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RISK MANAGEMENT OF INNOVATIVE SOCIALLY SIGNIFICANT PROJECTS (ON THE EXAMPLE OF URBAN PASSENGER TRANSPORT)

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ABSTRACT

The scientific novelty of the obtained results is the systematization of the theoretical basis for determining the features of risk management of projects of social importance in the field of urban passenger transport. A matrix of qualitative criteria for evaluating the social project has been drawn up, which will allow ranking the risks by the degree of significance. The most important elements of novelty in the scientific work are systematized scheme of the selection of risk assessment criteria in the form of a matrix; formed a model of risk management in the life cycle of a social project; a mathematical approach for determining the weight of risk is proposed.

The theoretical basis of the risk management process for socially significant urban passenger transport projects provides further opportunities for research and development of methodological tools.

Keywords: Aspect-Risk Factors, Innovations, Risk management, Smart Metering System, Socially Significant Projects, Urban Passenger Transport

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1. INTRODUCTION

As shown by previous studies of the authors, the urban transport industry is a strategically important link for the economic development of the country and its regions [1-2]. Any projects are associated with risks, so there is a question of effectively managing them to minimize their negative effects, which explains the relevance of this study. However, there is still a low level of customer service, insufficient use of available transit potential and favourable geographical location of the country. Mass motorization of the population is becoming an alternative to public transport, creating a new lifestyle and providing mobility for the population. The introduction of an automated accounting system for public passenger transport is a prerequisite for Ukraine's transition to providing quality services to the population at the European level. Creating and managing socially significant projects leads to sustainable urban development and enhances social development [3-5].

Any projects are associated with risks [6-8], so the question arises of the effective management of them in order to minimize their negative effects, which explains the relevance of this study.

2. LITERATURE REVIEW ON THE MANAGEMENT OF SOCIALLY SIGNIFICANT PROJECTS

Many scientists have dealt with project management issues, both from the technical side of the phenomenon [9-17] and the economic [4-6] and social [18]. However, we believe it is important to focus on the nature of the project to be managed. So let's take a closer look at what scientists think about urban passenger transport project management. The scientific opinion of foreign scientists is clearly demonstrated by a team of authors from Germany, Saudi Arabia, Romania, France and the United Kingdom [19-20]. A key element in the transformation of society is the rethinking of cities as smart cities, which includes the development of intelligent transport systems as the main service that all other services rely on. The authors call this the Intelligent Transport System (ITS) and propose to install in the future as a stand-alone system that will meet all the different requirements and provide high reliability of the overall system. A group of scientists from Spain demonstrated [21] how to model and implement a Smart Transport System that facilitates interconnection between people and transport providers. A large-scale study in her doctoral thesis was conducted by Paula Fraga-Lamas [22]. The main objective was to assess the feasibility of applying new technologies around the three key infrastructure sectors, including transport. The greatest practical value for the project is contained in Section 3, which provides a detailed overview of the most common weaknesses and risks and presents a new methodology to facilitate their identification and mitigation. The methodology was tested in the transport scenario. Scientists from the Philippines [23] have published a concept paper for the effective management of the transport situation, based on the Smart Transport System (STS). The proposed solution is the use of contactless cards, installation of Smart Bus peripherals, smart bus terminals.

However, the implementation of such a system contributes to the following risks: refusal of route taxis to participate; rejection of innovative changes by the population, especially by

some groups of people: privileged persons and pensioners; misuse of local budget funds through transportation of privileged categories of citizens from other cities, etc.

3. SUMMARY AND CONTENT OF PROJECT RISK MANAGEMENT OF SOCIAL VALUE

Social projects are designed to solve specific social problems by changing social situations. The main goal of social projects is to bring benefits to society, that is, to create positive social effects. It is important to remember that despite the importance of social impact, social projects are investments, so there is a need to study all the possible risks of a project in detail.

Risk is the potential threat of losing some of its resources, under-revenue or the emergence of additional costs, or the possibility of obtaining significant benefits (income) as a result of doing business under uncertainty [6]. *Risk management* is a special type of activity aimed at mitigating the impact of risk on the performance of an enterprise, firm or company. The most important decisions that an entrepreneur has to make are determined by what level of risk is acceptable to the enterprise [7].

The management of socially significant projects enables the quality implementation of the project and the projection of its consequences for the social system as a whole. The need for proper management of such projects is associated with the high likelihood of negative impact of social innovations that can cause unexpected social reactions or minimize the positive social impact of the project.

Given that it is not possible to eliminate or limit the consequences of all possible threats, the implementation of projects is subject to acceptable risky potential adverse events.

Risk management requires consistent steps that include:

- identifying and setting risk parameters (first understand where the link is in the problem area, i.e. find weaknesses);
- establishing a management apparatus that will help develop an action plan to minimize or eliminate risk;
- risk assessment through the use of specific tools and methodological approaches (qualitative and quantitative assessment);
- developing an action plan is to implement those plans and activities that are constantly adapting to the changing environment (situation modelling).

Qualitative risk management from project development to implementation enhances the ability to achieve project goals, minimizes costs and increases the positive impact of implementation.

4. SOCIAL EFFECT OF IMPLEMENTATION OF THE E-TICKET IN URBAN PASSENGER TRANSPORT

Public transport of the city is an essential element of the city life, its purpose – timely, high quality and full satisfaction of the needs of consumers of passenger transport. The quality of public passenger transport services can have a major impact on transportation safety. Improving the quality of passenger transportation is one of the most important areas of development of the city's transport system.

Improving the quality of transport services also includes the automation of payment for travel, which is the next step in the development of the level of passenger transport services and a new approach to the organization of passenger transportation. Payment automation makes it possible to translate travel payments into a non-cash form, which will minimize the corruption component of transportation services.

Ukraine is increasingly supporting the global trend of smart-city development. One of the important components of a "smart" city is "smart" transportation with the convenient and technological fare, which is beneficial to both the city as a whole and to every passenger [1]. Annually in Ukraine, there are more than 5 billion regular trips in all modes of transport, but there are still many problems (Fig. 1).

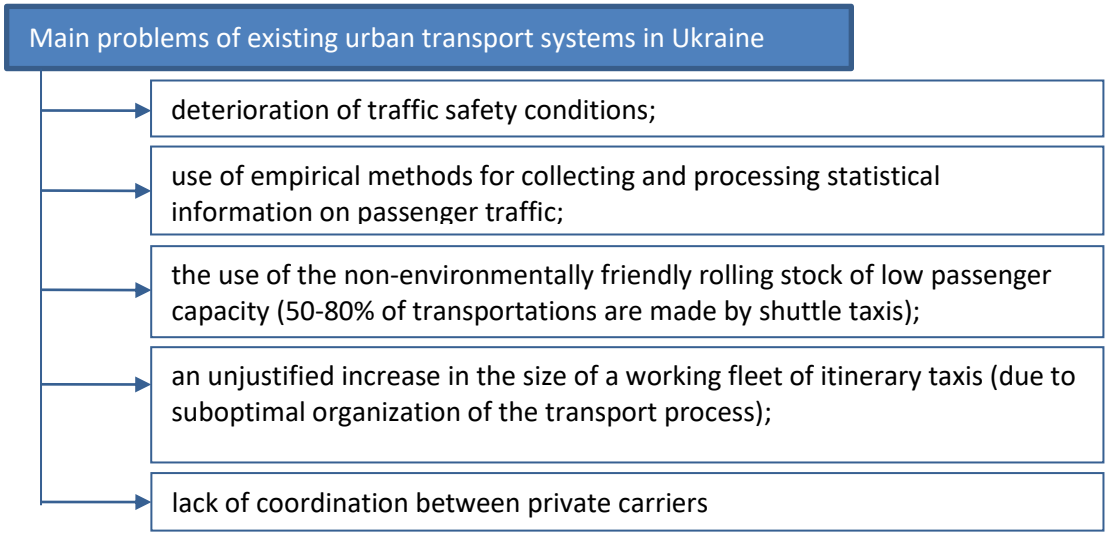

Figure 1 Main problems of existing urban transport systems in Ukraine

The emergence of an electronic ticket was influenced by two factors: the first is the need to issue a physical ticket for travel. The new law solved this dilemma; it gave the city authorities the right to determine the electronic ticket form factor for themselves. The second aspect is the requirement for the fiscalisation of payments. Mandatory fiscalisation of tolls obliges process participants to equip each transport warehouse with numerous fiscal modules, which is an expensive procedure. It still remains a major barrier to the widespread use of an open model of payment by bank card. And with such an e-ticket model, it has great potential: it not only allows you to conveniently pay for transportation with a card issued by any bank in the world, but it also enables the prospect of addressing benefits on the map of different social groups in the future.

Consequently, the introduction of an automated metering system for urban passenger transport is a very important step in improving the livelihoods of modern metropolitan areas. Not only comfort but also extreme safety and minimizing the impact of negative factors. The system should take into account the needs of people with disabilities and integrate with emergency systems. Available information systems make the tourist flow attractive in certain areas.

World practice shows that the most efficient and viable start-up system is when the automated fare system is under one operator, which organizes ticket sales, accumulation and revenue accounting, and other operations related to transport tickets. However, it is not possible to increase the profitability of revenue collection without optimizing cash flow operating expenses. At the same time, it is essential to improve the quality and accessibility of the ticket service. The work of a cashier is associated with all the risks associated with the human factor: errors, fraud, loss of productivity, etc. Introducing a self-service ticket sales system is a necessary requirement for any efficient public passenger transport system.

The introduction of the smart metering system offers a number of benefits for the carrier, city and passengers (Table 1).

Table 1 Advantages of introducing a smart metering system

For Carrier	For City	For Passengers
reducing operating costs for organizing and controlling revenue collection;	increasing the profitability of urban transport and, as a consequence, reducing budget financing for transport;	payment system of transport services European level;
improving economic performance;	an established system of passenger transportation;	comfort and convenience in payment of the fare;
receipt by the carrier of advances for the travel service;	preferential e-tickets can be focused and divided into passenger categories (students, seniors, veterans, employees, etc.); time (discounts for travel at non-peak hours); zones and territories;	ease of use of electronic tickets; the possibility of providing a system of discounts (applies to passengers of all categories); the possibility of personalization of electronic tickets.
reduction of costs for issuance and circulation of travel tickets due to the longer contact card service life (up to 8 years);	the possibility of improving passenger service, increasing the prestige of city authorities;	the prospect of the possibility of using a single ticket for different modes of transport;
the possibility of attracting additional funds for the conversion of vehicles.	the ability to manage passenger traffic during emergencies (the need for this was proven by the COVID-19 epidemic)	improving the quality of service due to the information provided by the system (information boards in transport, at stops, interchanges; by telephone, via the Internet and in print).

The successful organization of the process of managing urban passenger transport will ensure a positive social effect for consumers and complete satisfaction of their needs.

5. MODEL OF RISK MANAGEMENT IN THE SOCIAL PROJECT LIFE CYCLE: IDENTIFICATION OF ASPECT-RISK FACTORS IN THE PROJECT OF IMPLEMENTATION OF THE SMART-ACCOUNTING SYSTEM IN URBAN PASSENGER TRANSPORT OF USE

Because social value projects are most often integrated into the human environment, the risk assessment of such projects usually generates risk factors that, in conventional investment projects, have little or no impact on the implementation of the project in some cases. Among the important factors that can cause risky events in social projects are the following:

- the impact of government agencies and complex procedures related to the integration of infrastructure into a single space;
- public mood;
- the inability of municipalities to finance such projects;
- close attention to the audit of enterprises implementing government financing projects.

Risk management in the context of the project is undertaken to increase the likelihood and impact of positive events, as well as to reduce the likelihood and impact of negative events within the project. For effective project risk management, a project risk management model is proposed at each stage of the process, which will allow taking into account the risks that may arise in the case of an incorrect decision (Fig. 2).

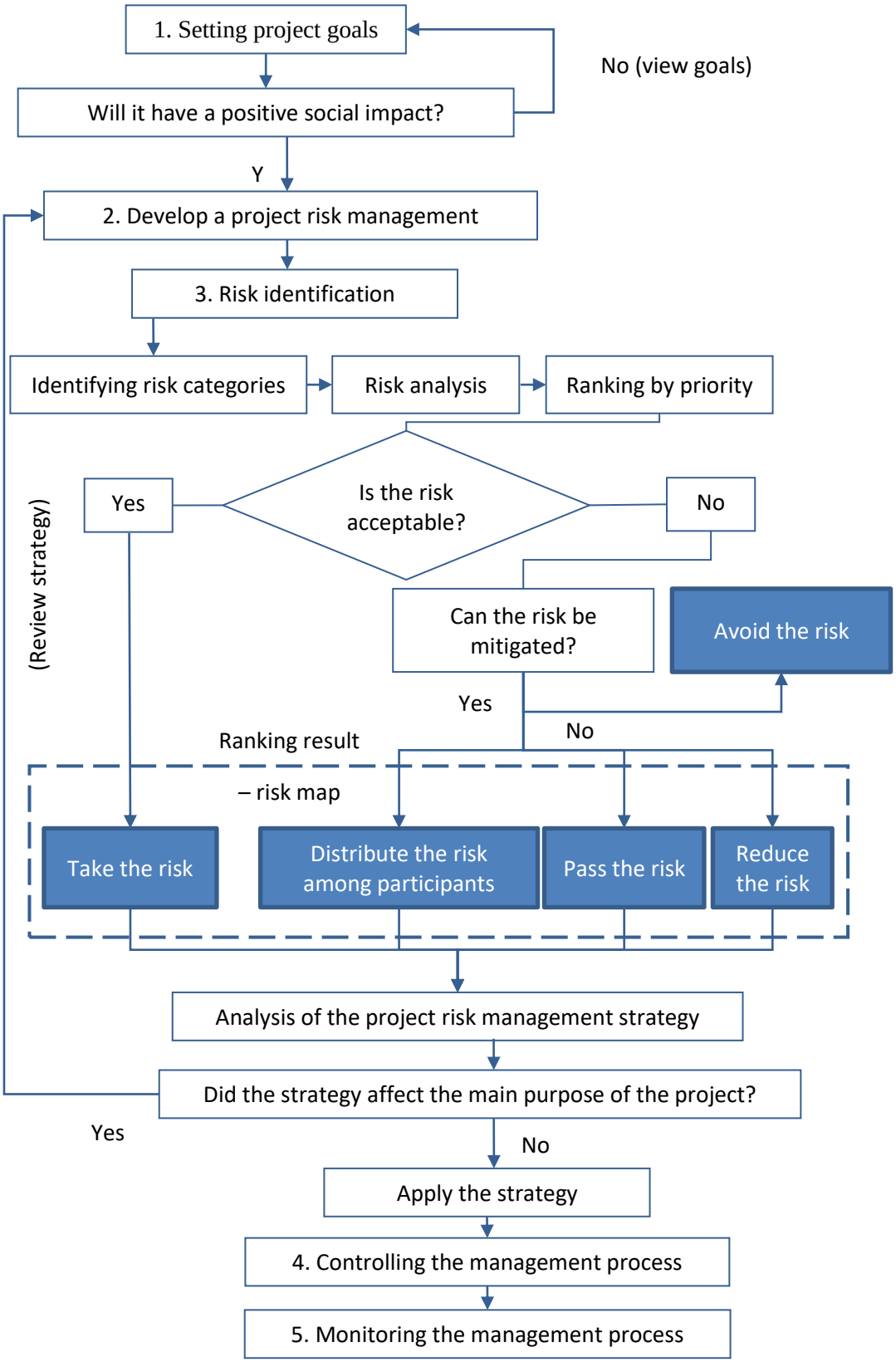

Figure 2 Model of risk management in the life cycle of a social project

Implementation of management at each stage and proper definition of project goals will significantly reduce the level of disorientation of the project process. The main risks of a

project are identified initially, so a detailed plan of action should be provided to eliminate them, whether the risks are further monitored or have not affected the further implementation of the project.

Project risk management allows to identify and prioritize risks before they occur and to provide action-oriented information to project managers. This model will help control risks throughout the implementation cycle.

In view of the above, the following scheme of qualitative risk assessment of the project is proposed (Table 2).

Table 2 Matrix for determining the degree of significance of risk by qualitative criteria

Degree of significance		**Consequences of risk**				
		Normal influence	**Minor impact**	**Moderately slight impact**	**significant consequences**	**Catastrophic**
Probability	Exceptional	Low	Low	Moderate	High	High
	Unlikely	Low	Low	Moderate	High	Very high
	Moderate	Low	Moderate	High	Very high	Very high
	Probably	Moderate	High	High	Very high	Extra high
	Most likely	Moderate	High	Very high	Extra high	Extra high

For the sake of fair identification, there is a need to formulate a mathematical approach to identifying risks and their significance. Significance is determined by specially selected experts. According to the results of the assessment, each risk is identified by the criteria of the matrix. The value of risk is calculated by the following formula:

$$R = \sum_{i=1}^{n} w_i * b_i, \quad (1)$$

where R – the risk indicator according to the general criteria; w_i – the importance of this criterion; b_i – basic risk assessment; n – the number of risk criteria; i – the quantity criterion.

Using a mathematical approach to determining risk assessments allows you to take into account unexpected situations throughout the project life cycle, as well as to find an information base to mitigate adverse events. The proposed approach will reveal the effect of each risk on the project. Each risk is assigned a qualitative criterion; it is possible to formalize the results with the help of a point system, that is, to assign each risk a certain score and to map a risk, the results of which will help to determine the directions of the risk management strategy.

Identification of Aspect-Risk Factors in the Project of Implementation of the Smart Metering System in Urban Public Passenger Transport

The risk management system in the project of introduction of the smart metering system in urban public passenger transport is characterized by the levels of project implementation management: strategic level and project implementation programs. The strategy defines a plan for the development of an integrated transport system in the medium term. Risk management policies and project budgets are designed to be consistent with the Strategy. An important element of management is to determine risk exposure both at the system level and at the specific project level. Risk Propensity (RP) means, in the broadest sense, all the provisions, policies, procedures, controls and systems through which risk propensity is defined, reported and monitored, as required by national and European regulators. In particular, the general concept of risk aversion is reflected in the Declaration of Risk Propensity (hereinafter referred to as the DRP).

The DRP determines the level and types of risk that a municipal authority is prepared to accept or which it is prepared to avoid in order to achieve its business objectives.

The risk appetite statement includes qualitative and quantitative indicators and measures on capital, risk, system and project liquidity and other relevant measures.

The DRP is closely linked to other structural processes, in particular, the development of a risk management strategy and budgetary process for the implementation of a smart metering system in public passenger transport, the assessment of the materiality of risk factors and the development of a risk management roadmap.

The DRP focuses on a common strategy and provides supervisors and leaders with a common structure and benchmarks to discuss, understand and evaluate the types and levels of risk the system is prepared to take. The risk propensity statement contains the key predicted indicators and what the system deems necessary to determine the risk propensity. The Risk Declaration covers the full range of risk types, namely financial, market, operational, liquidity and compliance risks, and identifies key risk indicators (those that have a significant impact on project implementation within a multi-project environment) and other limits and thresholds values (those that have little impact on the project objectives).

The DRP should identify risk aversion, acceptable risk level and risk-taking ability. Risk Appetite is the level of risk that a system is willing to take to achieve its strategic goals, in line with its financial resources and limited resources (liquidity, solvency, etc.). Risk Tolerance is a budget indicator for municipal institutions for which such a rate is set or less dependent on the state's approval of the institution's justification. Risk Capacity is the maximum level of risk that a system is able to take on given its current resources without violating regulatory capital constraints and liquidity needs. Meets the minimum regulatory level of Tier 1 capital and liquidity under the results of stress testing, which is lower than the limits approved by the lender financing the project. The DRP is reviewed and approved annually (or more frequently in the case of changes) and submitted to the Supervisory Board for approval. Risk exposure is monitored on a regular basis (usually quarterly) within the framework of the Risk Appetite Report (RAR). The RAR is a regular report to the relevant decision-making body on the level of risk aversion (during the reporting period) against the DRP. RAR is reviewed by the supervisor and the mini-governmental body to monitor the level of project propensity to take risks and to ensure that effective and comprehensive action plans for the deteriorating indicators (if necessary) of the approved SDR are available.

The following colour scale is proposed to report project risk exposure within a particular system:

- green (risk aversion level) – usually shows the level of risk in the budget, which is related both to macroeconomic indicators (e.g. dollar exchange rate, inflation rate, etc.) and to the financing of a specific project (since projects of this level are financed from the state budget);
- yellow – acceptable level of risk;
- red (risk-taking ability) – indicate the need to inform management and prepare corrective actions/action plans.

The risk management strategy defines the approved CRG (Risk Committee Committee) limits, maximum values, operating limits and other restrictions established by the Project Management Department or the Treasury (in an operational context). In addition, the strategy describes the mechanism of risk management and control, delegation, and the current risk profile across business segments.

The risk management strategy defines:

- target markets and their general characteristics;
- target financing areas by economic sectors, geographical regions, currencies;
- general eligibility criteria for project implementation;
- principles of risk management, with tools for assessing the degree of influence of a particular factor on the level of risk of the project.

Risk management policy defines the main goals and objectives, as well as the risk management system, the main approaches and methods of its implementation. The policy objective is to outline the general principles of risk management.

In Fig. 3 presents a modern conceptual scheme (model) for risk management, based on the identification, assessment and monitoring, as well as risk mitigation measures, including selected steps, with appropriate actions that are appropriate for each of these steps.

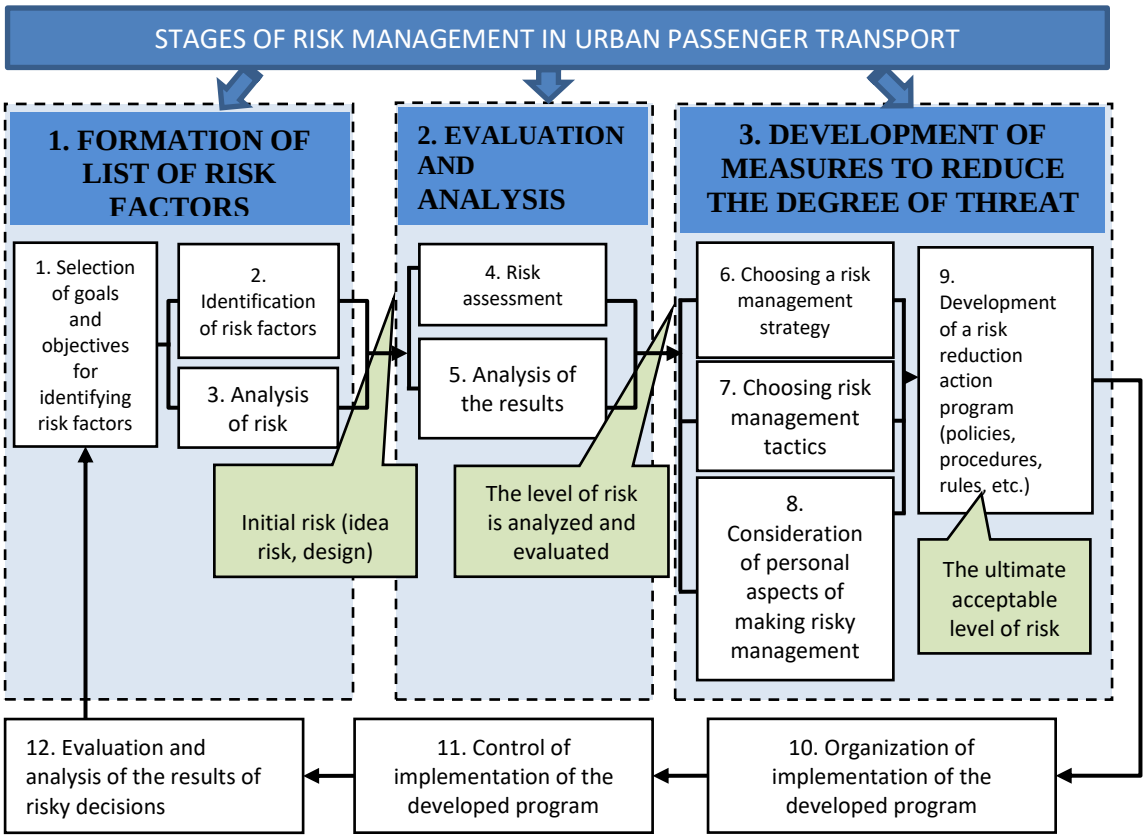

Figure 3 Smart management model, according to the concept of acceptable risk

The risk management system should be based on the following principles:

- purposeful ongoing awareness and risk monitoring;
- assessment of the likelihood and consequences of an adverse situation;
- formation and constant updating of risk management tools;
- setting risk limits (defining the limits of harm);
- developing recommendations on strategy formulation and efficient allocation of resources, taking into account the degree of risk;
- completeness and timeliness of display of risk values in management information systems (information systems).

At its core, the scheme presented is a reflection of the risk management process in a smart management system. The result of the first stage is a revealed list of risk factors. Before the second stage, the risk seems significant. After evaluating and analyzing the options, it appears to be less than the risk of the idea, the idea. This is due to the potential readiness of the managers for the occurrence of a risk event and orientation in its significance. The result of the first and second stages is the level of risk analyzed and evaluated. This level also seems quite significant and requires new action. In the third stage, the reduction of danger and threats is achieved. The strategic approach is to choose or delegate risk management techniques. Working with risk at the tactical level means, for example, starting to deal with it yourself. At this stage, the psychophysiological aspect of project management's attitude to risk is actively included. The psychological type of leader is manifested by the attitude of threats: it can be either very cautious or emergency, or demonstrate the ability to take the justifiable risk. Naturally, extreme options are not favourable. An acceptable risk level is achieved after the exit threat reduction program is developed. On the basis of the approved program, the stages of implementation, control and evaluation of the results of the decision are carried out. The results of this assessment are used in the new technological cycle of management.

Risk management techniques include five scenarios for responding to identified and assessed threats. Consider them:

- Evasion or refusal. It is advisable to use the limits of the risk factor, which is calculated as the ratio of the maximum possible loss to the amount of investment of its own funds to eliminate it.
- Transfer or its individual case - insurance. If the risk carries slightly lesser risks, and we cannot evade it, then it is better to pass it on to another person for consideration under the insurance contract.
- Localization and its individual cases: restrictions, limits. Sometimes it is more convenient to limit the scope of risk within the company's specialized units or by developing internal regulations.
- Distribution or diversification. This method is acceptable for use in relation to the risk of operating activities and other forms of investment activities. For example, in the case of investment sources such as bank loans.
- Compensation. This is a method for preventing threats. It uses the tools of forecasting, strategic planning, monitoring of external and internal situations, creation of reserves, etc.

Therefore, risk minimization techniques can help to effectively assess risk and maximize the economic impact of project implementation, but this requires a comprehensive assessment and reliable projections for future developments. However, none of the methods guarantees the complete elimination of the risks, but only their mitigation and mitigation if they occur.

6. CONCLUSIONS

The social aspects of the economic process of the urban passenger transport market play a very significant role in the overall nature of the operation of the local transport complex. Against this background, it is important to determine the impact of social factors on the provision of passenger transportation services, which will determine the direction of the city's development. It is the opinion of the public that is the main aspect of determining the direction of social design. The quality of social project implementation depends on the anticipation of all possible risks of negative impact or unpredictable social effect. In order to

avoid or minimize such problems, it is necessary to have effective project risk management, which implies continuous management decision making throughout the life of the project.

The theoretical basis of the risk management process for socially significant urban passenger transport projects provides further opportunities for research and development of methodological tools.

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