

LOGISTICAL RISKS OF MARITIME TRANSPORT PROCESSES

ЛОГИСТИЧЕСКИЕ РИСКИ МОРСКИХ ТРАНСПОРТНЫХ ПРОЦЕССОВ

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Abstract: Risk exists objectively in any marine enterprise, since the human presence of a person on the sea is accompanied both by circumstances caused by the irresistible forces of nature and directly by activities in the sphere of trading navigation. Risk management in the logistics supply chain is a complex multidimensional problem addressed in the process of identifying and assessing the risks and taking measures of protection against them.

In logistics, risk refers to the likelihood of an insured event occurring, as well as the possible damage caused by this event. Risk and an insured event can be described by using methods of the reliability theory. In this case, reliability is the probability of operation of the logistics system with failure or with no failure.

In order to identify rational methods and techniques for insurance, it is advisable to construe the logistics system as the process of movement of material resources.

KEY WORDS: RISK MANAGEMENT; SOURCES OF RISK; LOGISTICS SYSTEM RELIABILITY.

1. Introduction

An increase in cargo-turnover has been recently observed in water transport, the functioning of which is influenced by numerous factors of the external and internal environment and involves risks that arise at different stages of the logistical transport process. Risk exists objectively in any marine enterprise, since the human presence of a person on the sea is accompanied both by circumstances caused by the irresistible forces of nature and directly by activities in the sphere of trading navigation. Negative events can occur when a ship is in the sea or in a port, but risks also exist at the decision-making stage on the choice of sea traffic, freight rates, etc. Reliability of the carriage and, consequently, risks, while adhering to the logistical principles "just in time", "in a cost-effective manner" and "necessary qualities and quantities" become problematic issues. Accordingly, if the activities of transport as an object of increased danger were not subjected to various negative impacts, including risks, the transport component in the price of the goods, taking into account logistical technologies, could be significantly reduced.

Risk management in the logistics supply chain is a complex multidimensional problem addressed in the process of identifying and assessing the risks and taking measures of protection against them. As a result of its solution, it is possible to balance potential losses and benefits, avoid costly mistakes and ensure the stable operation of the logistics chains involving maritime transport.

Transport and logistical risks in the field of the carriage of goods by sea represent a combination of conditions and factors posing a real and potential threat (challenge, risk) to the sea logistics cargo supply chain. Unfortunately, at present, practical activities on revealing, identifying and assessing risks are not been expanded as they should be. At the same time, risk management and their minimization can be ensured on the basis of the logistical approaches, which allow fore diminishing the danger of choosing poor decision at the time of its adoption, as well as for mitigating the possible negative consequences of making decisions at the stage of their implementation.

The so-called "logistical" specification is considered as an important indicator of transport and logistical risks, that is, their

belonging to the specific types of flows, by means of which the links are established and implemented in the system. Moreover, the main components of the marine logistics supply chains will be the channels of trade, supplies, logistics and their corresponding information, financial and cargo flows.

2. Preconditions and means for resolving the problem

Researchers make distinction between four main sources of risk in the supply chain involving maritime transport:

- Environment (natural, regional-geographical factors, as well as terrorism threats);
- Regulatory and political sphere;
- Networking environment – interaction of the organizations in the supply chain (relationships between suppliers and customers, the influence of their problems on the counterparties);
- Internal (organization) environment (inadequate preparation of a ship and cargo for the carriage, defects in a ship and equipment, labor troubles, curtailment or stoppage of production by the supplier).

The least manageable risk factors arise in the environment and in the regulatory and political sphere. Natural factors are often combined with regional-geographical factors or are conditioned by the latter. For example, because of insufficient depth, the Georgian Black Sea ports are unable to receive tankers with tonnage larger than 130-150 thousand tons, the similar restrictions exist in many European ports; also, on busy routes of the intercontinental seas, the use of large tankers is undesirable from the environmental standpoint, since the probability of accidents in such water areas is considerably higher than on ocean voyages. More commonly, such factors can be controlled out only by way of operational and strategic adjustments in the shipping business itself.

The dangerous natural risks (risks of the sea itself and other natural disasters) are generally insured, but this does not solve the problem for the logistics system, since insurance only compensates for

losses once the timeliness and the quality of supply have already been violated. Therefore, risk management in the context of logistics should be oriented towards comprehensive control and prevention.

Another external source of risk is represented by the regulatory and policy decisions taken unilaterally, and which are beneficial to companies in one country or region. So, in order to ensure its own environmental safety, Turkey has set limits on the passage of the ships across the Bosphorus; in particular, tankers over 200 m long or the with dangerous types of cargo are permitted to pass through the straits only in daytime.

Consequences of such restrictions for transportation of Caspian oil and oil products from Georgian ports through these straits are unfavorable, especially considering that the volume of Caspian oil is expected to grow [1].

Risks caused by regulatory and political factors are generally not insurable, and their management tools should be methodologies for analyzing and reviewing the decisions, changes in business processes and structural changes that are carried out with the most efficient use of the competencies, knowledge and ties that the company has.

The phenomenology of the third ("networking") source of risk in the supply chain has been studied the least to date, despite its critical nature in creating the risk situations. The main problem is the complexity of risk assessment, since risk factors are rooted in the complex organizational and business interrelationships. Until recently, the issues of risk assessment and control in transport systems were addressed mostly in the context of individual organizations, but not in a systemic, "networking" context. Attention to this context is strengthened due to the following circumstances [2].

The increasing complexity of infrastructure and processes in transport logistics systems inevitably leads to a weakening of attention to their quality and control. In the maritime transport systems, the consequence of this the increased number of catastrophes with large damages and strengthened factors threatening life and health of people at sea.

In logistics, risk refers to the likelihood of an insured event occurring, as well as the possible damage caused by this event. Risk and an insured event can be described by using methods of the reliability theory. In this case, reliability is the probability of operation of the logistics system with failure or with no failure.

In general, insurance constitutes a justified system of ensuring the interests of natural or legal persons with a particular risk.

In order to identify rational methods and techniques for insurance, it is advisable to construe the logistics system as the process of movement of material resources in the spheres of production and circulation. Considering this, a logistics system would consist of two subsystems. These are:

- 1) Commercial subsystem, that is, the movement of material and financial flows in the spheres of circulation.
- 2) Production subsystem, that is physical movement or change of material and supplies immediately before receiving finished products in the production, and all kinds of logistics equipment (vehicles, transshipment machinery, etc.).

The commercial subsystem comprises the following operations or elements: procurement, sale, transportation, storage, production and information services and so on.

The production subsystem comprises the basic and support technological operations of the creation and movement of finished products. Multiplicity of links of the logistics system is what

creates the possibilities of failures. In a broader sense, these cases are called risks.

Multiplicity of links is also associated with the infinity of the logistics system, which can be measured by initial entropy

$$H = -\sum(p_i \log p_i + q_i \log q_i),$$

where n – number of operations of the logistics system or chain;

p_i – probability of failure-free performance, or reliability of operations to be carried out;

q_i – probability of failure, or risk of operations to be carried out;

The formula $p + q = 1$ shows that the logistics system is characterized by a high level of potential risks, which is significantly decreasing, first of all due to the reasonable management of material flows, or in order to maintain the minimum level of entropy for the purpose of influencing adequately on the operation of the logistics system.

Computer-aided management by highly qualified personnel can increase reliability of the logistics system and bring it closer to 1. Sound management requires a lot of information, which complies with the following condition

$$1 = H_{pr} - H_{cir} \quad \text{when } H_{cir} \rightarrow 0,$$

where H_{pr} and H_{cir} – are initial and final entropies. This circumstance defines information as a risk to eliminate or minimize the risk.

For the participants of logistics process, particularly for the suppliers (sellers), consumers (buyers), consignors and consignees, wholesale intermedia, transporters, etc. First of all, there is need for information on the situation existing in the market and in its separate segments, where the given logistical process is implemented. In addition, there is also need for current and predictable information on the specific situation of material flow.

At present, the seaports represent a set of disparate business entities (in fact, competitors) that do not have organizational unity and body coordinating their joint activities. Their uncoordinated actions result in decreasing the port's capacity. In this regard, a new logistics mechanism is needed that allows for coordinating the interests of all participants in the transport process, as well as the body that brings together their efforts [3].

3. Conclusion

The ability to manage the risks, that is, to reduce, compensate and prevent losses, is determined after identifying the nature of the risk of obtaining its quantitative and qualitative estimates. When assessing the risks, there are used several basic approaches and numerous methods [5].

According to the theoretical approach, the risk is calculated as follows:

- based on the logical reasonings, empirically - by extrapolating the past situations, and predicting them for the future;

- based on statistics - by studying statistics on losses, with establishing the frequency of the occurrence of the certain loss levels;

- expertly - based on the assessments and information received from experts;
- calculative-analytically - by constructing the loss probability distribution curve.

4. References

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