THE ROLE OF INTERNATIONAL TRANSPORT LOGISTICS IN OPTIMIZING TRANSPORT INFRASTRUCTURE ARCHITECTURES

[a]ANATOLII BOBRAKOV, [b]HUANG XIAOYU, [c]WU FEI, [d]MYKHAILO KULIK, [e]DMYTRO IVANENKO, [f]OLEKSANDR GAVRYLOVSKYI

[a,d,e]Zaporizhzhia Polytechnic National University, Zaporizhzhia, Ukraine.
[b,c]Kyrgyz State Technical University named after I.Razzakov, Bishkek, Kyrgyzstan.
[f]Kyiv National Hetman University of Economics, Kyiv, Ukraine.
email: [a]bobrakov@zp.edu.ua, [b]huang_xiaoyu@kstu.kg, [c]wu_fei@kstu.kg, [d]starwarskmv4@gmail.com, [e]ivanenko@zp.edu.ua, [f]Gavrilovskiy82@ukr.net

Research was performed within the framework of the international research project of the Scientific and Technical Organization Teadmus OÜ (teadmus.org) «Optimizing Construction Logistics: Strategies for Efficient Transportation Infrastructure in Global Projects».

Abstract: Nowadays, transport infrastructure is a crucial component of any social and economic system. The arrangement of infrastructure is a top priority in economic activity due to the globalization of international logistics. This study aims to comprehensively analyse the transport infrastructure system regarding architectural objects. It also seeks to identify the main issues of the management paradigm in the industry and options for solving them. The research employed general scientific methods of cognition, including logical and structural analysis, comparison, theoretical modelling, abstraction, induction, and deduction, as well as statistical methods, specification, generalization, and formalization. The article examines innovative approaches to developing transport infrastructure in the international logistics system. The authors analysed the main issues, challenges, and achievements of managing the architectural component of transport infrastructure. The paper concludes that the effective use of transport infrastructure capabilities is essential for increasing the productivity of economic processes. The authors also identified the position and role of architectural objects in the international logistics system.

Keywords: Cross-border infrastructure, Integration, Optimization, Transit, Logistics, Strategic priorities.

1 Introduction

The activation of globalization and integration processes has led to the emergence of new challenges. These challenges require dynamic and adaptive changes in the management of socio-economic processes. One of the most relevant concepts currently is the transformation of transportation infrastructure, which is maximally implemented in the international logistics system. The aim is to ensure the proper functionality of architectural objects of transportation infrastructure. It involves developing a complex set of organizational foundations and effective means of implementation and monitoring. The aim is to optimize the transport sector, given the global challenges of optimizing the international logistics system. This concept guarantees the optimization and simplification of management processes and the synergistic development of socio-economic processes.

Various scientific fields have been used by Ukrainian and foreign researchers to address the issue of transport infrastructure in the international logistics system (Aulin, 2021; Sabadash, 2020). Some modern scientists conduct studies on the functioning of the architectural component of transport infrastructure in relation to the global role of the international logistics system. They also study practical projects for optimization (Prokopenko, 2021; 2023). Some scholars examine infrastructure management in the transport sector from the perspective of complexity and multifunctionality (Pasichnyk et al., 2022).

Transport infrastructure in the international logistics system is divided into specific directions, including the purpose, means, and level of system component integration (Zelenko et al., 2022). Scholars emphasize that the potential and capabilities of the architectural infrastructure of the transport system are fully revealed only through the harmonization of the main factors - social, economic, and environmental. These factors are the foundation of the sustainable development concept (Pokrovskaya et al., 2020).

Current research by modern scientists convincingly shows that an effective transport infrastructure requires optimal use of resources, competent management decisions, and continuous improvement towards integration into the international logistics system (Kraus, 2019).

The problems related to architectural objects of transport infrastructure in the context of sustainable development have been extensively researched by contemporary scholars (Vignali and Acerra, 2021). Some conceptual issues have been addressed in the studies conducted by individual researchers (Iacob et al., 2019). Despite the scientific value of these published studies, several issues in this field still require resolution. Further scientific attention is required to study the problems related to analysing algorithms for optimizing modern transport infrastructure architectural capabilities in the context of globalizing international logistics systems.

This study aims to analyse the modern innovative capabilities of architectural objects as part of the transport infrastructure in the context of sustainable development and the dynamics of the conceptual priorities of the international logistics system.

2 Literature review

The study's scientific and methodological background was established by researchers who focused on the following aspects:

- The functioning of transport infrastructure architectural objects in the international logistics system.
- The problems of transforming management processes in transport infrastructure.
- Finding solutions to these problems.

Numerous scientific professional journals have published works on the topics explored in this paper. Contemporary scientists (Zichichi et al., 2020; Ciampoli et al., 2020) have examined the modern transport infrastructure of the international logistics system. The studies by Zhou Z., Cai M., Xiong C., Deng Z., and Yu Y. (2022) are noteworthy among the relevant publications. The authors establish the principles for effectively implementing the functioning of architectural objects in transport infrastructure within the context of modern global processes in the international logistics system. At the same time, some scholars (Solla et al., 2021) highlight the importance of adequately preparing the public environment for the management processes within the transport infrastructure sector.

Wu J., Wang X., Dang Y., and Lv Z. (2022) present the main conceptual framework for an effective management system in the studied industry, based on integration into the global system of international logistics. D'Amico F., Calvi A., Schiattarella E., Di Prete M., and Veraldi V. (2020) highlight the importance of actively implementing digitalization tools in the transport infrastructure system. At the same time, Abbondati F., Biancardo S., Palazzo S., Capaldo F., and Viscione N. (2020) point out the complexity of optimizing the functioning of some aspects of transport infrastructure in the international logistics system.

Therefore, while acknowledging the significance of the scientific and practical accomplishments of scholars in this field, it is important to emphasize the requirement for additional research to enhance the architectural aspect of the transport infrastructure. This will guarantee the sustainable development of the industry, enabling it to integrate into the international logistics system and proactively respond to new challenges in the current environment.

3 Materials and methods

The authors employed various scientific methods of cognition during their research, including abstract, logical, and

comparative analysis, as well as methods of specification, formalization, and graphical interpretation of theoretical information.

The theoretical and methodological framework of this study was formed based on the priority principles of conducting comprehensive research and a systematic approach. The authors employed the complexity principle to analyse the object and subject of study as a complex system with corresponding interrelations.

They used analysis and synthesis methods to identify the factors and stages of development of the studied object, as well as its defining elements. The comparison method was applied to determine the specifics of development and features of models of architectural objects of transport infrastructure in the international logistics system. The deduction method was used to develop proposals for optimizing management processes in transport infrastructure. The inductive method was utilized to forecast the indicators of future development.

The abstract-logical and dialectical methods of scientific cognition, as well as the method of scientific abstraction, were used for the stated purposes:

- to formulate theoretical generalizations;
- to clarify the conceptual apparatus;
- to identify basic concepts and categories;
- to formulate research conclusions;
- to shape the idea of an integrated transport infrastructure system in the context of sustainable development.

The formalization method was used during the research process to identify priority vectors for optimizing architectural objects in the transport field. Additionally, it was employed to formulate the results of scientific research for practical management purposes. This method structured the principles, functions, tasks, and priorities of the research object.

The study employed the general scientific method of specification to evaluate the effectiveness and feasibility of enhancing the role of architectural objects in transport infrastructure within the international logistics system. It also identified optimal solutions and conditions for optimizing the management system in the transport sector based on the principles of sustainable development.

4 Results

Today, transport infrastructure plays a crucial role in the industry's overall infrastructure. At the same time, its main purpose is to establish interconnections between the system's functional elements to ensure their efficient functioning and to utilize opportunities for spatial development.

To ensure that the strategic goals of the innovative stage of transport infrastructure development align with the dynamics of its operating environment in the international logistics system, an adaptive approach to forming an innovative strategy for transforming the transport industry's infrastructure can be implemented (Aulin, 2021). The approach involves creating a system for setting and adjusting goals with input from stakeholders, utilizing investment opportunities, and modern information and analytical systems and technologies.

Unbiased processes in production and economics necessitate the formation of a sectoral infrastructure. This is a test of structural changes in the system (Pasichnyk et al., 2022). Economic processes in the transport sector should be analysed using a systemic and integrated approach to ensure reliable, versatile, and practical results and management decisions.

In the context of global integration processes, the role of transport infrastructure is becoming increasingly important. This requires a comprehensive interaction between the structural elements of systems and other components of the economic and social sphere (Vignali and Acerra, 2021). In this regard, the functioning and development of transport infrastructure is currently identified as a significant component of improving the efficiency of production activities and increasing the level of socio-economic development.

The formation of international transport and logistics chains and the intensification of the interaction of various modes of transport reflect global integration processes. As a result, the technical and technological requirements of the transport process have increased (Kraus, 2019). The development of high-speed transport infrastructure and related architectural facilities is a particularly active area for certain countries (Zelenko et al., 2022).

To fully realize the transit potential of the international logistics system, it is recommended to analyse the optimal use of the architectural component of the transport infrastructure, as well as its potential opportunities and development factors. At the next stage, a system of suitable measures should be developed based on the identification of typical features of adaptability or misadaptability (Iacob et al., 2019).

The current model of institutional support for the innovative development of international transport and logistics infrastructure, in terms of architectural solutions, should combine a system of motivation for creative development and tools for digitalization progress. This optimization concept has a known potential both in the economic and managerial aspects. At the same time, logistic concepts have a set of clear rules to ensure their effectiveness. They also have the dynamism and flexibility to be adapted to the needs and tasks in a specific place and under certain conditions (Prokopenko et al., 2021).

All aspects of transport cooperation between Ukraine and the European Community are regulated by the Association Agreement between Ukraine and the European Union, the European Atomic Energy Community, and their Member States (Sabadash, 2020). Such communication is being implemented to establish the functioning of stable transport systems, as well as development towards integration processes and sustainable development. Additionally, modernizing architectural objects of transport infrastructure is a significant factor in the industry's progressive growth. It reveals promising tools for the implementation of strategic opportunities for state regulation of its innovative transformation processes regarding the international logistics system. The innovative concept of transport infrastructure systems provides for their openness to reconfiguration due to their flexibility, digitalization and efficiency (Prokopenko et al., 2023).

The EU project "Optimizing Construction Logistics: Strategies for Efficient Transport Infrastructure in Global Projects" highlights the obvious need for rapid integration of transport technologies and regional mobility projects. The issue is particularly relevant for countries with economies in transition, including Kyrgyzstan and Ukraine. Modern transport infrastructure with efficient multifunctional architectural solutions, fair market competition, effective coordination of activities and an efficient system of state regulation and management will form the basis for the development and functional growth of the national transport systems of Ukraine and Kyrgyzstan as part of a single system of international logistics solutions. Optimizing the quality of international logistics services will increase competitiveness, stimulate exports and promote domestic production and trade.

Global investment projects in Kyrgyzstan, China and Ukraine, including those initiated by the European Community, in particular the EU project "Optimizing Construction Logistics: Strategies for Efficient Transport Infrastructure in Global Projects", are mainly aimed at implementing a radical modernization of existing and construction of new transport and logistics infrastructure facilities to meet the demand for quality transport services. The priorities of such optimization include comprehensive innovative development of transport, in

particular through the enforcement of a targeted approach to innovation and investment projects, as well as the improvement of the management system for transport infrastructure development. At the same time, architectural solutions within the transport infrastructure system play an important role. Today, it is precisely the needs of the international logistics global network that determine the efficiency of the national transport infrastructure.

Modern projects to optimize construction logistics as part of an efficient transport infrastructure strategy in global projects are based on historical planning and architectural solutions in regional specificities.

In particular, the modern railway industry in the European-Asian context is a market whose production and technical potential is developing rapidly. In 2011, for example, a memorandum of cooperation was signed in Beijing between NC Kazakhstan Temir Zholy JSC and the Ministry of Railways of the People's Republic of China for the construction of the Astana-Almaty high-speed railway. The expected speed of the train is 350 km/h.

The construction of the Turkestan Railway in the thirties of the last century and the development of the entire railway transport in the region on this basis is a representative process in terms of planning and architectural solutions for railway complexes, as its length is more than 14 thousand km and the construction process is still ongoing. Railway complexes are an important component of the planning structure, which requires organization in a spatial and temporal vector. In essence, their architecture is inextricably linked to history, scientific and technical achievements. A railway station is a rather complex building that performs the main functions of managing passenger flows and the safety of the railway environment, as well as providing a wide range of related services. In this regard, the dynamics of the needs of modern society require constant expansion and adaptation of the functions of passenger buildings.

In the case of the Turkestan Railway, the construction of railway stations contributed to the development of the territory around them and connected settlements with other settlements. The intermediate stations built during its operation actively influenced the development of suburban areas. At the same time, some of the station complexes were located in the centre of the settlement, in close connection with its historical part. Another characteristic feature of the composition of railway complexes is the proportionality of the architectural structures, which are organically integrated into the surrounding landscape.

It should be noted that an influential element in the formation of the architectural and planning structure was the caravan roads that connected Turkestan with major regions, determining its important strategic location in the communication system of the Great Silk Road.

The Great Silk Road is a representative structure of the methodology of logistics processes, including the formation of material flows, the justification of the trajectory of movement and the organization of the necessary infrastructure. The logistical features of the Silk Road position it as a key link in the Eurasian supply chain.

Caravanserais were buildings constructed along the route of the Silk Road that served as resting places for caravans of travelling merchants. From China to Turkey, they gave merchants time to rest before continuing their journey, as well as the opportunity to exchange goods in local markets, contributing to the cultural and linguistic transformation of the region.

Many aspects of the internal structure of the caravanserai had a significant impact on the development of communication between travellers, such as the presence of steam baths and oriental bazaars. In large caravanserais, the eastern bazaars ran through the centre, between the two entrance gates. The Silk Road caravanserais, located throughout Central Asia, were of great socio-economic and cultural importance.

In terms of the globalization of construction logistics and the strategy of efficient transport infrastructure, the Great Silk Road and the Turkestan Railway are positioned as representative elements of architectural solutions for the transport and logistics system of Eurasian international traffic.

Within the framework of the EU project "Optimizing Construction Logistics: Strategies for Efficient Transport Infrastructure in Global Projects", under the conditions of free movement of cross-border flows of goods within the integrated European market, there is a tendency to replace national terminals with unified international economic logistics complexes. Such measures are positioned as an element of transport infrastructure optimization. Thus, the concept of consolidation of cross-border logistics complexes and their synergy with international logistics platforms is emerging. In the long term, this will contribute to more efficient cross-border trade flows.

One of the main prerequisites for the growth of the domestic market of logistics services provided for the purposes of foreign economic activity is the availability of an adequate level of quality of logistics services that would meet international standards. In this regard, it is necessary to develop systematic sectoral and inter-sectoral standards that will form the basis for regulating logistics activities in the implementation of multimodal transport projects. The following factors, in synergy with the introduction of an effective management system, can create conditions for the stable and functional development of the transport system:

- Modern infrastructure.
- Transparent market conditions and competition.
- Innovative transformation.
- Adequate system of coordination of activities in the transport sector.

Improving the efficiency and quality of services in the transport sector will help to increase its competitiveness, investment attractiveness and export opportunities. A specific toolkit should be developed to diagnose the investment attractiveness of transport infrastructure, and in particular its architectural component. This will attract investors to the transformation processes of transport infrastructure growth.

A special role in the process of adapting transport infrastructure to the modern requirements of the international logistics system should be given to the digital optimization of management processes (Sabadash, 2020). It is essential to introduce innovative solutions that improve the quality of logistics services through digitalization (Prokopenko et al., 2023).

The problems of implementing the optimization concept for architectural objects of transport infrastructure within the international logistics system may be caused by low responsiveness to methods of changing traditional organizational structures of the enterprise. It relates to the established and practised operational scheme (Prokopenko et al., 2021).

The conceptual strategy for the development of transport infrastructure towards sustainable development gives priority to improving the quality of transport services and their safety, as well as minimizing the destructive impact on the environment. It also emphasizes the need to optimize the management system in terms of publicity and digitization. Additionally, the strategy stresses the need to implement an anti-corruption policy.

5 Discussion

The vast majority of modern scientists see the optimal functioning of transport infrastructure in the international logistics system as the basis for the innovative development of socio-economic processes towards sustainable development. According to researchers in current scientific fields (Izrailov et al., 2020), one of the most effective ways of optimizing management processes in the transport industry is to actively use

the capabilities of architectural objects. This includes increasing the attractiveness of the industry for investment.

The transformation of the modern architectural system of transport infrastructure involves, first and foremost, fundamental changes in the functional model. Contemporary scholars (Patrman et al., 2019) argue that a promising option is to develop architectural solutions for specific categories, needs and functions of transport infrastructure. This requires the availability of appropriate, well-established integration processes and the prioritization of the principles of sustainable development of the industry.

According to the research results of scientists (Buyvis, 2021), at the current stage of optimization of transport infrastructure in the international logistics system we can name the following priorities:

- Rejection of outdated technologies and algorithms.
- Resource optimization of processes.
- Establishment of internal effective communication.
- Involvement of modern architectural solutions.

Yelizyeva A., Artiukh R., & Persiyanova E. (2019) believe that the transformation of the architectural part of the infrastructure is a component of effective modernization of the transport sector. It provides for multifunctionality and focus on cross-border destinations. At the same time, de Rus G. and Pilar Socorro M. (2019) assure that innovative approaches to the construction of railway stations, airports and other strategically important transport facilities are the main trend in modern integrated logistics processes. They ensure the efficiency and versatility of services for all categories of consumers within the industry. Innovative events in the transport infrastructure sector should focus on modernizing the system of architectural solutions and expanding the boundaries of transformational changes (Jansen and Seraj 2020).

Based on the findings of Gibbons S., Lyytikäinen T., Overman H., & Sanchis-Guarner R. (2019), it can be argued that architectural elements have significantly expanded their functional scope today. They have become a basic element of the market system. The authors consider architectural objects of transport infrastructure as one of the main prerequisites for the development of a modern international logistics system. At the same time, the scientists note that improving the productivity of management processes in the transport industry in terms of integration into the global logistics system requires the gradual and effective achievement of goals (Thacker et al., 2019).

Based on the results obtained in this study and the conclusions of the aforementioned authors, we can predict an increase in the role of architectural objects of transport infrastructure in the implementation of a successful integration management policy in the industry. This approach will significantly improve the efficiency of management decisions, introduce innovative capabilities of the international logistics system and ensure compliance with the requirements of sustainable development.

6 Conclusion

The multifunctionality of transport infrastructure architectural objects in the international logistics system was analysed in the article. It also assessed their role and place in the system of socio-economic transformations in the transport sector based on the principles of sustainable development. In the course of the study, the authors found out that the effective use of the capabilities of the architectural components of the transport infrastructure is a basic condition for the intensification of the efficiency in this area. They also highlighted the priority vectors for optimizing the transport infrastructure management system. Besides, the authors propose assessing the efficiency of transport and logistics systems based on the state of the architectural component.

Using the research results, the authors suggest several measures that should be applied within the framework of the general trend of global integration into the international logistics network. The paper develops a universal model for the optimization of transport infrastructure, covering the main socio-economic functions and an optimal management system. The study formed the basis of the adaptation mechanism of the existing architectural objects of transport infrastructure to the requirements of the modern international logistics system. In addition, the feasibility of the transformation of this area was substantiated.

The authors have established that only the synergy of a professional approach, a stable position and stable principles of forming strategic priorities for the optimization of transport infrastructure, considering the global integration and the need for proper control, will allow to fully and quickly bring the system of architectural objects of transport infrastructure into line with the principles of sustainable development.

Based on the results of the study, the authors proposed priority vectors for further research on this topic. They argued that it is necessary to organize the availability and systematization of practical information on architectural objects of transport infrastructure in the international logistics system.

An effective approach to the system of management processes in the field of transport involves a hub of methods and tools in a set of interconnections that can ensure an increase in productivity and efficiency of communication and integration processes. This approach should be based on implementing a development strategy that follows the principles of sustainable development as an integral part of the management paradigm.

The authors believe that there is a need for further research into the possibilities of increasing the functionality of architectural objects in the transport infrastructure to develop and implement programmes for integration into the global logistics network. This includes the incorporation of international practical experience.

Literature:

1. Aulin, V., Hrynkiv, A., Holub, D., Diachenko, V., & Holovatyi, A.: *Intelligence functions of transport and production systems and the possibilities of their architecture*, 2021. http://195.230.140.114/jspui/bitstream/123456789/10681/1/%D0%97%D0%B1%D1%96%D1%80%D0%BD%D0%B8%D0%BA%20%D1%82%D0%B5%D0%B72021v4-36-45.pdf
2. Sabadash, V., Chorna, Y., & Falko, K.: *International Logistics Systems: Research of Transformations under the Influence of Recession and Definition of Perspective Directions of Logistics Architecture Development*, 2020. https://essuir.sumdu.edu.ua/handle/123456789/83755
3. Prokopenko, O., Kichuk, Ya., Ptashchenko, O., Yurko, I., & Cherkashyna, M.: Logistics Concepts to Optimise Business Processes. *Estudios de Economia Aplicada*, 2021, 39(3). Article number 4712. https://doi.org/10.25115/eea.v39i3.4712
4. Prokopenko, O., Prause, G., Otenko, V., Cherkashyna, M., Kara, I., & Imnadze, I.: Adaptation of logistics companies to operation under the Covid-19 pandemic Restrictions. *Acta logistica*, 2023, 10(1), 47–60. https://actalogistica.eu/Issues/2023/I_2023_05_Prokopenko_Prause_Otenko_Cherkashyna_Kara_Imnadze.pdf
5. Pasichnyk, A., Lebid, I., & Kushchenko, Y.: Analysis of the efficiency of building a network of transport and logistics complexes based on the factor-rating model. *Transport Systems And Technologies*, 2022, 39, 216–228. https://doi.org/10.32703/2617-9040-2022-39-20
6. Zelenko, Y., Cherkudinov, V., & Levucka, S.: The environmental concept of multimodal transportation. *Transport Systems And Transportation Technologies*, 2022, 24, 58–62. https://doi.org/10.15802/tstt2022/272065
7. Pokrovskaya, O., Orekhov, S., Kapustina, N., & Kizyan, N.: Formation of logistics facilities in transport corridors. *IOP*

Conference Series: Materials Science and Engineering, 2020, 918(1). https://doi.org/10.1088/1757-899X/918/1/012032
8. Kraus, K.: *Functions of construction management of logistics complexes.* Modern innovation and investment mechanisms for the development of the national economy in the context of European integration, 2019. https://elibrary.kubg.edu.ua/id/eprint/28424
9. Vignali, V., Acerra, E., Lantieri, C., Di Vincenzo, F., Piacentini, G., & Pancaldi, S.: Building Information Modelling (BIM) application for an existing road infrastructure. *Automation in Construction*, 2021, 128. https://doi.org/10.1016/j.autcon.2021.103752.
10. Iacob, M., Charismadiptya, G., van Sinderen, M., & Piest, J.: An Architecture for Situation-Aware Smart Logistics. *IEEE 23rd International Enterprise Distributed Object Computing Workshop (EDOCW)*, Paris, France, 2019, 108–117. https://doi.org/10.1109/EDOCW.2019.00030
11. Zichichi, M., Ferretti, S., & D'Angelo, G.: A Distributed Ledger Based Infrastructure for Smart Transportation System and Social Good. *IEEE 17th Annual Consumer Communications & Networking Conference (CCNC)*, Las Vegas, NV, USA, 2020, 1–6. https://doi.org/10.1109/CCNC46108.2020.9045640
12. Ciampoli, B., Gagliardi, L., & Clementini, V.: Transport Infrastructure Monitoring by InSAR and GPR Data Fusion. *Surv Geophys*, 2020, 41, 371–394. https://doi.org/10.1007/s10712-019-09563-7
13. Zhou, Z., Cai, M., Xiong, C., Deng, Z., & Yu, Y.: Construction of autonomous transportation system architecture based on system engineering methodology. *IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, Macau, China, 2022, 3348–3353. https://doi.org/10.1109/ITSC55140.2022.9921842
14. Solla, M., Pérez-Gracia, V., & Fontul, S.: A Review of GPR Application on Transport Infrastructures: Troubleshooting and Best Practices. *Remote Sensing*, 2021, 13(4). https://doi.org/10.3390/rs13040672
15. Wu, J., Wang, X., Dang, Y., & Lv, Z.: Digital twins and artificial intelligence in transportation infrastructure: Classification, application, and future research directions. *Computers and Electrical Engineering*, 2022, 101. https://doi.org/10.1016/j.compeleceng.2022.107983
16. D'Amico, F., Calvi, A., Schiattarella, E., Di Prete, M., & Veraldi, V.: BIM and gis data integration: a novel approach of technical/environmental decision-making process in transport infrastructure design. *Transportation Research Procedia*, 2020, 45, 803–810. https://doi.org/10.1016/j.trpro.2020.02.090
17. Abbondati, F., Biancardo, S., Palazzo, S., Capaldo, F., & Viscione, N.: I-BIM for existing airport infrastructures. Transportation Research Procedia, 2020, 45, 596–603. https://doi.org/10.1016/j.trpro.2020.03.052
18. Izrailov, K., Chechulin, A., & Vitkova, L.: Threats Classification Method for the Transport Infrastructure of a Smart City. *IEEE 14th International Conference on Application of Information and Communication Technologies (AICT)*, Tashkent, Uzbekistan, 2020, 1–6. https://doi.org/10.1109/AICT50176.2020.9368828
19. Patrman, D., Splichalova, A., Rehak, D., & Onderkova, V.: Factors Influencing the Performance of Critical Land Transport Infrastructure Elements. *Transportation Research Procedia*, 2019, 40, 1518–1524. https://doi.org/10.1016/j.trpro.2019.07.210
20. Buyvis, V.: Algorithm for adjusting cargo delivery routes taking into account the state of the resource allocation system of the road and transport infrastructure IOP Conf. *Ser.: Earth Environ. Sci*., 2021, 823. https://doi.org/10.1088/1755-1315/823/1/012062
21. Yelizyeva, A., Artiukh, R., & Persiyanova, E.: Target and system aspects of the transport infrastructure development program. *Innovative Technologies and Scientific Solutions for Industries*, 2019, 3 (9), 81-90. https://doi.org/10.30837/2522-9818.2019.9.081
22. de Rus, G. & Pilar Socorro, M.: Pricing and investment in alternative transport infrastructures. *Transportation Research Part A: Policy and Practice*, 2019, 119, 96–107. https://doi.org/10.1016/j.tra.2018.10.040
23. Jansen, M., & Seraj, F.: e-Sight: Real-time cloud platform for visualizing edge transport infrastructure information. *IEEE International Conference on Pervasive Computing and Communications Workshops (PerCom Workshops)*, Austin, TX, USA, 2020, 1–6. https://doi.org/10.1109/PerComWorkshops48775.2020.9156181
24. Gibbons, S., Lyytikäinen, T., Overman, H., & Sanchis-Guarner, R.: New road infrastructure: The effects on firms. *Journal of Urban Economics*, 2019, 110, 35–50. https://doi.org/10.1016/j.jue.2019.01.002
25. Thacker, S., Adshead, D., & Fay, M.: Infrastructure for sustainable development. *Nat Sustain*, 2019, 2, 324–331. https://doi.org/10.1038/s41893-019-0256-8

Primary Paper Section: A

Secondary Paper Section: AP, JO