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The role of risk management of the logistic processes in economic development of the region

Risk is understood as the likelihood of damage or loss of income, the likelihood of which can be calculated. The probability of risk event is definable, therefore we can predict the onset of risky event and apply various methods of control to prevent it or at least to solve the problems resulted from it.

Determining the risk is associated with determining several elements of logistics systems and processes:

1. First, there are internal risks associated with intra-regional supply systems and processes related to self-sufficiency. Among the causes of these risks are:

– Reduction of the projected traffic volume (or capacity freight);

– The increase of cost of transport services (eg. to cover primary or secondary needs);

– Rising costs of fares and tax payments in the region's transport systems;

– Reduction in demand for transport services due to lower income of households and businesses in the region.

The risk of delays may result in breaching the supply contract by violating the basic conditions: the quantity, the quality and the delivery time.

In the area of commerce we can identify the risks associated with trade and transportation. Creation of an integrated system of transport and logistics in the region will reduce the level of risk, which is of great concern to all stakeholders, regardless of the method and cost of insurance.

Usually, uncertainty and risk may occur if such logistic terms as: "exactly in", "the lowest cost", "required quality" and "in required quantity" are used.

The model uncertainties were presented earlier in the form of Howard's cube, which is formed of three faces of uncertainty. In the case of uncertainty in logistics, the management should take into account more than three types of state conditions.

We are faced with multi-level classification of risk on the following grounds:

– on the basis of the type of the system (micro- and macrologistics risks);

– on the ground of logistics flow (risks associated with material, financial, information and personnel flow);

– on the ground of logistics operations or industrial logistics (procurement, transportation, manufacturing, distribution, warehousing, service).

Logistic function is related to logistics management risk associated with planning, organization management, control of logistics processes.

Macro- and micrologistics risks are associated with the risk of commercial nature, ie. with market fluctuations. As logistic system operates in the external environment of the market, all the risks are associated with changes, uncertainties and limitations of the infrastructure sector. Consequently, the more resistant is the regional logistic system to external changes, and the more flexible are its organizational units, the lower is the level of infrastructure risk.

These micrologistics risks include the risk of business competitors in field of logistics as well as the appearance of limitations in logistical structures of legislative nature and regulatory dependence on the activities of logistics partners. In particular, in macrologistics, there are risks of late delivery due to change of time of registration of documents for international transport and risks associated with legislative restrictions on transportation rules and customs clearance.

When classifying the risk by the type of logistics flow, we can distinguish the risks associated with material, financial, information and personnel flow. The risk of personnel flow it almost absent. On of the features of the logistics management area is to manage exactly this kind of flow.

The personnel flow is the flow of labor, characterized by the quantity and quality of the production facilities area. Personnel flow is controlled by the same principles of logistics management as other types of flows. Why is it necessary to manage the personnel flow? This is primarily due to the irregularity of intra- and inter-regional development, which generates the migration of labor resources. Over the past five years the flow of migration in Irkutsk region has increased by 16,5% and in 2009 population decreased by 6061 people (Table 1).

Tab. 1. Total results of migration in Irkutsk region

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Year	Number of arrivals			Number of departures			Migration growth (loss)		
	all	urban settlements	countryside	all	urban settlements	countryside	all	urban settlements	countryside
2004	40188	28752	11436	45390	34042	11348	−5202	−5290	88
2005	38350	26847	11503	43763	32836	10927	−5413	−5989	576
2006	37513	27462	10051	43562	32581	10981	−6049	−5119	−930
2007	37457	26920	10537	43143	32670	10473	−5686	−5750	64
2008	37328	27814	9514	41616	18086	14731	−4288	−3252	−1036
2009	29091	21182	7909	35152	26279	8873	−6061	−5097	−964

The flow of immigrants to Irkutsk region increases, since the territory is becoming steadily interesting not only in terms of finding a well-paid job, but also in terms of higher comfort for self-employment and liberal policy towards the migrating population. The actions of the local authorities can be seen as target-oriented on the effective use of human resources and management of personnel flow.

Today we cannot observe the presence of logistics approach to managing the flow of personnel in the CIS and foreign countries. We can only talk about an attempt to impose federal regulation on the migration process. And, in fact, the lack of management principles connected to the movement of labor creates a set of states uncertain about how to manage the area.

If you apply the principles of logistics management flow processes, it is generally possible to achieve the following results:

– the opportunity to monitor and analyze the volume and the direction of the flow;

– the possibility to control the flow of personnel and to eliminate the uneven distribution of manpower in some areas;

– organization of an effective movement of labor at work on rotational basis to carry out the effective transits of operations.

Logistical risks of the financial flow are associated primarily with the assessment of time required to receive the funds in the budget. On the one hand they are controlled by the process. On the other hand, they do not always coincide with the date of receipt which is required and designated. In result, it makes it harder to plan and forecast the income levels on the basis of non logistics principles.

Thus, the logistical risks in financial flows can also be divided into:

– risks arising from the shortfall (excess) funds in the budget (quantitative forecast risk);

– risks of the delayed receipt of funds in the budget and the accounts of the municipal organizations (risk time).

Risk classification for the logistics industry in the context of the territory involves the allocation of such risks as:

1. Supply risk (contract) – associated with the uncertainties that arise during the application process and implementation of procurement operations. At present, ongoing procurement processes in form of tender can reduce this risk. However, in practice of tendering, the efficiency of contract may be questioned, especially when it comes to service quality and punctuality which have to be constantly monitored .

2. Production risk – associated with the process of moving, handling of material resources among enterprises of the region, as well as with decision-making process in the formation of industrial infrastructure in the region. Reducing the risk in making logistical decisions is based on the method of ABC and XYZ-analysis of the spatial structure of production.

3. Transportation risks in the logistics sector – characterized by the probability of losses associated with the production of transportation and logistics services and the possibility of unmet demand for transport and logistics services, undertaken by the territorial transport structures.

Among the important factors of regional transportation risks there are:

– reduction of the projected capacity of freight transport system in the region;

– reduction of the projected realizable transport services;

– the rising cost of fuel, spare parts, machines and materials;

– an increase in payrolls and tax payments in transportation sector in the region;

– the dangers connected to transport;

– customs risks arising in the process of international traffic and measured with the loss of profit due to not accomplishing the conditions of the time of the transaction.

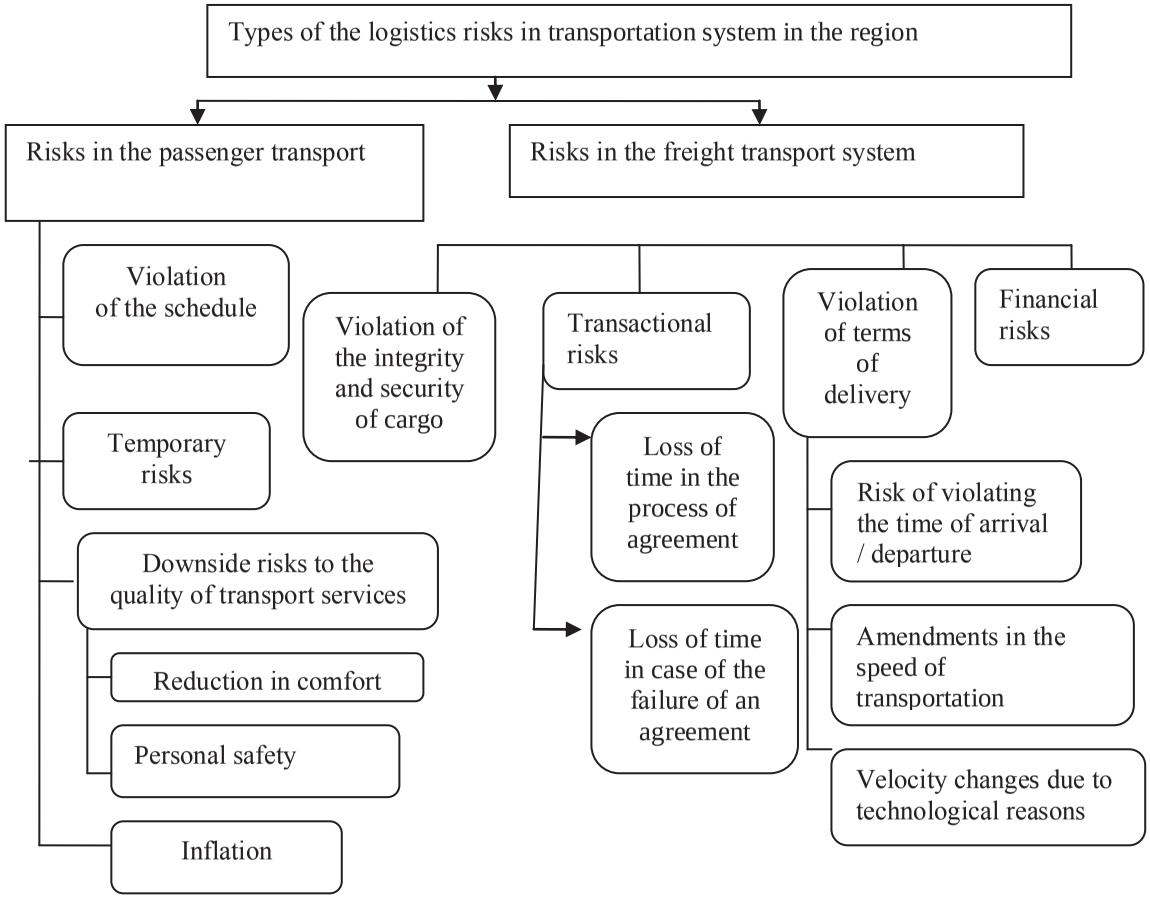

Fig. 1. The scheme of the logistics risks in transportation system by the types of transport services (by O.A. Freydman)

There are also the risks connected to storage systems in the region as well as the risks of the warehouse systems – associated with inability of the system to receive, store and transfer the necessary amounts of material resources on time.

Storage risks may also cause the economic loss because of the scarcity or underutilization of storage space.

The risks arising in the warehouse system of the region can be divided into:

– the risk of economic losses (costs);

– information storage risks arising due to inconsistencies in the recorded accumulation of stock or stock value;

– the transaction risks associated with time spent on searching for goods in warehousing system and time spent on procedures necessary to prepare and issue the stock.

Organization of the effective functioning of the subjects of storage systems in the region and increasing its power and portability, can visibly reduce the risks connected to the regional logistics management subsystems: production, distribution and transport.

Currently, the strategy of city-logistics has been developed to improve storage and transport systems in the region, based on the German experience. It is assumed that an increase in supply service storage systems will have beneficial impact on domestic and inter-regional trade.

Today, many large cities feel a surplus of warehouse space, which reduces their effectiveness. For example, the percentage of free storage space in St. Petersburg in 2009 was up to 22,3% (ie. 333.3 square meters). According to consulting firm Jones Lang LaSalle: "…in late 2009 warehouse real estate market remained passive, while the demand for quality stocks – low. Despite this, in the 4th quarter a few deals were made, which by the end of the year resulted in 30 thousand square meters of free warehouse space". It is noted that by the end of 2009 the volume of high quality warehouse deals rose by 10 thousand square meters to 1.494 million square meters. It is associated with the reduction in rental rates in the first half of 2009 from 100−115 $ per square meter/year to 80−90 $ per square meter/year.

The network of distribution warehouses in Russia is uneven, which does not allow for effective promotion of resources – for example, the Asian part of Russia suffers from a shortage of storage systems. There are even less terminal warehouse facilities, regarding the transport systems in the region. Due to that fact, nowadays it is most effective to create business parks near transport infrastructure, which will make the freight transport dominant.

For instance, in Irkutsk the basic terminal and warehouse complex is adjacent to the railway infrastructure. The new center will deal with freight between Europe and Asia-Pacific – the area under construction designed for the warehouse complex alone will have up to 3,400 square meters, the heavy ground under the canopy will have 3,700 square meters and the area for parking the motor vehicles – 1,000 square meters.

The risks connected to this project can be predicted and managed and some steps can be taken to reduce risk. At the stage of decision-making process the level of risk and the ways to reduce it should be assessed.

The theory of logistics management urges to consider reduction of logistics risks in decision-making process related to the operation of transport and logistic systems in the region.

Referring to this theory, we can notice the differentiation of risk areas on various risk levels:

1. The middle degree of regional logistic risk – meaning the zone in which all costs of transportation process within and outside the region are covered by the expected level of profit from selling transportation and storage services on the basis of enterprise-producers and intermediaries transportation process. In this zone not only pure logistics risk can occur, but also the risk of financial property that is associated with disruption of the payment system.

2. Critical risk – the possibility of losses exceeding the expected profits, which may lead to the loss of the amount of costs and profits (ie. all money connected to production activities).

3. Catastrofic risk – the loss in its size exceeds the critical level and may reach a value equal to the value of enterprises, properties and service providers in logistics. The manifestation of these types of risks not only leads to the decrease in overall performance of the logistic system of the region, but also to the emergence of multiple commercial and financial risks.

In the system of regional and interregional exchange, the best classified risks (by types) are those of transport services. The provision of services in the freight transport system is essential in terms of the organization of handling, logistics services and processes as well as the distribution of material flow.

This fact allows us to identify risks in terms of material, financial and information flow in the region. The risks in travel industry are associated with the regulation of the flow of labor resources (ie. human resources) and with the financial flow. The consequences arising out of risky situations, constitute a zone of any of the three risks. In the transport and logistics system in the region, depending on the value (level) of each of the violations listed above, risks can enter the system's permissible or catastrophic zone. Group of risks that arise in the passenger traffic, concern things such as the time of arrival of personnel at workplaces, or the departure for a journey to rest. Those are most often associated with losses of time and comfort.

Considering this group of risks from a regulatory perspective of the streaming process in time, we must first evaluate the adequacy of the group of criteria. The research conducted on the municipal public transport of the suburban railway communication showed that the predominant factors for choosing the transport are:

– the duration of travel (minimum time);

– the convenient location of departure and arrival points;

– the comfort (availability of seating places, or ability to travel in comfortable temperature);

– the safety of travel (in terms of accidents and the protection of personal safety)

According to Figure 1 and considering the risks mentioned above we can expect:

– the damage to businesses due to the late arrivals, violation of schedule and lack of alternative ways to travel, which may result in reducing the rate of transport of passengers

– the moral hazards associated with the emergency situations in transport

Thus, a system of criteria determining the risk situations may include:

1. Availability of alternative transportation options of passengers. The lower the risk, the greater the number of transportation options;

2. The number of accidents on the route of the passengers;

3. Criterion for severity of the accident, expressed in number of cases of the injured;

4. Criterion for the cost of compensation for the damage resulted from a risky situation.

The matter of finding the risk situation is associated with forecasting the onset of the risk event, for which you must identify the particular risks of the research process in the logistic supply chain and logistic management of risks. Both issues are related to organizing the research of the logistics risks. The procedure to detect them determines the level of risk.

Consideration of risk management in the freight transport system is quite extensive. Russian and foreign scientists see two ways of managing these categories of risks: risk reduction (prevention) and risk insurance (eliminating the consequences). Increased risks in the international multimodal transport reduce the effectiveness of the transaction which affects net export. Thus, the path of the cargo insurance, is not efficient enough in terms of economic growth of the territory of the sender. Much more effective would be to prevent the risk situations. The author of this article offers a method of limiting risk, which refers to the first approach, ie. the prevention of risks in transport and logistics system in the region.

Limiting the logistic risk applies in cases where there is the possibility of determining the maximum permissible limits of risk. Defining the boundaries of risk can be differentiated with the respect to the control of the object. More detailed methods for limiting the risk are presented in the table below:

Diversification of risk in investing in logistics facilities and operations, implies a risk calculations for the construction of logistics facilities, or co-financing the activities of logistics operators. In addition, the diversification of risks in the logistics activity involves the choice between the types of logistic activities.

From our point of view, to diversify the risks we must take into account such indicators of the system as:

– the speed of implementation of logistics operations by the type of operations;

– the level of competition in the logistics market (on regional level);

– the density of transport networks in the region (the ability to implement changes in transportation services);

– average income level of logistics operators in the market funding.

Another activity is to focus on the average rate of profit in the implementation of logistics operations.

This type of risk reduction is planned due to the nature of the system of logistics operators. The target itself is that the basic area of operation must be precisely for transport and logistics operations. Modern consulting agencies in the field of logistics processes indicate that with proper optimization of resources, logistics companies can achieve the increase in profits by 10−15%. The «competent optimization» term refers to an initial study of logistics processes about losses from risks during storage and transportation. If we consider this direction in terms of territorial risk, determining its level can be achieved by summing up all the territorial losses of companies carrying out transactions for the purchase and distribution of material resources.

Considering the risks within the logistics systems, we may note the following:

– risk management in the logistics management area may have two basic directions: of risk coverage through the insurance system and reducing risk through a system of preventive management measures;

– in relation to the management of logistics risk area of investment it is necessary to consider the aspects of regional logistics facilities, the management of the time flow

Tab. 2. The methods for limiting risk in logistic management (by O.A. Freidman)

Types of transport and logistics risks	Basis of risk limiting	Boundaries limiting the risk	Index
Risks in the passenger transport			
Disorders in schedules of transportation	Time delay	Determined on the basis of appropriate waiting times	Minimum time delay, the average for all routes in the region
Risk of compromising the quality of transport services	The level of service	Determines the interval in which passengers recognize the level of acceptable service	Integrated index of the number of logistics and marketing operations
Inflation	Don't limit, since the risk is of macroeconomic nature		
Risks in the freight transport system			
Transactional terms of the transaction processing	Period of negotiating transactions	Due to the legal basis for states in which the deal is implemented	The term of the transaction
Violation of terms of delivery	Delivery under the contract	Negotiated extra time for delivery in the event of force majeure, or manifestations of factors affecting the magnitude of risk	An additional period of delivery
Financial risks associated with investing in the construction of logistics facilities and services of logistics structures	The volume of investments	Losses from lost profits	The maximum loss from investing in the lost income

of logistics processes as well as the costs of performing logistics operations in the area of international and interregional transport;

– there is a need to create a centralized risk management system in the territory, which would allow it to monitor different types of risk in the logistic infrastructure of the region – for the risk management within the logistics infrastructure of the region, a unified set of criteria for risk assessment should be developed.

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The role of risk management of the logistic processes in economic development of the region

The development of market structures occurs in conditions of uncertainty and risk, which is reflected in the activities of all stakeholders of transport and logistics system in the region. If we understand how the risk of loss or reduced income occurs, we can calculate the likelihood of it. Most important in this regard is risk prediction, since its probability can be determined, and due to the forecasts the management of territorial risks can be developed.

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