

# Information Technologies for Risk Management of Transportation – Logistics Branch of the “Russian Railways”

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**Abstract.** The increased competition between modes of transport, the growing uncertainty of the business environment, the diversity of goals of the business units of the holding "Russian Railways" and the participants of the transport market inevitably increase the level of risks that can threaten the efficient development of the company. The development of information technologies is the base of risk management and higher competitiveness. The growth in uncertainty and speed of changes in the business environment leads to the necessity of implementation of digital technologies for risk management, influencing the added value of transportation-logistic services.

## 1 Introduction

The part of the management treatment is to appreciate the risk management. The development of information technologies is the base of risk management and higher competitiveness. The growth in uncertainty and speed of changes in the business environment leads to the necessity of implementation of digital technologies for risk management, influencing the added value of transportation-logistic services.

Special application field of this management is in the transport sector. The increased competition between transport modes, the growing uncertainty of the business environment, the diversity of goals of the business holding "Russian Railways" and the subjects of the transport market inevitably increase the level of risks that can threaten the efficient development of the company.

## 2 Strategy of Risk Management

The functional strategy of risk management of the holding "Russian Railways" has formed the methodical and regulatory framework of the risk management system, provided for the beginning of a change in attitudes towards risks in the railway transport, which resulted in awareness and acceptance of risks in all types of activities. Increased competition between modes of transport, growing uncertainty of the business environment, the diversity of the goals of the business units of the Russian Railways Holding and participants in the transport market inevitably increases the level of risks that may threaten the effective development of the company. The development of information technologies in the holding formed knowledge bases about risks and their consequences, therefore the information available

in them allows to forecast various types of threats and manage risk factors that affect their consequences.

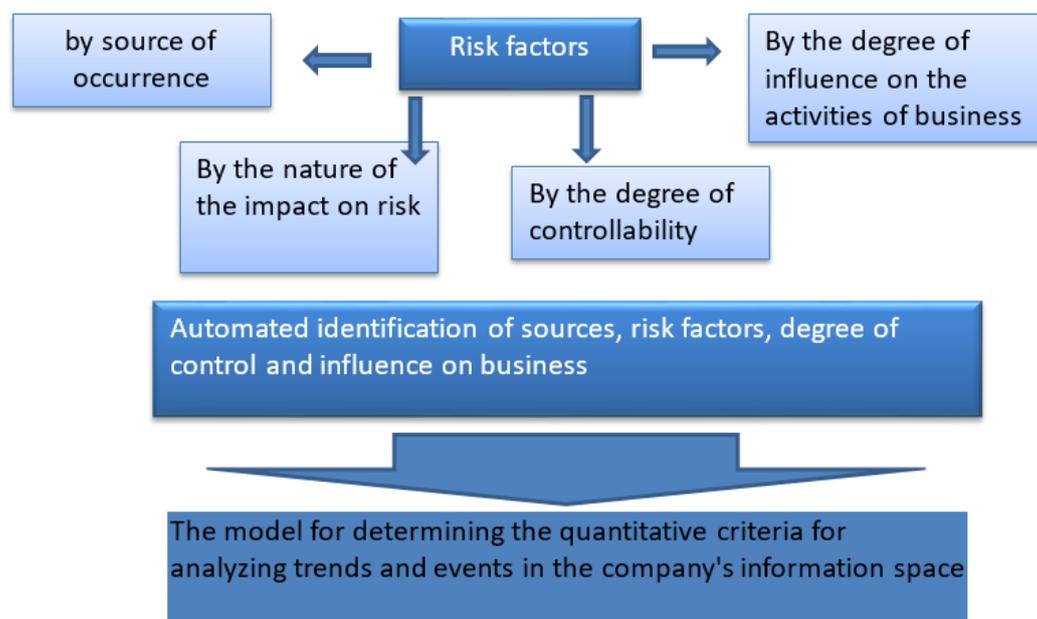
The interrelation of the main terms and definitions - "source of risk", "risk factor", "risk event" and "damage" form the logic of risk management. Sources of risk with a certain probability become risk factors, which in turn also with a certain probability can lead to risk-events, accompanied by damage. Such an approach to risk management dictates the need to formulate a list of sources of risk, group risk factors for each source, create a risk-event map and evaluate the damage for each risk event. Getting the maximum amount of meaningful information should curtail the sources of risk and reduce the likelihood of their becoming a risk factor. Management decisions should be aimed at reducing the likelihood of occurrence of a risk of events and the occurrence of damage.

## 3 Concept of Risk Management with use of Information Technologies

The proposed conceptual apparatus should be used both in the process of top-level risk management and in the standard information technology for risk management of business unit structural divisions involved in providing and providing transport and logistics services. To generate knowledge about risk factors, it is proposed to use the company's information resources, which allow them to predict risk factors aggregated by sources of risk, degree of control and degree of influence on business based on mathematical models of trend analysis and device and process characteristics (Fig. 1). Information technologies when creating functional risk management strategies for business blocks of a transport holding company can be used to solve the following tasks:

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- Formation of a register of typical risks (matrix of sources and risk factors).
- Establishment of quantitative values of risk assessment criteria (metrics).
- Assessment of the impact of identified risks on the target indicators of the business unit.
- Determination of the economic results of eliminating / reducing the consequences of the occurrence of events and incidents.
- Development of models for assessing the permissible level of risks for groups of typical risks.
- Monitoring of risks and activities for their identification and management, the structure of information support for the risk management system of the business unit.



**Figure 1.** Structuring of risk factors on the basis of information technology

In the development of information technology, risk management should consider the appropriateness of accounting for and identification of individual risk factors based on the cost assessment of the costs of monitoring and managing each type of risk. Otherwise, an uncontrollable set of factors and parameters fall into the sphere of risk management. The cost of risk is not only damage, but also the costs of monitoring sources and risk factors, the implementation of information technology for the risk management process, insurance and hedging activities.

The magnitude of the cost of risk, which the company is ready to neglect and not build a system for monitoring factors and sources, is determined by its risk appetite - the willingness to accept certain risks. However, for a transport company only the valuation is not enough, here the safety and reliability of the transportation process have priority, therefore the corresponding risks should be identified as the most critical or significant.

#### 4 Categorisation of Risks Management

Modern approaches to risk management consider risk not only as a threat, but also as a possibility, therefore information technologies for risk management should include processes of searching for new business prospects for the main activities in the business unit. Information technologies that support the risk management strategy and policy are an important tool for ensuring the safety and reliability of the transportation process, and a set of principles and methods built into the processes and organizational culture of the Company ensures sustainable development, performance of work and rendering services to customers with the least risks and losses high quality of service delivery

In 2015, Ernst & Young conducted a study of the best risk management practices of more than 1,000 companies around the world. This study showed that the key task of risk management is the creation of value added, as well as the formation of integrated solutions based on a preventive response to risks and improving

performance, which is impossible without the use of information technology.

For successful risk management it is proposed to divide them into three categories:

- strategic risks that must be taken, as they carry the possibility of obtaining benefits;
- avoidable risks, which should be avoided, as they have a negative impact;
- external risks that the organization does not control and that can negatively or positively influence the business.
- Identification and elimination of potential threats in the sphere of basic cargo transportation services are aimed at reducing damage or preventing the loss of financial and economic benefits of the Russian Railways holding, providing customer orientation, improving the quality of services, increasing the scale of the transport and logistics business, organizing effective interaction of business units in perimeter of the transport and logistics business block (Table 1).

## Conclusion

The main goals of the risk management system are higher efficiency of management system due to the managers' awareness of the company's risks, higher quality of business planning and activities indicators monitoring, compliance with the regulatory requirements (both external and internal). Achieving these aims provides for sustainable income and investment attractiveness of the company (lower costs of funds attraction).

Till lately the attention was focused on risks managed by control means but having no or little potential for added value. As the requirements of the parties concerned grow and the business environment constantly changes the leading organizations start to pay more attention to risks, which create added value.

**Table 1.** Register of risks of transport and logistics business.

Name of risk	Significant signs
Pre-completion	Is characterized by lower production output in industry and agriculture
Macroeconomic	Is connected with the changes in taxation system, inflation, changes in transportation tariffs and rates, national currency rate fluctuations
Competitive	Is expressed in the growth of commercial efforts of competitors and relative decline of competitiveness of transportation-logistic services of the company including high-profit sectors, as well as shift of freight transportation to other transport means
Technogenic and environmental	Is caused by external sources, independent of the company's activity
Productional	Is connected with the violation of agreed transportation conditions, violations of technological transportation process which lead to lower revenue than planned
Commercial	Expressed in the failure of the task of revenue from providing customers with additional services
Application form (Interactions with customers)	Non-fulfillment of applications in domestic and international communication, as a consequence, reduced loading
Staffing	Increased staff turnover, insufficient staffing, reduced competence
Operating	Mistakes and delays in transportation documents, violations of technological process of arranging the transportation services, not fulfilling the technical requirements of freight placement and fixing which leads to lower loading
Planning quality	Inaccurate loading forecast and freight base determination, thus lower revenue than planned
Financial	Not completing the plan of accrued revenue from transportation activities; Incomplete or delayed revenue return from transportation activities
Economic	Higher expenses due to increase of prices, insufficient managerial control of expenses elements
Managerial	Inefficient employment, arrangement and management of human resources, inefficient communications within the company
Technogenic	Is explained by internal factors (fire, disaster)
Reputational	Lower transportation services quality which leads to lower loading and lower revenue than planned

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