

UDC 351/354:351.812

DOI: 10.48077/scihor.24(8).2021.98-107

Public Management of Railway Transport Development based on the Principles of a Systematic Approach

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Article's History:

Received: 10.07.2021

Revised: 11.08.2021

Accepted: 15.09.2021

Suggested Citation:

Dykan, V., Kirdina, O., Ovchynnikova, V., Kalicheva, N., & Obruch, H. (2021). Public management of railway transport development based on the principles of a systematic approach. *Scientific Horizons*, 24(8), 98-107.

Abstract. The article is devoted to scientific and applied research on the problem of the formation and implementation of a universal, efficient and effective public management system for the development of railway transport in the changing socio-economic and political conditions of Ukraine. The definition of the category "public management of railway transport" and the problems of the railway industry as a whole was clarified. A universal, efficient and effective system of public management for the development of railway transport has been formed, containing all the necessary aspects: entrance to the system, working subsystems, exit, external environment, feedback, as well as the components and elements that are part of them. It has been proven that entrance into the system is the defining management and organizational link of the entire system. The main directions of introduction and development of elements of working subsystems are analyzed. Proposals on operational and strategic directions of improvement of public management of railway industry development in the following areas are presented: improvement of legislative and regulatory framework; full separation of the functions of public administration from the economic functions of railway enterprises; the development and implementation of a new public tariff management system; development of a progressive approach to the organization and management of passenger transportation and the introduction of a public administration system in the international security. It was concluded that the effective operation of the developed system and the successful introduction of areas of improvement of public management for the development of the railway industry will achieve the following results: create conditions for the development of free competition in the industry; increase the competitiveness of the railway industry in Ukrainian and international markets; achieve the desired indicators of railway industry efficiency and innovation growth

Keywords: elevated, improvement of management, systems approach, development, infrastructure



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INTRODUCTION

The sustainable socio-economic development of Ukraine depends entirely on the level of development of each branch of the national economy as a whole, as well as its individual infrastructure elements at the present stage. Integration into the world and especially into the European economic space is a defining priority of public administration at all levels. Thus, the stable development of the country's railway industry is a key prerequisite for the overall growth of all economic and social indicators of the country; enhancing its Ukrainian competitiveness in foreign markets; broadening and strengthening linkages among economic agents; enhancing the economic security of the state; development of foreign economic activity to ensure the European integration vector of development, etc. Rail transport, in fact, is the "blood circulatory system" of the Ukrainian economy, which implements a comprehensive influence on all aspects of the life of the state by promoting interregional and international cultural ties, socio-economic transformations, tourism cooperation between states, retail and wholesale trade, etc. [1]. But, it should be noted that today the system of the railway industry of Ukraine does not fully comply with the world and European standards, directives, standards, regulations, and requirements, as well as is significantly far behind in terms of the content of the legislative and regulatory technical base, infrastructure component, the quality of transportation and service services provided and other important aspects of the effective development of the industry as a whole. Thus, the above factors determine the relevance of the selected topic of research on the need to systematize the scientific, methodological and practical provision of sustainable development of the railway industry of Ukraine in the conditions of integration processes and its further improvement by creating and introducing a systematic approach to the formation of a universal and effective system of public management of the development of railway transport and the industry as a whole.

Public management of railway transport development is a complex, multi-component socio-economic system and has many unresolved problems and development prospects. Therefore, many scientific works of scientists and specialists of public administration, economics, and management are devoted to this issue, such as V.L. Dykan and H.Ye. Ostroverkh [1-3], Yu.L. Mokhova [4], A.O. Diegtiar et al. [5; 6], H. Eitutis et al. [7], I.V. Tokmakova et al. [8], V. Hudkova and Yu. Tiutiun [9], B.Ya. Ostapiuk [10], V.V. Matviienko [11], N.E. Avanesova et al. [12], V. Kruhlov and D. Tereshchenko [13], I.S. Lukasevych-Krutnyk [14] and others. But, despite the substantive and fundamental studies carried out by these scientists, the issues of the formation of a universal, efficient and effective system

of public management for the railway transport development in the changing socio-economic and political conditions of Ukraine remain unresolved. The main purpose of the article is to study methods and models of public management of railway transport development based on a systematic approach. To achieve this purpose, tasks are as follows:

- to clarify the definition of the category "public administration of railway transport";
- to establish a universal, efficient and effective system of public administration for the development of railway transport;
- to identify the main elements of the system entrance;
- to analyze the main directions of implementation and development of elements of working subsystems;
- to provide proposals on operational and strategic directions of improvement of public management of railway industry development.

THEORETICAL ASPECTS OF CREATING A UNIVERSAL AND EFFECTIVE SYSTEM OF PUBLIC MANAGEMENT OF THE RAILWAY TRANSPORT DEVELOPMENT OF UKRAINE

Today, railway transport occupies a leading place among key sectors of the economy in Ukraine. It is a secure link for more than 80% of all freight and almost half of all passenger traffic. So the defining position of the railway transport of Ukraine is due to two interrelated factors, namely:

- significant economic, social, and technical advantages over other land, water, and air transport modes;
- the geographical position of Ukraine, through which significant transport and economic flows pass.

In order to establish a universal and effective system of public management of the railway transport development of Ukraine, it should be clarified the definition of "public management of the railway transport" by summarizing scientific works [4; 5; 7; 8] and highlighting the main systemic, organizational, and managerial problems that may prevent the continuous operation of the system [9-11] (Fig. 1). The research carried out in Figure 1 and the processing of scientific sources [6; 12; 15; 16] make it possible to form a universal system of public management of the railway transport development, the main feature of which is the presence of four interconnected subsystem units, namely: economic growth, the introduction of an innovative component and an integrated information environment.

As shown in Figure 2, the system is based on a system approach, that is, it contains all the necessary aspects: entrance, operating subsystems, exit, external environment, feedback, as well as the components and elements that are included in them.

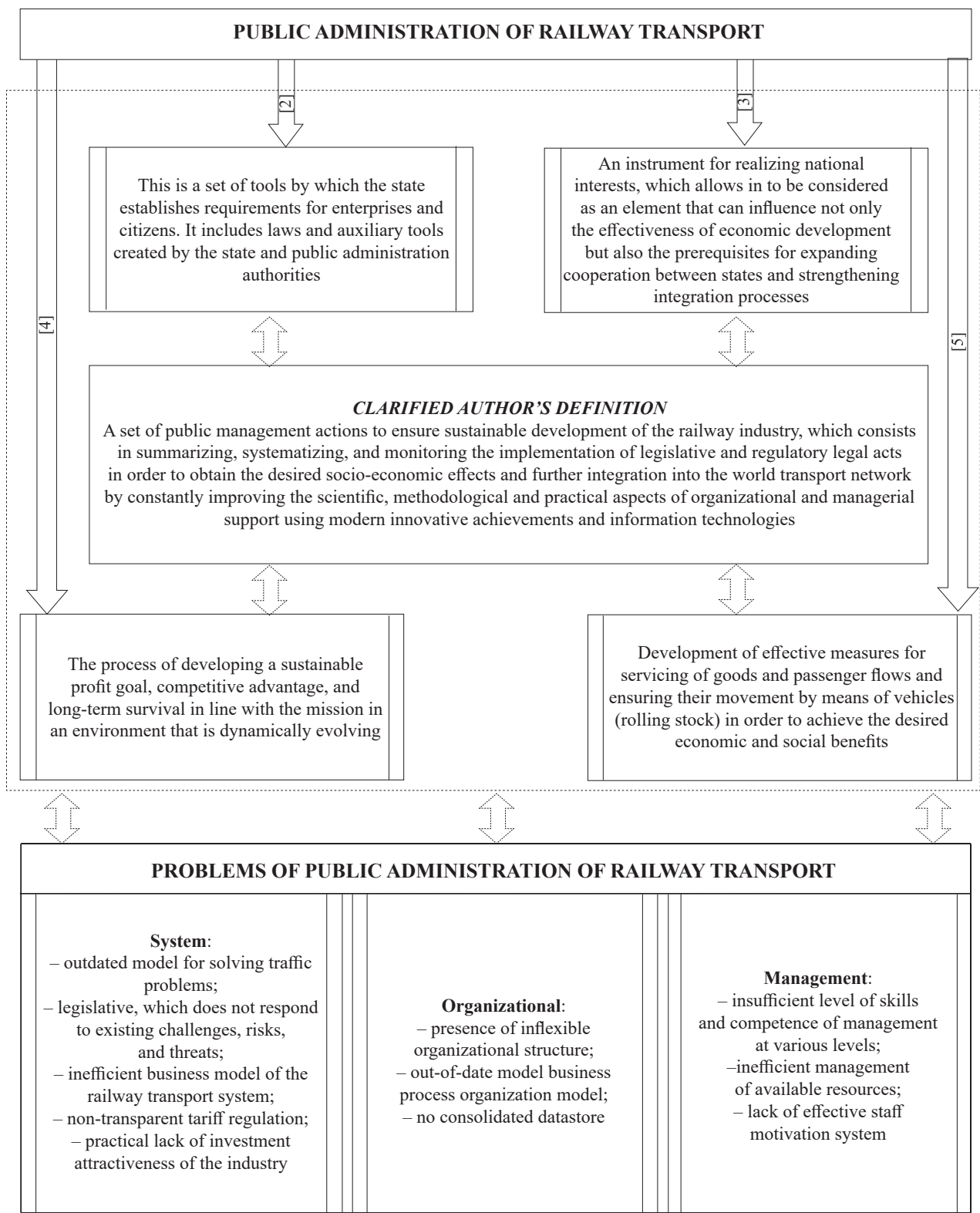


Figure 1. Clarification of the category “public management of railway transport” and problems of the railway industry
Source: author’s development based on the generalization of [4; 5; 7-11]

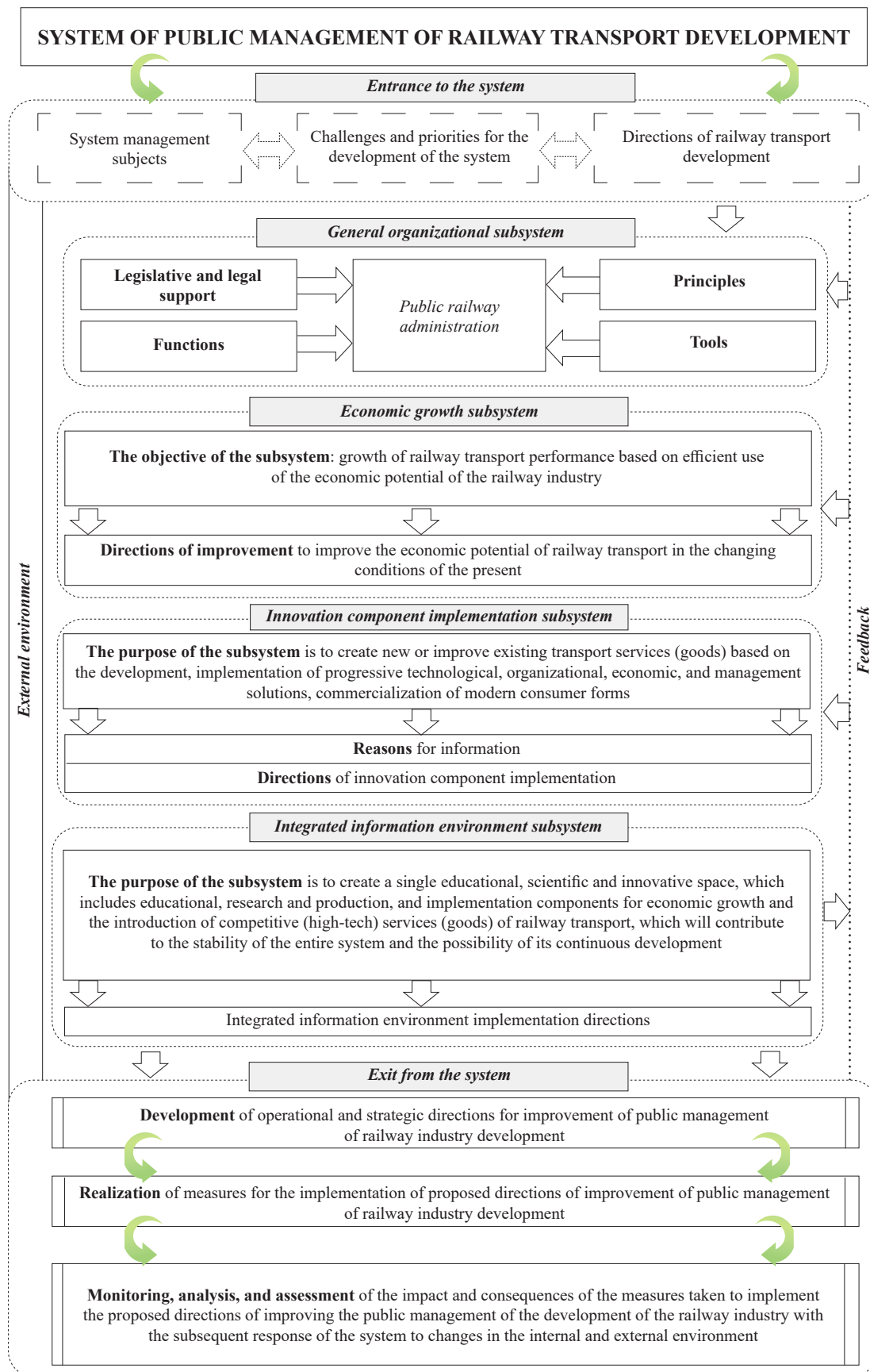


Figure 2. Formation of the system of public management of railway transport development

Source: author's development based on the generalization of [6; 12; 15; 16]

ANALYSIS OF ELEMENTS AND COMPONENTS OF THE ESTABLISHED SYSTEM OF PUBLIC MANAGEMENT OF THE RAILWAY TRANSPORT DEVELOPMENT

Therefore, in order to increase the scientific, methodological and practical value of the established system of public management of railway transport development, it is necessary to analyze each element and component

of this system and provide proposals for improving their individual components.

I. Entrance to the system is the defining management and organizational link of the entire system and is characterized by the presence of three elements.

1. The system control subjects can be roughly divided into three hierarchical levels (Table 1).

Table 1. Subjects of public administration of the railway transport development system

No.	Subject name	Main tasks of the subject
<i>I. Higher level of management</i>		
1.1	Cabinet of Ministers of Ukraine	Manage the entire system, have broad authority, and directly and indirectly affect all other subsystems and system elements
1.2	Ministry of Infrastructure of Ukraine	
<i>II. Medium level of management</i>		
2.1	State Agency for Railway Transport	Implementation of state policy, control of equal access to infrastructure, coordination of railway transport enterprises, registration and coordination of the activities of carriers, operators, industrial transport, subways, etc.
2.2	National Transport Regulatory Commission	Formation of an effective tariff policy in the transport services market, which belongs to the natural monopoly
2.3	State Transport Safety Authority	State supervision of traffic safety, including railway transport
2.4	Accident Investigation Commission	Performs the function of analyzing each force majeure situation that led to the accident and determines the ways to overcome it
<i>III. Low level of management</i>		
3.1	PJSC "Ukrzaliznytsia"	Put into practice the decisions of the higher and middle management subjects, monitoring their implementation, and transmit the received information for its subsequent processing and improvement of their activities
3.2	Private carriers, railway rolling stock operators, freight forwarders	
3.3	Non-public railway transport: industrial, railway transport, access roads	
3.4	Subway	

Source: author's development based on the generalization of [16-19]

2. The system should fulfill the following common objectives and focus on such development priorities:

- compliance with timeliness, completeness, and quality standards in the provision of services by railway transport to meet the needs of the population and social production;

- protection of the rights and freedoms of members of the community during their service by railway transport enterprises, as well as the focus on its safe operation and maintenance;

- balancing the necessary rate and proportions of the development of Ukraine's national transport system;

- creation of a reliable system of economic security of Ukraine, protection of legitimate interests of railway transport enterprises and consumers of transport services;

- creating favorable conditions for general economic and social growth, improving the competitiveness of the

national economy in the international market, and improving the quality of life of all segments of the population.

3. The main directions of the efficient development of railway transport should be divided into two interrelated elements:

- transport policy direction (organizational and personnel; property; investment; financial and credit; tax; tariff, etc.);

- administrative direction (administrative and leisure; public oversight; administrative and regulatory).

II. The common organizational subsystem is the key link of the system and, using the following elements, forms an effective mechanism for organizing the work of all components and links of the system. The main elements of this subsystem include the following:

- legislative and legal support is a set of mechanisms that are developed and operate at both the national and international levels. They are divided into compulsory

or mandatory (national laws and regulations, treaty obligations) and voluntary (virtue covenants, codes of conduct, etc.) [20]. Their competent implementation should form a legal basis that applies all other elements and

components of the system in work;

– the set of principles, functions, and tools of the general organizational subsystem in this study is proposed to be considered as follows (Table 2).

Table 2. Principles, functions, and tools of the system of public management of railway transport development

No.	Common organizational subsystem element	Main types
1	Principles	<ul style="list-style-type: none"> – Systematics – Quality of service provision – Legal support – Coenomic growth – Innovation – Informativity – Reliability and safety – Accessibility and financial transparency – Competitiveness
2	Functions	<ul style="list-style-type: none"> – Regulatory – Security – Control and supervisory – Price forming – Integrative
3	Tools	<ul style="list-style-type: none"> – Economic planning and forecasting tools – Plan adjustment tools – Operational and strategic management accounting systems – Generation and dissemination of knowledge – Continuous qualification staff training – Simulation of results – Information technology (problem-oriented databases)

III. Economic growth subsystem.

Today there is an urgent need to pay special attention to the development of mechanisms, tools, and directions for the economic growth of railway transport in Ukraine. The study proposes the following areas of improvement to increase the economic potential of railway transport in the changing conditions of the present:

– general updating of the state's transport system for the introduction of linkages between the different transport means, which will contribute to the socio-economic importance of the railway industry;

– improvement of the regulatory and legal environment in the field of financial and investment support for railway transport activities, which will create the basis for increasing the attractiveness of the industry among existing and potential Ukrainian and world investors and will lead Ukrainian legislation to the world and European norms and standards;

– improvement of organizational structures and management methods will make it possible to introduce modern management means and methods to achieve the desired financial and economic results and increase

the economic potential of the railway industry as a whole;

– improving the system of training and education of personnel by transforming the system of traditional values and motivation will promote competition for prestigious jobs in the railway industry, which will increase the economic effect of the general introduction of innovations.

IV. Innovation component implementation subsystem.

The effective functioning of the railway industry of Ukraine takes place in difficult socio-economic conditions and is impossible without the activation of its innovative development in various directions. That is why to get out of this difficult situation it is necessary to introduce the systemic solution of problems of activation of innovation activity of enterprises of the railway industry, the formation of the unified research environment, efficient technologies of development and introduction of innovations, development of intellectual capital, and improvement of quality of products [2; 21]. Figure 3 describes the main reasons for innovation in the public management of railway transport development.

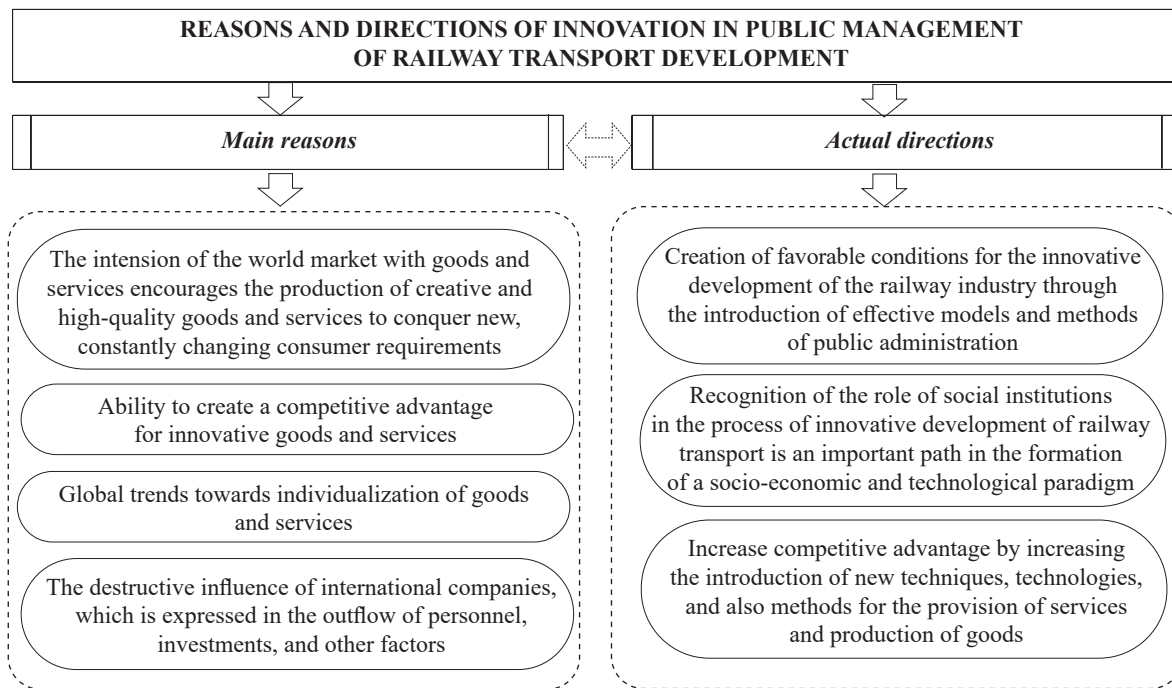


Figure 3. Reasons and directions of innovation in public management of railway transport development

Source: author's development based on the generalization of [2; 3; 21]

V. Integrated information environment subsystem.

An analysis of the current state of the railway industry of Ukraine found systemic shortcomings in the functioning of existing information systems, which significantly reduce the reliability and quality of information support for the entire cycle of creating a service (product), and therefore cause an increase in its duration and inefficiency of management decisions. Define the main directions of implementation of the integrated information environment:

- adaptive railway management information system in the changing conditions of the present;
- information system for monitoring the development

of railway transport;

- information system for planning and programming the development of railway transport for short-term and long-term periods;
- information system of state control over railway transport development;
- an information system that accompanies the production of goods and services, including innovative.

At the exit from the system of public management of railway transport development, there are operational and strategic directions of improvement of public management of railway industry development, see Table 3.

Table 3. Operational and strategic directions of improvement of public management of railway industry development

No.	Direction	Direction characteristic
1.	Improving the legislative and regulatory framework	<ul style="list-style-type: none"> - Establishment of an effective legislative framework in accordance with international standards - Development of an improved version of the Charter of Railway Transport of Ukraine - Ensuring financial and economic transparency of railway transport - Approval of the Procedure for initiation, preparation, and implementation of various projects, special attention should be paid to innovative
2.	Complete separation of the functions of public administration from the economic functions of railway enterprises	<ul style="list-style-type: none"> - Provision of a certain capacity of the main directions of railway transport - Control of the compatibility of railway transport with foreign countries - Development of an effective investment policy for the railway industry (including raising funds from local budgets for investment) through the formation of a new investment support mechanism
3.	Development and implementation of a new public tariff management system	<ul style="list-style-type: none"> - Transparent tariff formation - Introduction of tariff simplification at the borders of the state - Development of a methodology for integrated tariff management <ul style="list-style-type: none"> - Introduction of progressive tariff methods - Formation of methodology for calculation of fees for railway transport services <ul style="list-style-type: none"> - Accounting of investment component in tariffs - Creation of an automated system of corporate-state management of railway transport (management of finance and resources, planning and implementation of cargo transportation, etc.)

Table 3, Continued

No.	Direction	Direction characteristic
4.	Development of a progressive approach to the organization and management of passenger transportation	<ul style="list-style-type: none"> - The introduction of a network of interconnected logistics centers and terminals with extensive capabilities - Construction of high-speed railway sections - Acceleration of border inspection posts of Ukraine - Enactment of international standards for the carriage of passengers - Improvement of social passenger transport
5.	Introduction of a public administration system in the international security	<ul style="list-style-type: none"> - Application of security management system certification procedures - Improvement of procedures and methods of state supervision and control of the safety of railway transport in accordance with international standards - Introduction of innovative security projects and programs - Technical and technological modernization of transport - Introduction of public-private partnerships - Application of long-term concessional lending mechanisms

Thus, the implementation of measures to implement the proposed directions for improving public management of the development of the railway industry will achieve the following practical results:

- to create conditions for the development of free competition in the industry;
- to increase the competitiveness of the railway industry in Ukrainian and international markets;
- to achieve the desired indicators of railway industry efficiency and innovation.

CONCLUSIONS

There were conducted scientific and applied studies of the problem of the formation and implementation of a universal, efficient and effective system of public management of the development of railway transport in the changing socio-economic and political conditions of Ukraine. The value of study consists in the scientific, methodological, and practical results obtained, namely:

1. The definition of the category "public management of railway transport" is clarified, which is considered in the article as a set of managerial influences of the state to ensure the sustainable development of the railway industry, which consists in summarizing, systematizing, and monitoring the implementation of legislative and regulatory legal acts to obtain the desired socio-economic effects and further integration into the world transport network by constantly improving the scientific, methodological and practical aspects of organizational and managerial support using modern innovative achievements and information technologies.

2. A universal, efficient, and effective system of public management of the development of railway transport has been formed, containing all the necessary aspects: entrance, working subsystems, exit, external environment, feedback, as well as components and elements that are part of them. The main feature of the developed system is the presence of four interconnected subsystem units, namely: economic growth, the introduction of an innovative component, and an integrated information environment.

3. The main elements of the system entrance are defined:

- system management subjects, which are divided into three levels of management and perform interrelated objectives;

- general tasks, priorities of the system operation are set out and the main directions of railway transport development efficiency.

4. Main directions of implementation and development of elements of working subsystems are analyzed:

- the common organizational subsystem is the key link of the system and, using a complex of elements, forms an effective mechanism for organizing the work of all components and links of the system;

- is proposed a set of improvement directions to increase the economic potential of railway transport in the changing conditions of the present;

- the reasons and directions of innovation in the public management of railway transport development are identified;

- the main directions of implementation of the integrated information environment have been investigated.

Proposals on operational and strategic directions of improvement of public management of railway industry development in the following areas are presented: improvement of legislative and regulatory framework; full separation of the functions of public administration from the economic functions of railway enterprises; the development and implementation of a new public tariff management system; development of a progressive approach to the organization and management of passenger transportation and the introduction of a public administration system in the international security. It was concluded that the effective operation of the developed system and the successful introduction of areas of improvement of public management for the development of the railway industry will achieve the following results: create conditions for the development of free competition in the industry; increase the competitiveness of the railway industry in Ukrainian and international markets; achieve the desired indicators of railway industry efficiency and innovation growth.

REFERENCES

- [1] Dykan, V.L., & Ostroverkh, H.Ye. (2018). Improving the mechanism of state management of the development of the railway industry of Ukraine in the European integration vector. *Bulletin of Transport Economics and Industry*, 62, 11-19.
- [2] Dykan, O.B. (2016). *Organizational and economic tools for ensuring the competitiveness of industrial enterprises of railway transport*. Kharkiv: Ukrainian State University of Railway Transport.
- [3] Dykan, O.V. (2016). Conceptual bases of neo-industrial modernization of industrial enterprises of Ukraine on the basis of formulation of innovation and logistics systems. In V.V. Prokhorova (Ed.), *Sustainable development in a socially oriented economy* (pp. 335-364). Kharkiv: Smuhasta typohrafiia.
- [4] Mokhova, Yu.L. (2016). Mechanisms of functioning of the railway branch in the countries of the European Union. *State and Regions. Series: Public Administration*, 3, 134-140.
- [5] Diegtiar, A.O. (2016). Features of formation of strategy of development of railway transport of Ukraine. *The Current Problem of Public Administration in the Context of Systemic Change. Series: Public Administration*, 298(XVII), 5-11.
- [6] Diegtiar, O.A., Orlova, N.S., Kozureva, O.V., Shapovalova, A.M., & Prykazka, S.I. (2019). Financial capacity of territorial communities: European experience and ukrainian case. *Collection of Scientific Works "Financial and Credit Activity: Problems of Theory and Practice"*, 4(31), 516-526.
- [7] Eitutis, H., Nykyforuk, O., & Karpov, V. (2015). Analysis of the productivity of the railway of Ukraine. *Railway Transport*, 31, 64-77.
- [8] Tokmakova, I.V., Ovchynnikova, V.O., & Korin, M.V. (2020). Directions and tools of state management of strategic development of railway transport. *Bulletin of Transport Economics and Industry*, 69, 114-127.
- [9] Hudkova, V., & Tiutiun, Yu. (2015). Structural and functional analysis of state regulation of railway transport development. *Railway Transport. Series: Economics and Management*, 33, 70-77.
- [10] Ostapiuk, B.Ya. (2014). Principles of effective management of railway transport in the system of national economy in the conditions of globalization. *Business Inform*, 10, 192-197.
- [11] Matviienko, V.V. (2016). The main directions of state regulation of railway transport of Ukraine. *Actual Problems of Public Administration. Public Administration Series*, 1(49), 19-25.
- [12] Avanesova, N.E., Mordovtsev, O.S., & Serhiienko, Yu.I. (2020). Theoretical and methodical bases of identification and interrelation of the influential destabilizing factor on economic safety of the industrial enterprise. *Business Inform*, 9, 20-28. doi: 10.32983/2222-4459-2020-9-20-28.
- [13] Kruhlov, V., & Tereshchenko, D. (2019). Public-private partnership as tool for developing regional labor potential. *Science and Innovation*, 15, 5-13.
- [14] Lukasevych-Krutnyk, I.S. (2020). The concept and methods of harmonisation of the private law legislation of Ukraine in the field of provision of transport services with the legislation of the European Union. *Journal of the National Academy of Legal Sciences of Ukraine*, 27(2), 91-106.
- [15] Lendiel, O.D. (2020). Assessment of the state of the infrastructure of the regional tourist services market. *Scientific Bulletin of Mukachevo State University. Series "Economics"*, 7(1), 39-45.
- [16] Gevorkyan, A.Yu., Druhova, O.S., & Klepikova, S.V. (2018). Factors influencing the determination of investment attractiveness and business value. *Bulletin of the National Technical University "Kharkiv Polytechnic Institute"*, 19(1295), 131-134.
- [17] Kalycheva, N.Ye. (2018). The influence of public administration on the effective development of railway transport. *Intelligence XXI*, 5, 62-65.
- [18] Kucheryna, L.A. (2013). State regulation of railway transport development. *Efficient Economy*, 10. Retrieved from <http://www.economy.nayka.com.ua/?op=1&z=2391>.
- [19] Cesaretti, G.P., Borrelli, I.P., & Viola, I. (2021). Circular economic analysis for Sustainability. *Rivista di Studi sulla Sostenibilita*, 1, 201-221. doi: 10.3280/RISS2021-001012.
- [20] Kirdina, O.H., Nazarenko, I.L., Utkina, Yu.M., & Dykan, V.L. (2014). *Economics and organization of innovative activity on railway transport*. Kharkiv: Ukrainian State University of Railway Transport.
- [21] Kirdina, O.H. (2015). Innovations in railway transport and utility levels. *Economics of the Transport Complex*, 15, 124-130.

Державне управління розвитком залізничного транспорту на основі принципів системного підходу

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Анотація. Стаття присвячена науково-прикладним дослідженням проблеми формування та впровадження універсальної, ефективною та дієвою системи державного управління розвитком залізничного транспорту в мінливих соціально-економічних і політичних умовах України. Уточнено визначення категорії «державне управління залізничним транспортом» та проблеми залізничної галузі в цілому. Сформовано універсальну й ефективну систему державного управління розвитком залізничного транспорту, що містить усі необхідні аспекти: вхід до системи, робочі підсистеми, вихід, зовнішнє середовище, зворотний зв'язок, а також компоненти та елементи, які є їхніми частинами. Доведено, що вхід у систему є визначальною управлінською та організаційною ланкою всієї системи. Проаналізовано основні напрями впровадження та розвитку елементів робочих підсистем. Представлено пропозиції щодо оперативно-стратегічних напрямів удосконалення державного управління розвитком залізничної галузі за напрямками: удосконалення законодавчої та нормативно-правової бази; повне відокремлення функцій державного управління від економічних функцій залізничних підприємств; розробка та впровадження нової державної системи управління тарифами; розвиток прогресивного підходу до організації та управління пасажирськими перевезеннями та запровадження системи державного управління в міжнародній безпеці. Зроблено висновок, що ефективне функціонування розробленої системи та успішне впровадження напрямів удосконалення державного управління розвитком залізничної галузі дозволить досягти таких результатів: створити умови для розвитку вільної конкуренції в галузі; підвищення конкурентоспроможності залізничної галузі на українському та міжнародному ринках; досягти бажаних показників ефективності залізничної галузі та інноваційного зростання

Ключові слова: підвищений, удосконалення управління, системний підхід, розвиток, інфраструктура