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FORMING OF THE MARKETING MECHANISM OF SUSTAINABLE URBAN TRANSPORT DEVELOPMENT ON THE PRINCIPLES OF ECOLOGICAL LOGISTICS

Monograph

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The monograph covers a set of problems related to research the modern paradigm of marketing of the subjects of the city public transport, the study of the quality of urban public transport services in Ukraine, the behavior of consumers of urban public transport, marketing mechanism for implementing the environmental function of the subjects of the urban public transport.

It is designed for scientific and practical workers, teachers, students of higher educational establishments.

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4.2. Transport and road complex logistics management in the context of financial and economic security

Vivchar O., Marynenko N.

The transport and road complex is a multifaceted, multi-sectoral, multi-criterion complex, and managed system. It is known that large (by size and number of elements) and complex (by interconnections and algorithms) systems are different classes of systems of financial and economic security (FES). From this point of view, the transport complex is a large system, since it consists of many elements. In addition, it is also a complex system of financial and economic security, since many of its elements are bound by

a multitude of diverse connections. Classification of systems involves their division by degree of organization. Well-organized and disorganized, or diffuse, systems are distinguished. According to this classification, public road system belongs to diffuse systems. Its diffusion is due to the presence of a large number of vehicles with random parameters, moving in random, from the point of view of system, routes and those that accidentally affect the rest of the system. Despite the diffuse properties, public road system is a large system subordinated to the common economic needs.

Research of the system involves solving one of the most important tasks – separating the system from the environment, which interacts with the FES system. According to the statement that “... the environment is a collection of all objects whose change of properties affects the system, as well as those objects whose properties change as a result of system behavior”, the boundary between the system and the environment may change. Functioning of the transport and road complex FES logistics system in the process of system analysis which takes into account models of two types: the model of the environment and the model of the system’s operational flows using the logistics approach of the FES. An environmental modeling is required in order to clearly formulate the goals and objectives of the system in the solution of the problem, as well as the constraints and requirements of the system.

The objects of the research are innovative and logistic approaches to the management of FES by the transport and road complex enterprises in a multifaceted environment, which significantly affects all its elements. To determine the size of the system, it is necessary to establish rational boundaries between the system and the external environment which consists of financial and economic, scientific and technical, social, natural, administrative, logistics and international issues.

The external environment of the transport and road complex is made up of factors being external to the system of the FES, which, on the one hand, are beyond the control of those who develop or make decisions, and in this sense are fixed or set from the point of view of the system, and, on the other hand, are not neutral in relation to the system and significantly affect the achievement of its goals.

The transport and road complex system covers two subsystems – transport complex (TC) and public road industry (PRI). These systems perform their functions, have tasks, goals and final results. Between the transport and road complex and the environment there is a constant connection, which sets the conditions and receives the final result making the system an opened one. Currently, the transport and road complex is an unregulated system, since TC and PRI do not interact with each other organizationally in the transport process. All the conditions imposed by the external environment, are transmitted to the subsystem separately and thus not coordinated, which results in an increase in the degree of diffusion of the entire system.

Despite the departmental disunity, the transport and road complex must be studied as a single national economic system. Its input parameters are the volume, quality, services and resources aimed at increasing the transport and operational qualities of the road network. At the output of such system, it is possible to expect results related to the increase of transport and operational indicators (TOI), but the final conclusion does not take into account all the qualities of the roads, because each of the subsystems exists separately. Requirements to the quality of roads that are dictated by the external environment of the transport and road complex are not tied to the PRI subsystem, so it can not fully meet all the needs of society [1, p.55].

The logistics system of the transport and road complex FSE, which makes it possible to regulate its parameters, comparing the results of functioning with the needs of society and to use logistics effectively, is presented in fig. 1.

Input indicators of the system are volumes, which society demands, – quality, level of security and efficiency of transport services, and requirements for roads qualitative characteristics. The society also directs resources in the transport and road complex, which are used directly for the implementation of the transport process and in the PRI to ensure the transport process. Resources from TC to PRI are transmitted in the form of taxes or other payments, which provide the required level of the roads TOI.

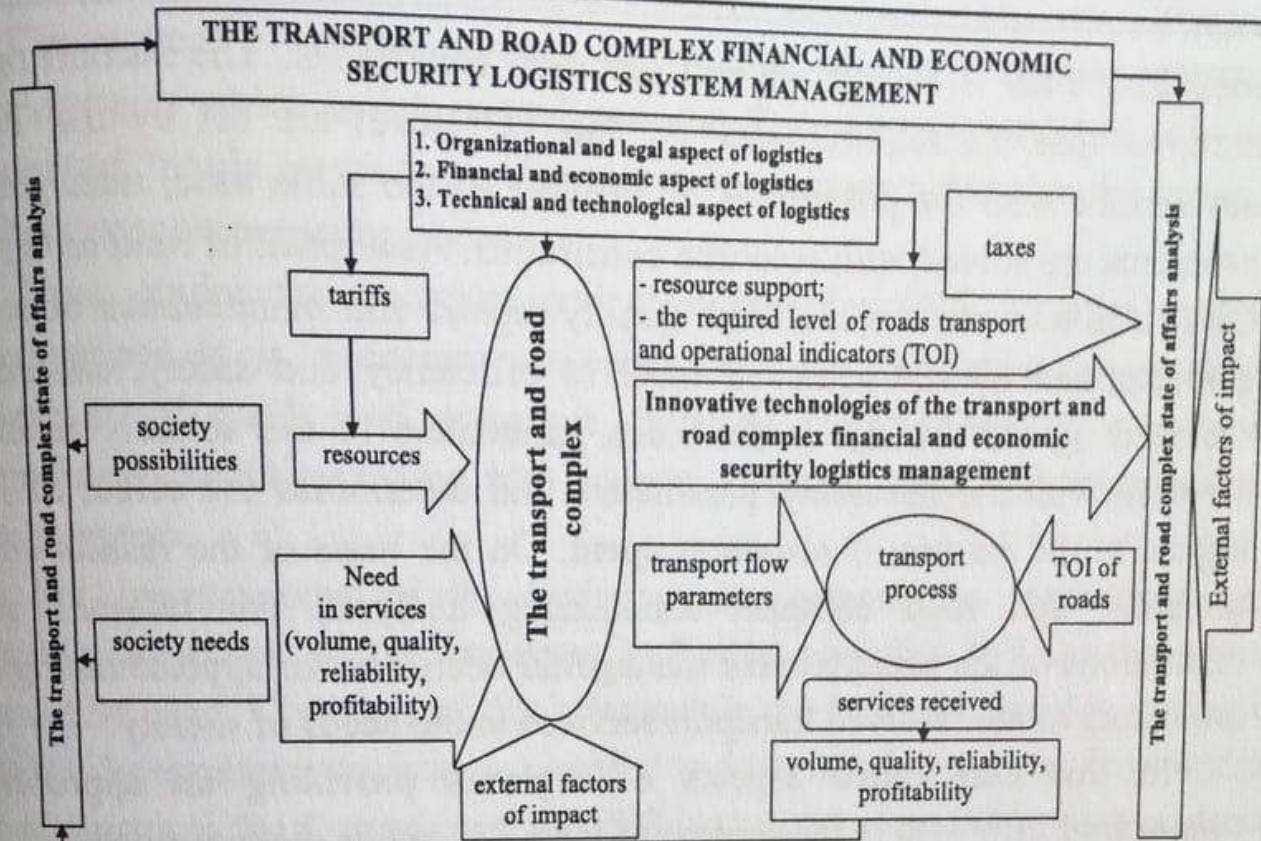


Fig. 1. Scheme of the transport and road complex financial and economic security logistics system management. Source: [2]

The transport and road complex is a constituent of the transport process due to indicators of traffic flows: the intensity of traffic, the composition of the traffic flow, the speed of cargo tension. At the same time, it is impacted by the external actions, which significantly affect the mentioned indicators of traffic flows. In addition, the TC specifies the requirements for the PRI to maintain the level of the given TOI, in accordance with the opportunities of society, expressed in terms of resources. This FES logistics system will facilitate the focus on improving the functioning of roads' repair and construction enterprises and implementation of logistics technologies into practical activities.

Subsystem PRI is a constituent of the transport process due to the TOI of the road network. Its incoming indicators are financial and material resources as well as requirements for maintenance of the TOI level, which also depends on the impact of the external environment factors.

Two versions of the TC and PRI interaction should be considered. According to the first version, the TOI level is determined by the needs of society, and resources must correspond to this level. In this case, the task of

managing FES is solved without resource constraints. The second option assumes that the requirements for the TOI level are set by the TC in accordance with the possibilities of society. At the same time, management problems are solved with resource constraints. As a result of road repair and construction works the real high-quality repairs and maintenance of roads, characterized by the achieved level of efficiency and safety, should be received by the society. It compares parameters of the actually received services with the necessary parameters and determines the effect of FES logisation of the use of resources spent. On the basis of the results of the transport and road complex functioning analysis, the relevant state institutions of the society make managerial decisions for approximating the indicators of the received transport services to the needs of society.

In this case, three aspects of logistics providing an appropriate managerial influence in the context of the FES, can be distinguished:

1. Organizational and legal aspect of logistics connected with the change of the structure of the transport and road complex logistics management, the legislative framework regulating the interaction of its subsystems, as well as with the improvement of the legal basis of the transport process organization.

2. Financial and economic aspect of logistics, aimed at regulating tax and tariff systems of the TC and PRI.

3. The technical and technological aspect of logistics stimulates the development of highly effective technical solutions, modern vehicles, new technologies of the transport and road complex.

To accomplish the tasks it is necessary to determine the problems of decision-making, to identify the factors influencing these decisions, that is, to obtain an expression that links the purpose with the means of achieving it. In this logistic system, the goal is to choose the optimal innovation and logistics approach to the transport and road complex FES management. In this case, the PRI decides on the creation of conditions for improving the TOI. At the same time, among the criteria while setting the task, there are also those that are not formalized, for example, next to the criterion "time", social criteria such as "comfort" can be considered.

Consequently, under current conditions of the national economy development, which is integrating into the European system, not only the concept of "roads network development" has changed, but also the essence of these processes management.

Thus, under the transport and road complex FES logistics system management it is necessary to understand the formation of dynamic processes of roads and transport facilities maintenance in a reliable operational condition taking into account regional, state and international requirements.

For improvement of the logistics management the innovative and logistics approach to the transport and road complex FES management should be used. The basis of this approach is the following model: strategic goals – integration processes – material and technical provision. It provides an approach to the formation of the FES logistics system taking into account the impact of innovative technologies of the transport and road complex logistics management. As the modern system of the roads development is a specific system of the innovation and logistics management of their transport and operational status, it should be implemented step by step.

First level (higher) – strategic logistics – binds consumers and producers to a single whole. The final result of strategic logistics is the reduction in time for operations inside the repair and construction enterprise and its increase for interaction with consumers.

Second level (medium) – integrated logistics – elements of in-company systems of the repair and construction enterprises (subsystems of planning, procurement, production, storage, transportation, distribution and control) which function as the only clearly arranged mechanism of repair and operation of roads.

The third level (lower) – the logistics of material and technical maintenance of repair and construction of roads. It provides continuous management of logistics flows in systems at different ratios of their characteristics, trajectory of motion, time of movement start and promotion through separate points of repair and construction enterprises.

This model also takes into account the influence of innovative technologies of the transport and road complex FES logistics management.

They anticipate the impact of innovation and their application in practice; it concerns the use of new road repair materials, effective management of material, informational, financial flows for road repair works, use of scientific achievements in the field of PRI and their interconnection.

One of the difficulties in introducing an innovative and logistics approach to FES is the fact that the transport and road complex is an "alive" system that operates under conditions of uncertainty and risk. Support of the reliability of this system requires significant material and financial costs and determines the magnitude of logistic indicators (costs per unit of output, costs per tonne-kilometer of goods transported for repairing roads, loading fleet of vehicles etc.).

An analysis and control of logistics activities, and hence logistics costs, play an important role in ensuring the effectiveness of the FES logistics system and identifying factors that have a positive impact on the efficiency of logistics operations. The basis for the cost formation is the resource composition of the production system of the transport and road complex, and the costs of all types of resources associated with the repair and construction of roads is a category that combines the formation and use of resources of the production system. Given the nature of the resource composition that is necessary for road repair and related costs, it is advisable to determine the degree of uniformity and conditions of use.

Logistics costs are important among other financial and economic indicators of the transport and road complex. The availability of reliable information on logistics costs, the clear order of their reflection in the final results create effective incentives for efficient performance. Taking into account the logics of the transport and road complex, we can conclude that the costs of the resource in their general understanding consist of two parts: first, the cost of acquiring a particular type of resource, its comprehensive preparation for use in the road-repair process, and secondly, the cost of the resource itself during the preparation of repairs or construction of roads [3].

The first part is the capital expenditure (in most cases) or the costs associated with solving the strategic tasks of the transport and road complex. These include: costs for the acquisition of fixed assets and intangible assets, research work, etc.

The second part is the current costs of the transport and road complex, which are connected with the solution of its tactical tasks. Used in the road-repair process, capital expenditures are converted to the current gradually, using the road section into which they were invested.

Total logistics costs for repair and construction of roads of the transport and road complex enterprises are calculated by adding transportation costs, costs for loading and unloading works, costs on warehousing and storage of stocks, costs for information flows management, costs for the organization of innovation and logistics activities at the transport and road complex enterprises, costs for the preparation and execution of works, other costs associated with the execution of logistics operations.

Nowadays, the efficiency and effectiveness of the transport and road complex depends primarily on the level, structure and distribution of costs associated with all types of activities and income. Cost control plays a very important role in managing them, which includes accounting, and cost analysis at various stages of their formation and occurrence.

In the process of implementing logistics functions, the use of system analysis can provide both a simple operation complexity and a global implementation of the restructuring of the entire transport and road complex logistics system costs, as well as industry's, region's ones etc.

For achieving positive results in the organization of internal logistics system analysis of the transport and road complex costs it is desirable to have employees who would deal with the organization and system analysis.

The logistics policy is developed taking into account two factors – the desired level of logistics service and the minimum amount of logistics costs for its achievement, and the objective of the FES logistics management is to establish a balance between these two components, beneficial to both the consumer and material flow generator.

The efficiency of the logistics system is an indicator (or system of indicators) that characterizes the level of quality of the logistics system's operation at a given level of general logistics costs [1].

From the consumer's point of view, which is the ultimate link in the logistics chain, the logistics system efficiency is determined by the quality of service of his/her order. The growing interest in improving the efficiency

of the entire logistics chain puts forward higher requirements to the system of assessment indicators, which in this case should provide an integrated assessment of logistics processes.

Minimization of logistics costs is the main criterion for the logistics system efficiency. The focus on minimizing losses is relevant, but only in case if required logistics service level is reached. Due to this, the multicriteria assessment of the logistics system efficiency has become popular. The most commonly used criteria are the following ones: costs, consumer satisfaction, quality, time, assets.

On the basis of the conducted theoretical researches it was determined that logistics at transport and road complex enterprises is the direction of economic activity, which is aimed at the search for possibilities to increase the efficiency of the material flows management.

The mechanism of providing the FES of the enterprise can be considered as a system of organizational, financial and legal means of impact, which are aimed at timely detection, prevention, neutralization and elimination of threats to financial security of the enterprise.

Consequently, the methods discussed contribute to the search of the most optimal FES logistics solutions in terms of reserves for minimizing logistics costs, which positively affects the financial and business activities of the enterprise as a whole and justifies the use of the innovation and logistics structure at the transport and road complex enterprises. The main objective of providing the FES at such enterprises is to achieve maximum stability of its functioning, as well as to create the basis for further growth of its economy, despite the existence of objective and subjective factors.

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