykh transportnykh koridorov evraziiskogo ekonomicheskogo soyuza*]. *In: Automotive: design, construction, calculation and repair and production technologies. Proceedings of V All-Russian scientific and practical conference*, Izhevsk, 2021, pp. 468–470. [Electronic resource]: https://elibrary.ru/item.asp?id=47070096. Last accessed 10.09.2022.

17. Kuzmin, L. A. Existing and promising tools for digitalization of the transport and logistics infrastructure of the Eurasian Economic Union [*Sushchestvuyushchie i perspektivnie instrument tsifrovizatsii transportno-logisticheskoi infrastruktury evraziiskogo ekonomicheskogo soyuza*]. *Ekonomika i predprinimatelstvo*, 2021, Iss. 8 (133), pp. 100–104. DOI: 10.34925/EIP.2021.133.8.013.

18. Konoplyova, V. S. Information technologies in logistics of the EAEU. In: Topical aspects of development of customs affairs and regulation of foreign trade activity of Russia in the conditions of international integration: Economic safety and risks of globalization. 2nd-3rd All-Russian scientific-practical Internet conferences. Kaliningrad, 2021, pp. 71–75. [Electronic resource]: https://elibrary.ru/item.asp?id=47280400&pff=1. Last accessed 10.09.2022.

19. Zakharov, A. N., Filatkina, E. M. Trade and economic cooperation between the EAEU and APEC in the context of introducing artificial intelligence technologies and creating an ecosystem of digital transport corridors [*Torgovo-ekonomicheskoe sotrudnichestvo EAES i ATES v kontekste vnedreniya tekhnologii iskusstvennogo intellekta i sozdaniya ekosistemy tsifrovykh transportnykh koridorov*]. *In: Managing the Development of Large-Scale Systems (MLSD'2021). Proceedings of the Fourteenth International Conference. Under the general editorship of S. N. Vasilyev, A. D. Tsvirkun*. Moscow, 2021, pp. 999–100. [Electronic resource]: https://mlsd2021.ipu.ru/proceedings/999–1003.pdf. Last accessed 10.09.2022.

20. Boreyko, A. E., Bubnova, G. V. Methodological approaches to the management of international transport corridors. *Ekonomika zheleznykh dorog*, 2020, Iss. 5, pp. 43–50. [Electronic resource]: https://www.elibrary.ru/item.asp?id=42895893. Last accessed 27.07.2022.

21. Bubnova, G. V., Boreyko, A. E. Conceptual provisions and solutions for formation of digital platforms of international transport corridors. International Scientific Conference «The Economics of Digital Transformation and Sustainable Development of Transport», 01.06.2022. [Electronic resource]: https://conferences.science/conferences/edits-2022.html Last accessed 10.09.2022. ●

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