

# Logistical organization of shipments in the context of interaction of various modes of transport

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**Abstract.** The paper represents researches in the field of logistical processes in the context of interaction of various transport modes. The characteristics of forms of shipments' logistical organization in railroad and water communications were defined that differ from the existing ones by the performed functions and types of operators. This allows describing more precisely the organizational forms of interaction. The authors have developed an algorithm for managing operational activities in the logistics center, based on the interconnection of flows within it and coordination of the participant interaction in supply chains. The proposed methodological recommendations on the economic justification of the logistics center, which consist in the organizational support structure, allow providing a differentiated approach to the planning of operations for processing the flow according to the composition of the logistics chain.

## 1 Introduction

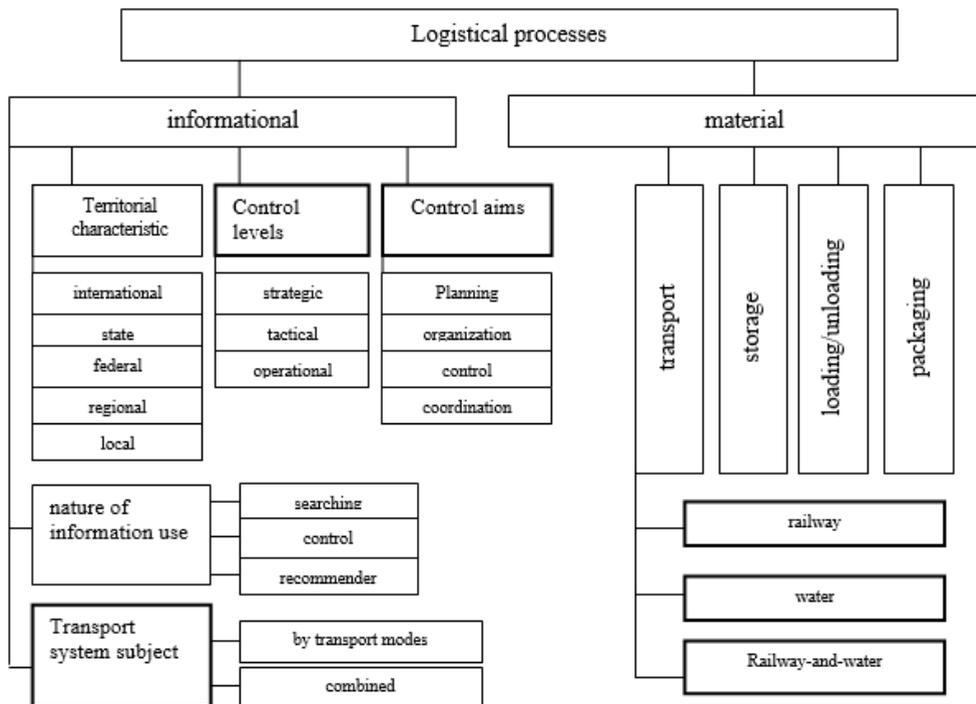
Today transport sector has several relevant issues to be worked out, for instance: the need in integrated development of transport hubs with a rational combination of railway approaches to seaports and major cargo terminals, system of information and technological interaction for various transport systems; strengthening of the transport infrastructure that ensures the transportation process and the organization of new forms of interaction between rail and water transport at both regional and national levels. Therefore, the scientific research is demanded, the primary aspects of which is elaboration of theoretical and methodological basis for development of new forms of transport system interconnection. This will serve for increasing the integrative effect and methodological justification of practical solution of the problem of managing the operational logistics activity in the framework of integration transport and logistics chain subjects at the regional level [1].

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## 2 Materials and methods

The analysis of logistical processes in transportation allowed to conclude that logistical processes are considered at two levels: informational and material. In accordance with these levels, complemented classification of logistics processes is presented (Figure 1). When substantiating the classification in terms of the information level, one should proceed from the need to manage transport flows. The effectiveness of taken decisions depends on the information that they are based on and on its reliability, thus there is a need for clear structuring of information processes in transportation by different characteristics. Classification of the transport process according to a broader list of features and its structuring enable studying the process of management of operational activities under rail and water transport interacting [2].

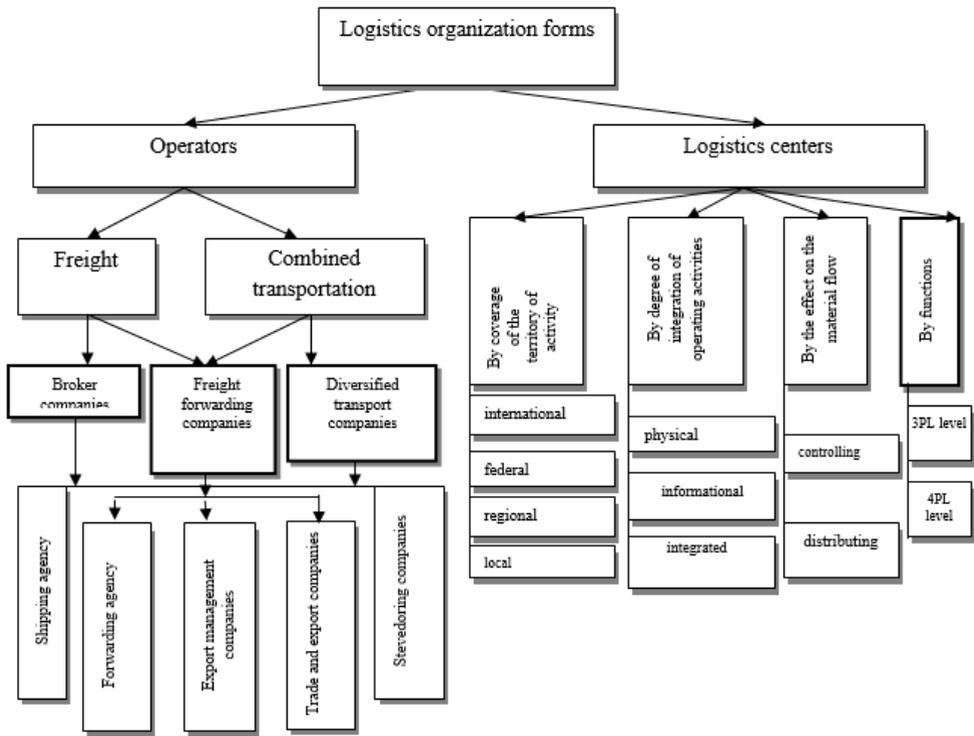


**Fig. 1.** Classification of logistical processes in transport.

When substantiating the classification of the forms of the logistical organization of shipments in railway and water communications, one should proceed from the fact that tendencies in the development of rail and water transport freight traffic require solving the problems of improving their interaction, which is possible only if all the subjects of the transport and logistics chain are integrated.

Therefore, in order to determine the rational form of interaction under certain conditions with respect to a particular object, the following classification by characteristics and specification levels is proposed (Figure 2).

The next step is a detailed description of each classification level and the determination of the practical significance of the proposed classification concept, which allows studying the processes of interaction of transport and logistics chain subjects in their various forms of organization more specifically [3].

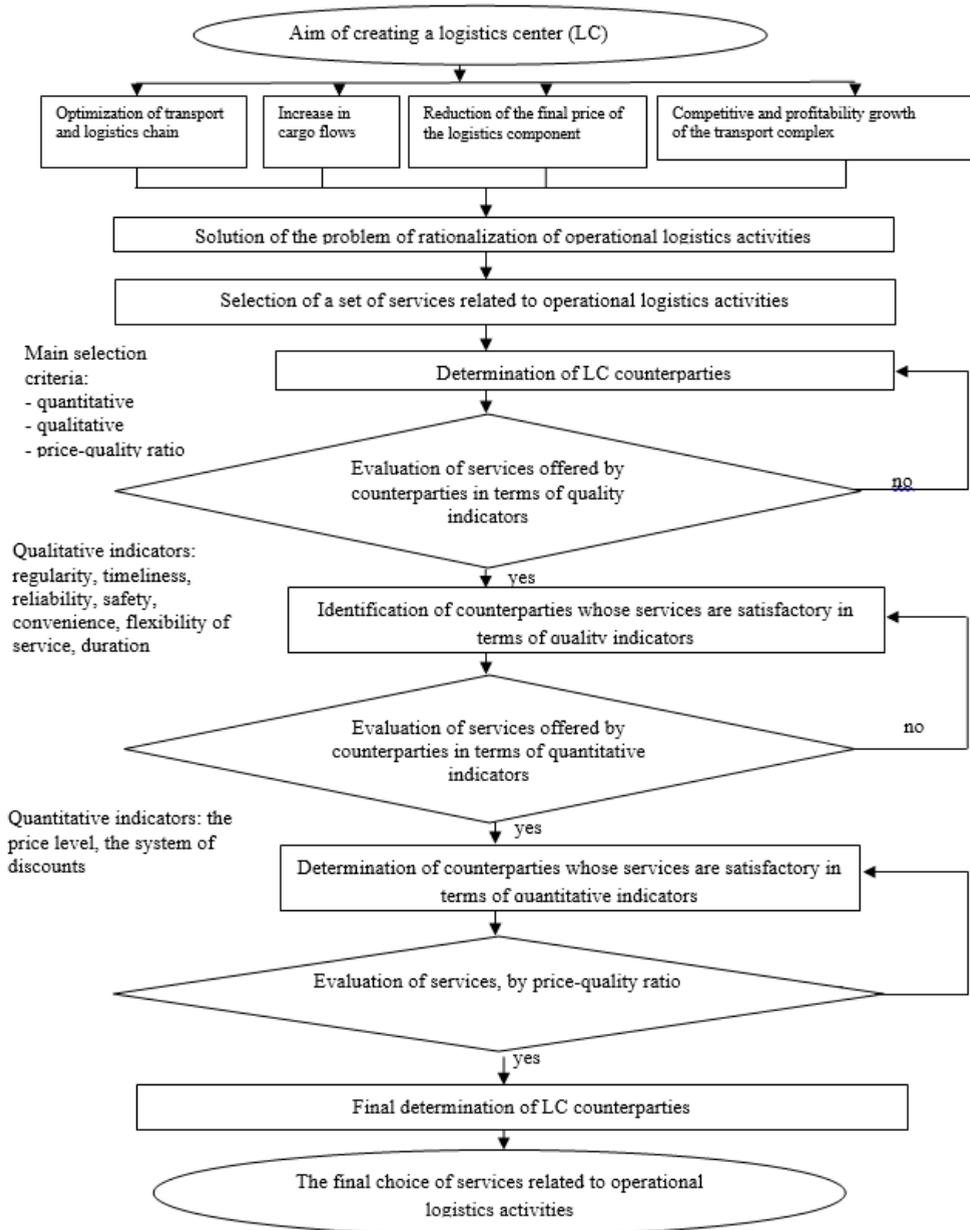


**Fig. 2.** Characteristics of the forms of logistic organization of transportations in rail-and-water service.

### 3 Results

Characterizing the organizational forms of interaction between rail and water transport leads to the conclusion that creating a logistics center makes interaction between rail and sea transport the most effective. Such effectiveness is achieved due to the following activity: firstly, the logistics center using control actions ensures the coordinated delivery of rail cars and ships to a certain time and for certain types and volumes of cargo. Secondly, it excludes the crowded approach of rail cars to the port, thereby reducing their queuing on approaches to the port stations. Third, the operational activities of the center are aimed at providing a wide range of services, including freight forwarding, warehousing, customs, insurance services, packaging services, consolidation, repackaging, subdivision of consignments [4].

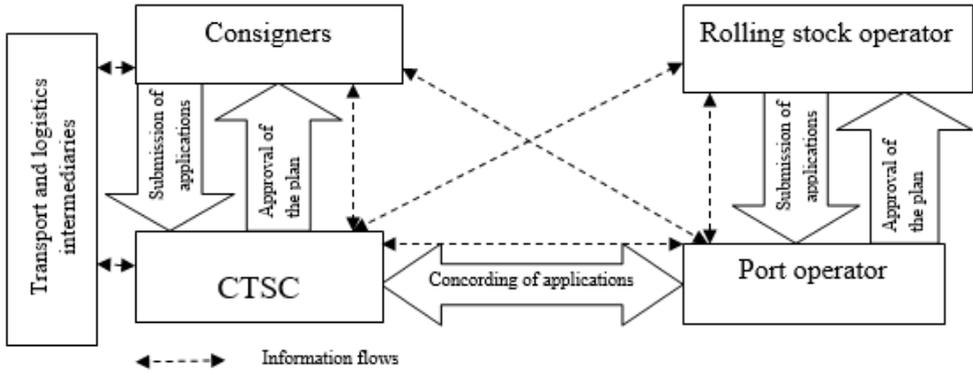
Based on the foregoing, an algorithm for managing the operational activities in the logistics center, presented in Fig. 3.



**Fig. 3.** Block scheme of the algorithm for managing operations in LC.

The operational management algorithm in the logistics center is based on the selection of services related to operational logistics activities related to the activities of counterparties, and contributing to regulating the process of interaction between rail and water transport for the qualitative and timely satisfaction of the consigner market demands.

Then the paper proposes a scheme of the interaction process between rail and water transport during management of operational activities for planning and organization in the field of cargo transportation [5]. The process of interaction is shown in the scheme form in Figure 4.



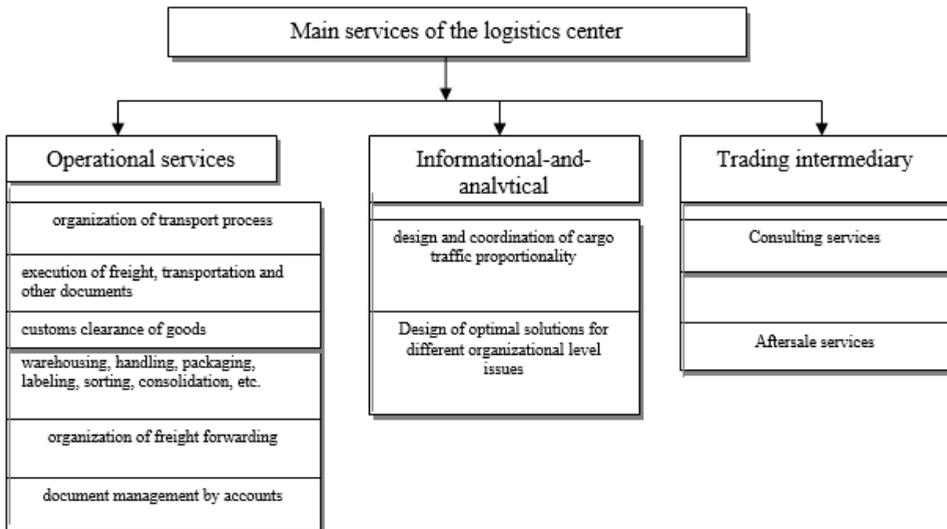
**Fig. 4.** Scheme of the process of interaction between rail and water transport in the process of planning and organization of multimodal transportation

The process of interaction includes the following key participants of the transport and logistics chain: CTSC (corporate transport service center), a port operator and a rolling stock operator.

Further, the weaknesses in the implementation of this process of interaction between rail and water transport are pointed out. It does not provide sufficient flexibility and accuracy in the organization of cargo flows, which leads to financial losses of participants in the supply chain.

From all above it follows that there is a need to improve the process of interaction between rail and water transport through the organization of the transport and logistics process based on a logistics center that will unilaterally coordinate interaction between all participants in the transport process when transporting products from the producer to the consumer [6].

To solve the practical problem of managing and improving operational logistics activities in the interaction of rail and water transport, the logistics center offers a range of the following services: operational, information-analytical, trade-intermediary and other services within the 3PL provider shown in Fig. 5.



**Fig. 5.** Set of services provided by the logistics center.

To solve the problem of creating a mechanism for managing flows in the interaction of rail and water transport, it is necessary to improve technologies in the field of managing the logistics operational activities of the transport complex. The technologies to be improved are aimed at creating a transport and logistics system based on a vertically integrated system of logistics centers, organized according to the principle of coverage of the activity territory: logistic centers of the federal level - logistics centers of regional level - logistic centers of territorial level [7, 8].

## 4 Conclusion

The purpose of the proposed mechanism based on the system of logistics centers is to obtain the maximum synergetic effect with a balanced, coordinated partner interaction of all contractors of the transport and logistics chain. When developing the flow management mechanism, the aims and functions of the logistics centers are defined that are focused on achieving the goal of the logistics system: the organization of high-quality cargo transportation (fast, safe, cheap), with the least expenses and most economic efficiency for all participants in the transport process [9].

The carried out research of logistical processes in transport and tendencies of cargo flows served as the basis for development of classification of logistical processes in transport. The proposed classification is recommended to be applied taking into account the completed features when forming the scheme for interaction between rail and water transport for better satisfaction of cargo owners in the organization of the transport and logistics chain. For a more detailed study of the processes of organizational interaction between rail and water transport, it is recommended to apply the proposed characteristic of the forms of logistics organization of transportations, supplemented with levels of detail and functional characteristics of classification. The application of the proposed model is possible in the logistics center activity, taking into account the specifics of the services provided and the functions performed in the logistics center to maximize added value for customers through the approved integrated participation of all counterparties in the process of management of material and related flows.

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