

Formation of a Programmatic Management Mechanism for Risk Reduction in Educational Activity

Journal of Education
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DOI: 10.1177/0022057421998334
journals.sagepub.com/home/jex

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Abstract

The modern educational environment is characterized by an increase in the influence of factors of uncertainty and instability. Based on a comparative analysis of the concepts of control, their improved typology has been formed. To form the model of the risk control system, the authors have chosen the concepts of control, focused on the management information system, the management system with an emphasis on management functions and coordination of the management process. The definition of the economic category "risk control" was formulated. The theoretical foundations of the formation of the risk control system of educational institutions have been improved.

Keywords

risk control, information support, risk perspectives, structure, methodological support

Introduction

In a dynamic educational environment, maintaining financial stability, solvency, investment attractiveness and ensuring the growth of market value is a challenge for any business entity, including universities (Looser & Mohr, 2020). The variability of the external environment of the functioning of economic entities and their internal features put forward new requirements for the existing management system, and necessitate its improvement and adaptation to new needs (Nkhoma et al., 2020). In the process of making and implementing management decisions, it is likely impossible to achieve target indicators in the areas of activity, which is due to the influence of risk factors on the university (Fan et al., 2020). The need to identify the causes of deviations of actual indicators from planned ones implies the occurrence of a time lag between an adverse event and the response to it, which does not allow timely implementation of corrective actions in the face of rapid changes in external and internal environmental factors (Murray & Crammond, 2020). It should be noted that the reason for the low efficiency of the risk management system is also its imperfect, incomplete integration into the university management system (Jelonek & Mazur, 2020). Universities need to constantly search for innovative approaches and modern management techniques and put them into practice, in particular, to improve the risk management system (Hart et al., 2020). The dynamism of the external and internal environment forces universities

to take a more careful approach to risk management, increase the efficiency of decision-making, and look for new approaches to timely identification of the risk impact on the main indicators of university performance (Friedman et al., 2020). A wide range of tools, methods, and models are now known, the use of which allows ensuring the implementation of risk management at the proper level. However, not all universities pay due attention to risk assessment, taking into account the existing cause-and-effect relationships, that is, mutual influence, rapid change in risk-oriented management.

The development, adaptation, and implementation of innovative risk management tools, in the authors' opinion, are the competence of the control subsystem—risk control (Litterscheidt & Streich, 2020). The model of the adaptive

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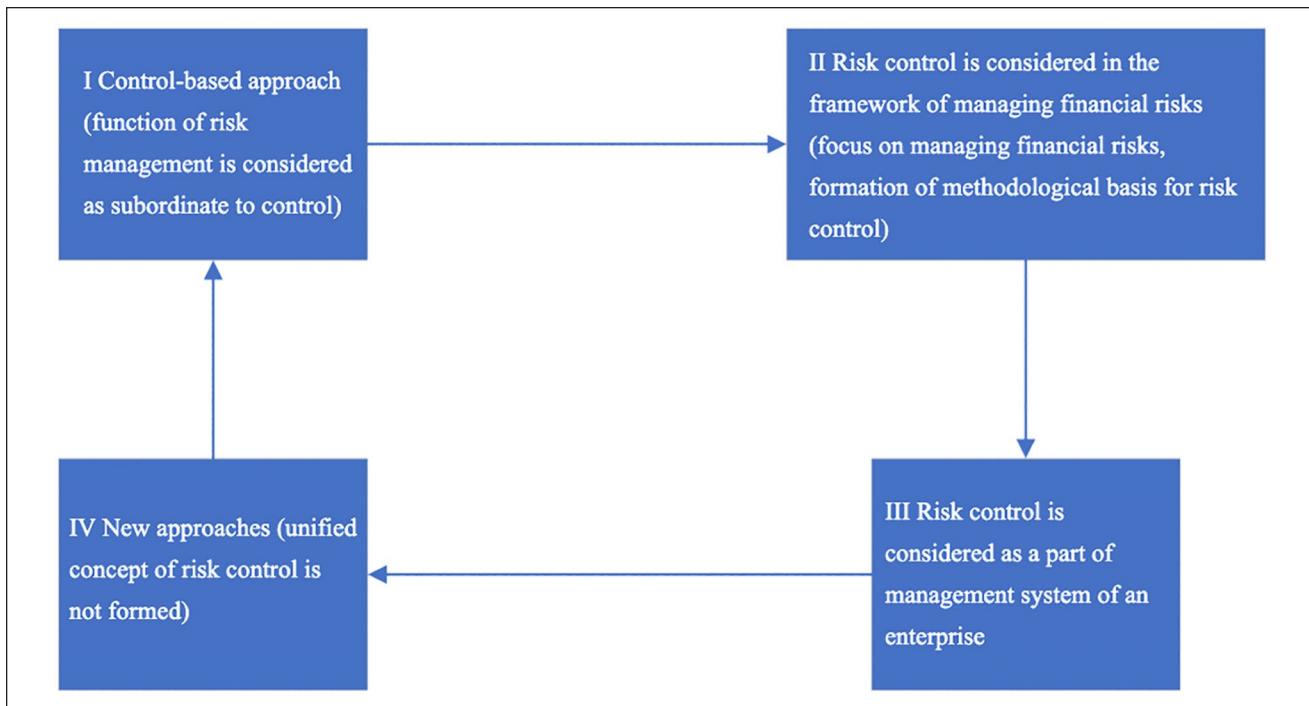


Figure 1. Evolution of views on risk control.

behavior of the university as a system is advance management based on risk control (Yuesti et al., 2020). Accordingly, the main thing that can be achieved in the process of adaptive behavior is to eliminate the danger of the negative influence of those phenomena that were not or could not be taken into account before the time (Hassall et al., 2020). This necessitates the development of the concept of risk control in the enterprise, and the concept should be implemented not as a one-time act but as a process (Aljadeff-Abergel & Ayvazo, 2020). The implementation of the risk control system into an integrated university management system will improve the quality of decisions made in terms of increasing the university's adaptability and ensuring its sustainable development (Mosyjowski & Daly, 2020).

Due to the novelty of the concept of risk control and the relatively small experience of implementing the system of risk control in the activities of universities, the issues of integrating risk control into the risk management system are insufficiently covered in the scientific works of foreign and domestic scientists (Cattermole-Terzic & Horberry, 2020; Tovkanets, 2018). Despite the fact that a significant number of works by German scientists have been devoted to the study of risk control, no consensus has yet been reached on the interpretation of the term "risk control" (Khalaf, 2020).

Some aspects of risk control are considered in the works of Russian scientists who made a significant contribution to the adaptation of scientific developments of German scientists in accordance with the peculiarities of the development of the Russian economy, the specifics of the functioning of

Russian universities and developed their own scientific and methodological provisions for the formation of the mechanism and model of the risk control system (Atif et al., 2020). A small number of works of scientists from Belarus and Kazakhstan are devoted to the issue of risk control.

However, an integrated approach to understanding risk control, which would make it possible to choose its model that would be adequate to the specific conditions of the university's activities, is not sufficiently developed (Piasta et al., 2021). It should be noted that the concept of risk control in the scientific developments of domestic scientists-economists is not sufficiently disclosed (García-Gámez et al., 2020). Considering the above, it can be concluded that there is a need for further study of the concepts of risk control, its object, subject, purpose, as well as tasks, functions, and tools (Cooper et al., 2020). The evolution of views on risk control is shown in Figure 1.

Risk control is a "cross function" that serves as a "connecting link" since all areas of a university's activities are viewed from a risk perspective (Effeney, 2020). Risk control is an operational and strategically oriented information support system, which is a component of the control system and is focused on all functional areas of the university (Pérez-Eransus & Martínez-Virto, 2020; Kobal, 2019).

Materials and Methods

Based on the analysis and synthesis of conceptual characteristics and features of the categories "control" and "risk,"

risk control is considered from the position of the concept of control, focused on information support and an information system, since risk control is interpreted as a system of information support for the process of making strategic and operational decisions by management to prevent the impact of risks on the activities of the university to ensure and implement the main goals of its development; however, the integral function of this system is defined as the detection, differentiation, methodological, and informational support of the process of making strategic management decisions by the university management aimed at reducing the impact of negative trends on the activities of the university. The authors believe that reducing risk control to the information support system of the risk management system is unacceptable, because such an interpretation significantly narrows the range of functions it performs.

Risk control occupies a “borderline position” between risk management and control systems. Based on the conducted critical analysis of the existing concepts of risk control and the authors’ own practical experience in this area, the concept of control was developed, which is based on the idea of differentiating the areas of the risk control system and the risk management system, similar to the corresponding section of control and management. Within the framework of the proposed concept, risk control is considered as a control subsystem designed to coordinate planning and risk control, as well as to provide a risk management system, information about risks to support management in the process of making financial decisions. Based on the above interpretation, the key goal of risk control is the effective coordination of planning, control, and provision of the university management with information about risks. Based on the processing of the input information of the university’s control system, with the help of special tools, risk control forms an information base for risk management.

Results and Discussion

Risk control is considered as a complex system of methodological, analytical, information support for making optimal management decisions in the process of university functioning in conditions of an increased level of risk and economic instability, aimed at timely identification and neutralization of external and internal risks and threats that impede the achievement of goals of effective university development. Risk control acts as a strategic management tool and is the basis of the entire university management system in conditions of uncertainty. Compared with the above interpretations of the definition of risk control, it significantly expands the range of functions it performs, and more fully reveals the role of the subsystem implemented in the control system. The statement is ambiguous: risk control acts as a strategic management tool, since control is carried out in the context of the operational and strategic levels

of university management. Risk control is interpreted as an integrated system of information, analytical, and methodological support of the risk management system in all functional areas of risk management aimed at achieving goals in the field of risk management, the main goal of which is to provide a risk management system and comprehensive information necessary to prevent possible destabilization of the university’s activities (preventive control) or overcoming it at the slightest loss. The concept of risk control is focused on information, analytical, and methodological support of the risk management system to achieve the operational and strategic goals of the university.

Risk control is interpreted as an integrated management support mechanism focused on achieving the strategic and operational goals of the university through early diagnosis of risks and the development of a feedback system based on feedback in conditions of uncertainty in the external and internal environment, the main function of which is to achieve the set goals by implementing early diagnostics risks based on the integration of planning, control, and information support. Risk control is understood as a control and information subsystem of control, focused on achieving the goals of the risk management system, which ensures the coordination of its functions in all business processes. The main goal of risk control is to provide information support to management for comprehensive and objective risk management at the enterprise. Risk control is a system that provides quantitative measurement and control of risk positions, and also estimates the potential for potential losses. The main starting point of risk control is information and analytical support for decision-making processes in the risk management system. The content of risk control consists of systematic identification, assessment and development of recommendations for neutralizing risks, as well as drawing up reports on risk management.

For the formation of the scientific and methodological basis of risk control, it is important to clearly understand the relationship between risk control and risk management. It is proposed to use risk management methods in the control mechanism: most scientists characterize control as a complex mechanism that provides feedback in the management system of an industrial university to achieve its goals. Risk management methods allow predicting in a timely manner the possibility of adverse events. All this has determined the basic elements of the concept of “risk control.” Considering the above definition, there are two possible options for the relationship between the risk control system and the risk management system: first, the risk control system is autonomous in relation to the risk management system, with such an interpretation there is an unjustified duplication of functions performed; second, risk control is presented in the structure of the risk management system, but does not enrich its methodology and, accordingly, is ineffective.

Summarizing the above, the following can be noted:

1. The interpretation of the definition of risk control in most cases is unified: the unity of approaches consists only in formal reproduction with some variations of the most general provisions of the modern concept of control;
2. In the interpretations mentioned above, the nature of the relationship between the risk management system and the risk control system is difficult to trace or not traced at all.

Taking into account the above, the authors' interpretation of the category "risk control" as an economic category was proposed, which, in contrast to the existing definitions, is interpreted as an integrated subsystem of information support for management decisions, focused on coordinating the university management system to minimize the impact of risks on the achievement of business objectives by university and is based on timely identification and forecasting of their occurrence using the fuzzy model in the face of uncertainty in the external and internal environment. Risk control can be defined as a control subsystem that is designed to coordinate planning and control, to provide the risk management system and university management with information about risks to support management in making financial decisions. This allows clearly formulating the tasks of risk control performed by the system:

- Risk planning, determination of target values of indicators;
- Risk control;
- Preparation of reports on the state of risks of the university and the transfer of information to management units;
- Formation of a system for identification, analysis, and risk assessment;
- Coordination of various phases of the risk management process within and between individual elements of the management system;
- Advisory support to the university leadership on issues related to risk management.

In modern conditions of functioning of business entities, an effective risk control system is a prerequisite for achieving the goals and objectives of the risk management system, that is, it is imperative. Risk control, in the authors' opinion, should be viewed as a "connecting link between control and risk management systems." On the basis of the analysis, the authors have proposed an improved substantive model of risk control (Figure 2). In it, risk control is a subsystem of the control system. If control in most universities is based on a process approach, covers all business processes and is aimed at improving the efficiency of each of the departments and the university as a whole, then risk

control takes into account all the risk perspectives of the university's activities.

In addition, risk control, like the risk management system, is a subsystem of the university management system. Since the risk control system is a set of interrelated elements that act as a whole to achieve the set goals, it can also be considered as an independent system. From this point of view, risk control has a number of its subsystems. Summarizing the above, it can be stated that risk control, on one hand, is an integral part of the university's control system, and on the other hand, it supports the risk management system. Based on the analysis of the works of foreign and domestic scientists in the chosen direction of research, it can be asserted that the risk control system aims to increase the efficiency of the university's risk management system, and is implemented as follows: the risk control system based on the existing, improved, or developed tools allows finding potential threats and risks of the university's activities, identifying the most significant of them in terms of the level of influence on the achievement of the university's goals. In a complex information about the most significant risks, their analytical interpretation, the assessment of their likely negative impact on the results of the university's operating activities form information, analytical, and methodological support for making management decisions in the framework of the risk management system.

The risk management process presented in Figure 2 includes the following elements:

- Information exchange and consulting;
- Establishing context;
- Risk assessment (which includes risk identification, risk analysis, and risk assessment);
- Risk treatment;
- Monitoring and analysis.

The risk management process begins with "setting up the environment," that is, defining the goals that a university wants to achieve, choosing and justifying external and internal factors that can influence the decision-making process. Risk assessment includes identification, analysis, and risk assessment. Based on the results of the identification, the sources of risk were identified, as well as the nature of their possible impact on the functioning of the university. Risk analysis involves consideration of the causes and sources of risk, and their consequences and probabilities of occurrence. Risk assessment involves comparing the quantitatively assessed degree of risk with the risk criteria defined during the installation of the environment to establish the type of risk. Risk treatment as a stage of risk management consists of improving the existing methods and introducing new methods of risk management, which covers the assessment and selection of alternatives, analysis of their costs and benefits, as well as assessment of risks, which may arise as a result of a wrong method.

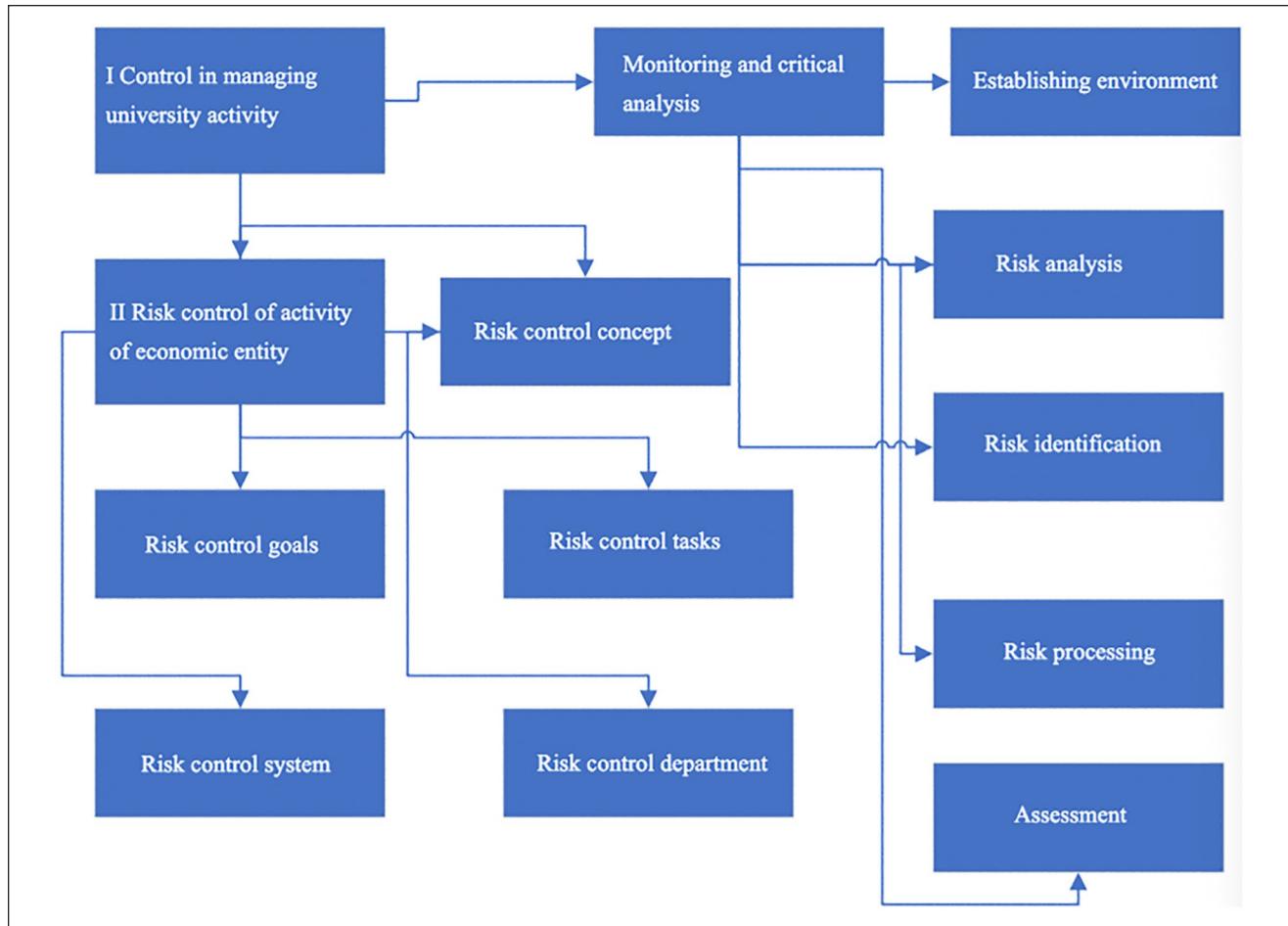


Figure 2. Content model of risk control.

To achieve the set goals, the risk control system is designed to perform a number of tasks. Integration of control and risk management makes it possible to single out the key tasks of risk control in the context of the functions performed by the system.

The following functions of risk control were distinguished:

1. General (inherent in control), namely, accounting, analytical, informational, methodological, control, and integrating (coordinating);
2. Specific (inherent in risk control), namely, predictive-analytical and innovative.

Sometimes, the following infrastructure-related risk control functions are distinguished:

- Informational and analytical;
- Control;
- Methodical;
- Coordinating;
- Consulting.

Table 1 presents the tasks and functions of the risk control system.

The tasks of the risk control system in the context of the stages of the risk management process of a business entity are presented in Table 2, and their relationship with the corresponding tasks of the risk management system is shown in Figure 3.

Risk control plays the role of an auditor in the risk management system, ensuring that results are obtained on an independent basis. Control and internal audit services do not duplicate, but complement each other. The authors consider the above statement to be incorrect. It is also worth focusing on the fact that the study of the demarcation aspects of the category of “control” in the context of the management paradigm of the university is still relevant, since it is often unjustifiably identified with management functions, in particular control. The functional responsibilities of the control service include information and methodological support of management decisions, organization of long-term planning and budgeting, coordination, and consulting on financial and economic issues of the university’s activities. In contrast, the purpose of the internal audit institution is to check the effectiveness of corporate governance in general and the risk management system in particular. The risk control system as

Table I. Functions and Tasks of the Risk Control System.

Functions	Key tasks of control system	Key tasks of risk control system
Accounting and analytical	Determination of the main controllable indicators for assessing the activities of the university and the influence degree of factors on the final result, development of analytical reports for the management.	Development and maintenance of risk accounting. Internal risk reporting. Collection and processing of accounting and analytical information about risks, their significance.
Informational	Implementation of internal and external communications based on the goals of the university, organizational structure, and current and possible needs.	Development of a module for accounting and analysis of risks in the general architecture of the university information system. Accumulation, selection of information about risks for making management decisions.
Consulting	Providing consulting support to management in the formation of a strategy, setting targets, drawing up budgets, when developing proposals to improve the efficiency of the university, its individual divisions, while improving the motivation system, and determining the personal responsibility of employees for the results of work.	Consulting on taking corrective measures in the field of risk management, choosing alternative solutions, risk management strategies. Providing recommendations on the application of modern methods and tools for risk management. Submitting proposals for the development of a system of key indicators for assessing the effectiveness of risk management measures.
Methodological	Development of a planning and budgeting algorithm, forms and methods for drawing up planning documents and internal reporting, methods for identifying and diagnosing deviations, risks, methods for recording costs and results, methods for conducting financial diagnostics.	Unification of criteria for assessing the activities of the university and its departments to prevent and overcome risk events. Development of methods for assessing the flexibility of management and the level of destabilization of individual universities. Development of an algorithm for choosing a risk control model, a methodological approach to assessing the degree of implementation and subsequent adjustment of the implemented risk control model. Development of new methods of risk management, etc.
Control	Monitoring the achievement of the goals and forecasts of the university (checking their consistency and realism), implementing control in the process of drawing up and executing budget plans, calculating deviations of the actual values of indicators from planned, targeted, and desired ones, monitoring the internal and external restrictions and risks of activities at the university.	Establishment of standard values for risk indicators, which are the basis for comparing actual values. Determination of the permissible limits of their deviations. Monitoring deviations of the actual values of indicators from the norm. Monitoring the implementation of risk management measures, etc.
Coordinating	Ensuring the functioning of individual subsystems of the management system, coordination of the activities of departments. Ensuring the efficient use of all types of resources (financial, labor, production) available to the university.	Aligning operational objectives and programs with strategic objectives, taking into account risk factors. Provision of actions aimed at targeted risk management by establishing rational communications between the links of the management system. Effective use of resources in risk events, etc.
Integrating	Control acts as a mechanism for implementing the process of integrating the strategic and operational levels of management into the overall management system.	Integration of strategic and operational risk management in order to develop a unified program for systematic development (rehabilitation) of universities. Integration of planning, control, analysis, and regulation processes into a single system using indicator maps, based on which measures will be assessed to prevent and overcome problem situations and to stabilize the university's activities.

Table 2. Tasks of the Risk Control and Risk Management System in the Context of Individual Phases (Stages) of Risk Management of a Business Entity.

Stage of risk management	Risk control system (RCS)	Risk management system (RMS)
Risk identification and analysis	Responsible for the analysis of the external and internal environment, carried out using the tools it proposed, in terms of drawing up a comprehensive risk report. At this stage, the RMS carries out the identification of risks, the formation of a risk map, their analysis, and ranking.	Analyses the information provided by the risk control system in the report and selects for the next assessment those risks and their structure that, in the opinion of the management, pose the greatest threat to the university's activities.
Risk assessment	The choice of risk assessment tools that are most suitable for use with a given nature of the input information of a business entity provided for the specified procedure has been substantiated. The risk management and risk control departments jointly establish at this stage the standard value of the risk amount for each type of risk. Based on the procedures for identifying, analyzing, and assessing the risks of the university's activities, an initial risk report is drawn up. A report indicates the threats to the university's activities, its characteristic risks, the results of the assessment of the potential impact of all key (significant) risks on the university's activities, the likelihood of risk events, initial risk indicators, control actions, and the time of their implementation. Provides recommendations for choosing a method for influencing risks.	Subject to the emergence of new circumstances that relate to risk assessment in the risk management process, it makes organizational adjustments and additions, and sends them for revision to the RCS. A primary risk report is provided to the risk management subsection. At this stage, the risk management system determines the acceptable (tolerant) level of risk.
Risk processing	If a prepared report has shortcomings, it is finalized by the department. X As the measures aimed at risk reduction are implemented, the department prepares a repeated risk report, which indicates the "new" probability of the risk event, its impact and the magnitude of the risk.	Based on the recommendations of the risk control department, it selects methods of influencing the risk, the use of which will minimize possible losses in the future. Based on the received initial risk report, the department makes an appropriate decision on risk management at the enterprise, which will make it possible to reduce the likelihood of risk occurrence or the degree of risk impact on the enterprise. The direct influence on the risk is realized by the methods selected in the previous stages. X
Monitoring and critical review	At this stage, the results of decisions made are determined, the actually achieved and planned values of indicators characterizing the risk are compared. Based on the results obtained, either the risk management strategy is being revised or the approaches, tools of risk management, and risk control systems, which were used at the stages of analysis, assessment, and risk treatment, are improved.	

a component of the control system is aimed at establishing and maintaining the functional capacity of the risk management system, while checking its effectiveness is the competence of internal audit.

The implementation of a risk control system in an enterprise is impossible without clearly defined tools that can

ensure the achievement of the set goal. To perform certain tasks, the risk control system operates both with risk management tools and standard tools for operational and strategic control. The control toolkit proposed in the scientific literature is most often associated with its subject-oriented type, that is, the control subsystem. To implement risk

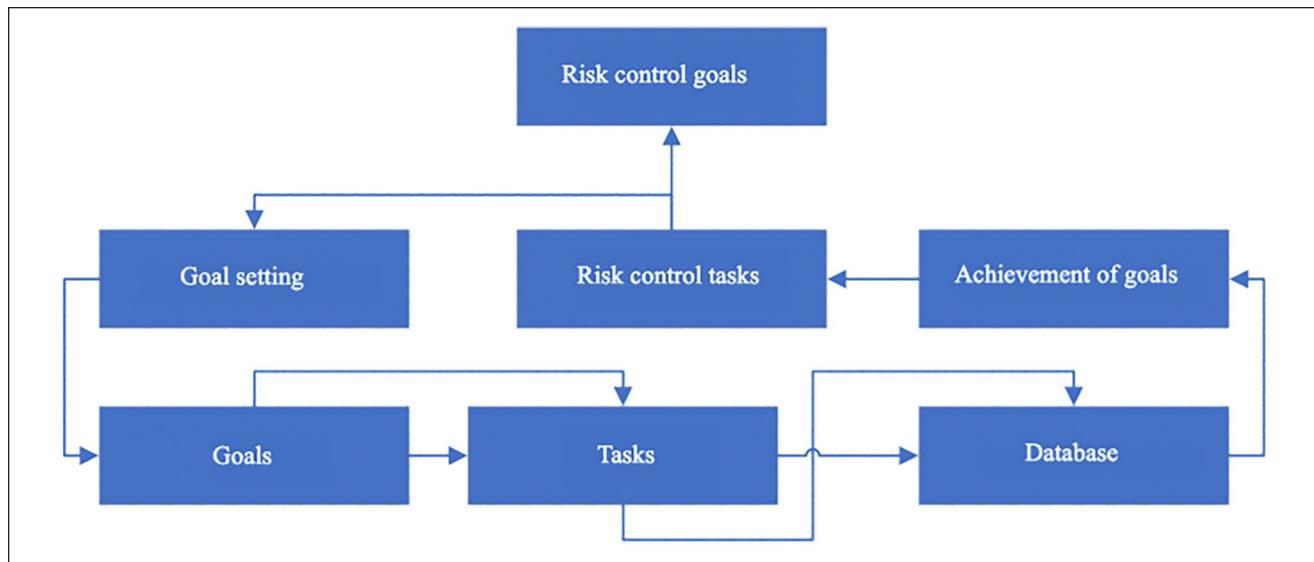


Figure 3. Relationship between the risk management system and the risk control system.

Table 3. Specific Risk Control Tools.

Tool	Characteristics
Value at Risk (VaR)	The Value at Risk indicator represents the amount of negative change in the amount of risk that will not be exceeded by a given probability in a certain time interval. The disadvantage of this indicator is that it cannot be calculated for risks that cannot be quantified. The established threshold value of this indicator, its dynamics is a signal for making operational management decisions. It should be emphasized that in modern conditions, when changes in the external environment are abrupt, the use of VaR is impractical, since the methodology is based on normal distribution, and under such conditions of university functioning it is absent.
Cash Flow at Risk (CFaR)	The CFaR indicator is used to assess the future cash flows of the university, the amount of loss of some of which as a result of exposure to risks will not exceed the calculated value of the CFaR indicator with a given probability α . This concept allows for risk assessments of the university, including both financial and non-financial risks. To calculate the CFaR indicator, it is necessary to develop a model of the influence of risk factors on cash flow, which should take into account the specifics of a particular university. The CFaR concept proposes to shift the emphasis from the analysis of the amount of constant cash flows to the analysis of risk-related flows, the value of which has a probabilistic nature.
Risk-based budgeting	Provided that the “risk-based budgeting” approach is applied, any input parameter for budgeting is specified not by one number, but by a range of values. Such an approach can be set by 2–3 values and an expert assessment of their probability (e.g., pessimistic, optimistic, and realistic scenarios), or it can be set more complexly in the form of a statistical distribution. Through simulation, the collected uncertainty information can be consolidated into a financial model. The output will be a budget in which the final data will be presented as a probability distribution in a certain range. If there is a risk in the implementation of budgeting, it is mandatory to reflect in the budget of the general expenses of the university as a separate item of unforeseen expenses, which are proposed to be presented in this way: probable expenses caused by the occurrence of risk; costs of measures to eliminate the consequences of the risk. To determine the planned indicators of probable unpredictable costs, it is proposed to use the methods of mathematical statistics for the costs that were carried out in previous reporting periods and are associated with the onset of risky situations. When developing budgets, the following risk accounting algorithm is used: <ol style="list-style-type: none"> 1. Identification of all potential risks and their identification in order to form an information base for subsequent assessment of the impact of risks; 2. Assessment of the impact of risks on budget indicators; 3. Selection of the optimal budget option, taking into account the impact of potential risks; 4. Selection and application of appropriate risk management methods.

(continued)

Table 3. (continued)

Tool	Characteristics
Balanced scorecard (BSC)	<p>The classic BSC has four projections: finance, customers, internal business processes, and learning and growth, and does not include separate accounting for risk factors. However, the BSC has a number of points of contact with the risk management system, which creates the prerequisites for integrating the latter into the BSC. These four “directions” form a field for searching and classifying risks. The classic BSC supports the process of identifying university risks that might go unnoticed in isolated risk management. Correlation of BSC goals with specific risks, determination of risk indicators, and their limit values contributes to the fact that the impact of risks on strategic goals will be timely taken into account, information about risks will be communicated to the university management, and the company’s strategy, if necessary, will be adjusted. The integration of risk factor consideration into the BSC results in the university’s potential and chances being considered in conjunction with the firm’s risk potential and its impact on the university’s strategic goals.</p> <p>Approaches to integrating BSC and risk management systems:</p> <ol style="list-style-type: none"> 1. Expansion of the functions of the classic BSC (the approach provides for the introduction of risk factor accounting directly in each projection)—Balanced Scorecard Plus; 2. The establishment of a special risk management block in the structure of the classical BSC (accounting for all relevant goals and indicators for the risk management system, their normative and target values, as well as the corresponding measures, is placed in a special additional block); 3. A modified BSC, in which, instead of focusing on the four projections of the BSC, reflecting the strategic goals of the university, the strategic factors of the university’s success (Balanced Chance and Risk Scorecard) become a key element. Alignment of risks with strategic factors of success improves employees’ understanding of the relationship between risks and the final results of the firm’s activities and raises personnel awareness of risk control; 4. Combination of approaches No. 2 and No. 3.
Theory of fuzzy sets	<p>One of the modern tools that can be applied in the risk control system is the theory of fuzzy sets. Fuzzy logic can be used to assess the risks of an industrial university. This process can be represented in the following sequence:</p> <ol style="list-style-type: none"> 1. Identification of risk factors; 2. Assessment of the linguistic variable; 3. Determination of the significance of the risks affecting the results of the university’s activities; 4. Calculation of the total risk value.

control procedures, it is necessary to create and/or modify the appropriate tools, that is, special analytical and optimization models suitable for identifying risk events and preparing management decisions to prevent potential crisis situations. So, for example, the Balanced Scorecard (BSC) belongs to the strategic control tools, while the modified BSCs, which take into account the perspective of risk, are the tool of risk control.

A brief description of the specific risk control tools identified by the authors is presented in Table 3. To improve the efficiency of the risk management subsystem, the authors suggest using the following methodological risk control tools.

The mathematical apparatus of the theory of fuzzy sets for assessing and predicting the likelihood of the occurrence of risks of operational activities of risk control uses a modified system of balanced indicators—for diagnosing deviations of key performance indicators and key risk indicators from their predetermined critical values, for the prompt development of proposals for taking measures aimed at reducing negative impact of specific risks on the efficiency of universities.

Conclusion

Considering the above, it can be stated that risk control is aimed at forming an integrated business structure of the university, which will support the risk management system in achieving its goals. The risk control system identifies forms of risk, analyses them, and provides the obtained results of the analysis to the appropriate decision-making body. Within the framework of the study, the authors share the views of the above-mentioned authors and believe that direct decision-making on risk management is not within the competence of risk control and that it is the risk management system that should perform the specified task. The risk control system and the risk management system influence each other. The formation of a risk control system is determined by the requirements of the risk management system, while risk control by developing new tools and techniques provides the risk management process with a new impetus. The introduction of a risk control system has a positive effect on the efficiency of the university management system as a whole and is manifested in the following aspects:

- Increasing the efficiency of decision-making due to the delineation of tasks performed by the risk control and risk management systems;
- The risk management system is focused on setting goals, objectives, organizational aspects of the risk management process, making final decisions to reduce the likelihood of a risk, or/and its impact on the university.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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