

¹Bakytgul Zhetpisbayeva, ²Dmitry Dyakov, ²Gulvira Akybayeva, ³Saule Shunkeyeva

¹*Astana IT University, Astana, Kazakhstan*

²*Karaganda University named after academician E.A. Buketov, Karaganda, Kazakhstan*

³*National Professional Development Center "Orleu", Karaganda, Kazakhstan*

UNIVERSAL APPROACHES TO MODELING AND DEVELOPMENT OF METHODOLOGICAL TOOLS FOR UNIVERSITY RISK MANAGEMENT

Abstract: The article is devoted to the study of the problem of risk management modeling in universities. The authors use representative expert material, which is comprehended through the methods of scientific analysis, generalization and description. The authors proceed from the fact that the idea of risk management has spread from the financial and production sectors to the education system. In this context, the authors analyze the mechanisms of selection and adaptation of approaches to modeling risk management in Western universities, and summarize the results of research of Russian universities to identify universal and acceptable approaches to the development of their own risk management models and accompanying methodological tools. The authors summarize the logic of identifying universal risks for universities in the context of their financial and Academic Affairs. As a result, they propose formulations of universal approaches to building risk management of HEIs, which can become a basis for Kazakhstan to develop its own modeling concepts.

Keywords: risk management, university, risk, modeling, universal approaches, tools, higher education system.

Introduction

Modern higher education in Kazakhstan faced an objective need to develop a risk management system. In this regard, special regulatory documents containing framework requirements for the development of risk management of the organization were adopted (Kazakstandart, 2020; Ministry of Education and Science, 2021). The solution of the new task required the search for adaptive mechanisms that take into account the specifics of higher education institutions' activities, and, as a consequence, the development of their own model of risk management. The lack of adequate experience created the risk of formalization and unjustified copying of the systems adopted in the financial and industrial sectors. There was a need for theoretical understanding of the problem of risk management modeling in higher education institutions, generalization of best practices of Western universities.

The analysis shows that in the Western scientific literature there is a well-established expert opinion that a modern university is an economic entity, the activity of which is associated with typical risks of any business enterprise from the service sector. The position of the European expert community can be defined as skeptical, since the prevailing opinion among researchers is that the university should not be measured in market categories, which include risk management (Raanan, 2009).

Russian experts demonstrate high research interest to this problem. Numerous publications of the first 15 years of the XXI century testify to the full acceptance of the idea of risk management in the system of higher education institution. As a result, the concept of "educational risk" has appeared in the Russian expert community (Chubarova, 2005), an idea about the methodological foundations of the Western system of risk management of higher education institutions and its practical implementation in Russian education was formed. At the same time, there are studies devoted to analyzing the specifics of risk management in certain

aspects, for example, in the aspect of professional standards, activities of federal universities, education quality management, etc. (see e.g., Kostyukova. (2011); Belyaeva (2014); Agarkov, (2015); Utemov (2021). Studies on the adaptation of risk management tools in specific Russian universities are of particular interest.

Scientific research of Kazakhstani experts is reduced mainly to the problem statement and prospects of its implementation in higher education. The issues of risk management methodology are fragmentary, without analyzing the management models of specific universities in Kazakhstan. In other words, the process of comprehension of methodological aspects of risk management in Kazakhstan is at the initial stage (Ahn, (2013); Zhetpisbaeva, (2023); Shunkeeva, (2023)

This determines the relevance of this article, which aims to identify universal approaches to modeling the risk management of HEIs and assessing its maturity. Our tasks include assessing the Western models of university risk management; identifying the principles of selection of universal approaches to building risk management in the process of mastering best practices; characterizing the universal tools of university risk management taking into account the results of adaptability.

Methods and organization of the study

The research was conducted on the material of available publications of experts in the field of modeling risk management in higher education institutions with the use of scientific methods of analysis, generalization, description, within which the author's interpretations of universal approaches and risks in the system of higher education are proposed.

In the course of the research, the foreign experience of risk management implementation in higher education institutions was generalized, the logic of differentiation of modeling principles acceptable for the education system was determined. Expert publications on the search for universal modeling approaches and their adaptation to the conditions of Russian HEIs were studied separately.

The results of the study and discussion

The analysis shows that risk management models in Western universities proceed from the basic differentiation of two types of risk, which in Russian-language expert literature are defined as "pure" and "speculative". Under "pure" risks are understood threats to life, safety and health. They are considered to be poorly controllable, and therefore require cardinal solutions, i.e. maximum possible elimination. "Speculative" risks relate to issues of financing, human capital development, and IT strategy implementation. This is what determines the profitability and competitiveness of the university. Approaches to the management of such risks include mechanisms that allow to avoid damage and increase the benefits from their elimination. Of great importance here is access to up-to-date information about the demand for educational services of competitors and their strategic plans to build strength in the general consumer market. Since the 2000s, the activities of Western universities began to develop under the conditions of the Sarbanes-Oxley Act adopted in 2002, which tightened the requirements for financial reporting and mandatory risk assessment.

The history of risk management shows that a great contribution to the development of the concept and modeling of risks was made by university scientists. Here opinions were divided, as there was no unanimity in the academic community about the appropriateness of risk management in universities. In their view, this approach was appropriate in the financial world or in extreme sports, while universities are a place of comprehension of sciences and training of the intellectual elite of society. However, reality demanded to reckon with the fact that universities existed in the financial world and were even a form of business embodiment. Therefore, Western universities have had to implement adaptive risk management models.

The research shows that in the world practice there are universal risks arising in the activities of universities (Raanan, 2009). First of all, these are academic risks, which are associated with research and teaching. Common parameters of their measurement are quality and resource deficit, cost, intensive deactualization of results, low starting level of enrolled students, ineffective tools of quality management system in general (Narayan, 2021).

Academic risks are usually accompanied by ethical risks caused by violation of norms of academic integrity, subjectivization of the process of evaluation of learning outcomes, academic exploitation of students. The cumulative consequences of academic and ethical risks can affect the external reputation of the university, its ratings among employers, applicants, scientists, the competitive environment in general.

The risks associated with changes in the policy in the field of education and science are singled out separately. They can be both internal and external in nature. An obvious consequence of the emergence of such risks is the reduction of funding for the education system as a whole or individual areas of university activities. These risks have a noticeable impact on the entire university management system and may even lead to bankruptcy. Reduced funding can increase the risk of intensive commercialization of education, which will certainly lead to the loss of the "spirit" of university education, the loss of the code of ethics, integrity, academic freedom.

In turn, all this can aggravate the so-called management risks. Many researchers include the inability to replace an ineffective manager in a timely manner, who can be selected without the participation of the entire university staff; and, conversely, the emergence of risk as a result of sectoral rotation of personnel, retirement, i.e. at the very moment when sufficient managerial experience has been accumulated.

In addition, Western experts emphasize the risks associated with aggression, reduced security in universities, poor accommodation of students in campuses, "desertion" of teachers (Raanan, 2009).

As the historiographical analysis has shown, the practice of risk management requires the management to seek a balance in the relationship between universities and the authorized body. In the Western paradigm, the autonomy of the university is an important value associated with the democratic principles of society as a whole. This had to be reckoned with and made part of the university governance system. This process proved to be difficult and at the same time beneficial. One of the first countries to realize this was Great Britain, which in 2000 introduced a mandatory system of risk management in universities. The sought balance of relations consisted in the fact that the university began to adhere to the framework rules of the funding body and inform it about existing and potential risks (Higher Education Funding Council for England, 2001). The resulting system was gradually provided with the Concept of risk management development in HEIs, scientific and methodological tools and staff risk managers (Huber, 2009).

According to experts, a significant contribution to the theory and practice of risk management in HEIs was made by the authors of the Pricewaterhouse-Coopers report prepared for the Higher Education Funding Council for England (HEFCE) (2005). This report contains practical recommendations for the implementation and improvement of risk management processes in HEIs. The experts offer their definition of risk as a threat or opportunity in the form of an event that can negatively or beneficially affect the organization's ability to achieve its goals. This understanding of risk allowed HEIs in England to form two equivalent approaches to risk management: 1) to see risks not only as a negative but also as a positive force; 2) to establish a close link between risks and the strategic goals of the university.

Another country where the risk management system in education was actively developed was the USA. Unlike Great Britain, American universities paid attention mainly to financial risks, which was the subject of a specially developed standard COSO-2004 "Organizational

Risk Management. Integrated Model", which formed the basis for the corresponding national standards of Great Britain, Canada, Japan, Australia, New Zealand. The need for the development and implementation of this standard was caused by external factors, mainly of tragic nature: the shooting at the Virginia Institute of Technology (11.09.2001), the destruction of universities in New Orleans after Hurricane Katrina (2005), protests of university teachers against unjustified hiring and firing of rectors (2010), the high-profile scandal of sexual abuse at Pennsylvania State University (2011). Against this backdrop, American society began to make specific demands to ensure the financial sustainability of universities, safety, and strengthen ethical policies. This led to the fact that the standards for accreditation, ranking, financial audit of universities included parameters from the field of risk management, for example, awareness of the board of directors of the university about risks and measures to eliminate them.

The 2000s saw the active introduction of risk management system in the post-Soviet higher education institutions. This is evidenced by numerous expert publications devoted to the theoretical understanding of the problem, issues of model selection, and typology of risks in education. Some experts considered HEI risks in the context of global economic processes. Thus, the experts of the Ural Federal University suggest that "there may be a risk of deepening recession (capital outflow) due to a sharp decline in the cost of energy resources (Brent oil), limited credit resources" (Agarkov, 2015, p. 110). In this context, the risks that all federal universities in Russia may face are given:

- 1) lack of highly qualified personnel due to demographic decline and population outflow;
- 2) decrease in investments due to the rise in the cost of investment projects, impossibility to predict the profitability of the organization;
- 3) toughening of competition due to active state support, processes of unification and integration of universities into the international educational space;
- 4) restricted access to borrowed capital in the context of the financial crisis;
- 5) unfavorable changes in legislation (Agarkov, 2015, p. 111).

With the development of risk management in the world practice, there is an expert opinion that risk management is, first of all, the management of an economic entity that is under the constant influence of external factors and strives to overcome them for the sake of achieving strategic goals. This defines the basic approach to modeling risk management in higher education institution. It should include 5 vertical, one horizontal and one unifying processes. The vertical processes include the definition of strategic goals of the HEI; risk assessment in the context of their classification; risk report; risk management measures; risk monitoring. The horizontal process should be the internal control of fulfillment of all vertical processes. The unifying processes include periodic external audit of the risk management system. It is noteworthy that the realization of all processes requires work with documents regulating the system and its evaluation. Universal approaches to the organization of model-forming processes have emerged:

1. Defining the strategic objectives of the university is the beginning of the risk management system. The quality of risk control depends on how fully the objectives are defined. In fact, at this stage the risk management system is embedded in the processes of HEI activity. Strategic objectives should be reflected in statutory documents, HEI development strategies, and they should be measurable. In Western practice, it is customary to separately identify operational objectives related to compliance with legislation and reporting.

2. When assessing risks, as a rule, a list of events that can adversely affect the achievement of strategic goals of the university is drawn up. In this regard, it is advisable to proceed from the classification of risks by specific attributes. It is important that the chosen classification should be compact and understandable to managers of different levels of university management. The world practice has developed various approaches to risk

classification: a) by risk factors (internal and external); b) by processes of HEI activity (strategic, operational, "pure", "speculative"). Definitions of these risks are presented in the Federation of European Risk Management Association (FERMA) models (AIRMIC, 2002).

Based on the existing practice, it is possible to identify universal principles for describing the risks of higher education institution: a) the name of the risk, it should reflect its essence and be understandable to officials of different levels; b) classification of the risk; c) the strategic goal to which the risk is related; d) the official or unit exposed to the risk; e) risk factors; f) assessment of the risk probability; g) the level of risk acceptability; h) existing ways of risk management.

There is a well-established expert perception of risk measurement methods. In the world practice it is customary to measure risk as a combination of the probability of occurrence of a negative event and the amount of possible damage in the range from 0 to 1. Along with quantitative methods it is customary to use qualitative and mixed methods of measurement. The analysis carried out in this connection shows that preference is given to qualitative methods, which are less costly and do not require a full volume of statistical data. At the same time, the effective application of qualitative methods requires the involvement of a highly qualified manager, preferably from the top management of the university.

In western practice, it is common to apply various methods of risk identification, for example, to form a list of risks it is suggested to analyze external and internal factors of influence or "brainstorming"; to determine the magnitude of the impact of detected risks on the activities of the university to use special questionnaires filled out by officials. After forming the list of risks and their measurement it is necessary to highlight the risks, the reduction of which is required in the first place.

3. Reporting activities of the HEI should include self-assessment of risk reduction. At this stage it is important to detail the risks and measures to eliminate them in the context of the university activities and the work of structural units. It is important to assess the cross risks that arise in the course of interaction of the HEI subdivisions. Such reports should include specific measures to respond to the risks and the resources required for this purpose. This should be a justification for receiving targeted financial resources from the Board of Directors of the university. These reports should form the basis of the university's risk management system.

4. Approaches to risk management should be built in the logic of compromise between the costs and benefits of risk reduction. In this regard, there are several universal ways of risk management: a) risk avoidance by refraining from specific actions or activities; b) risk reduction by insurance and diversification; c) risk compensation by increasing the additional capabilities of the HEI; d) risk redistribution through profitable partnerships, outsourcing; e) risk acceptance, i.e. inactivity to reduce risk, readiness for losses.

A universal approach to the introduction of a three-level model of risk management. The first level provides distribution of risk management functions between employees and departments of the university; each of them should understand their actions and contribution to management. The second level is the development of the university risk management strategy, which describes the risks, ways of response, necessary resources. The third level is related to the documentation of the risk management system within the framework of HEI landscape maps, strategies, job descriptions, regulations of structural units, professional development programs, reporting.

5. The risk monitoring system should be based on the parameters of the management system's ability to prevent academic and financial damage of the HEI with the least costs.

The analysis of expert publications allows us to form universal principles for the adaptation of methodological tools of HEI risk management.

First of all, all risk management mechanisms should be documented. It is important to use a conceptual framework and a clear algorithm for their use. Employees responsible for risk

management should be able to unambiguously interpret the purpose and effectiveness of the tools they use. It should include a mechanism for prompt receipt of information about risks from officials and structural units. At the same time, each of them should be able to propose measures to eliminate and minimize risks in the context of their functional field. In this regard, a special scheme has been developed in some HEIs that takes into account the collective approach to risk mapping. In universal form, this scheme can include 4 levels of implementation:

1) Team work on risk identification. At this level, representative focus groups are created, representing all categories of positions, for example, teaching staff, top managers, managers in the context of business processes of the university, auxiliary staff, etc. Each focus group or its member individually fills in a special questionnaire about risks, its content was described above.

2) Work of experts on risk assessment. At this level, an expert group of experienced managers, such as heads of departments, deans, vice-rectors, is created. Their task is to summarize the collective information about the risks, make their selection, assess the degree of probability of occurrence, impact on the objectives of the university.

3) Development of a package of documents. At this level, the top managers of the university together with the risk coordinator form a register of risks, a matrix of probability of occurrence and impact, a diagram of risk actualization and other.

4) Development of management decisions. At this level, the rector of the university determines a list of measures to eliminate and minimize risks. It is important to correctly group the risks, for example, according to the principles of Merna and Al-Khani (2008), as well as to determine the official responsible for working with each of the identified risks, it can be both heads of departments and the rector himself.

Of great importance in the development of the toolkit is its focus on assessing the likelihood of risks and their impact on the achievement of strategic objectives. Therefore, it is necessary to describe in detail the methods of risk assessment and indicators of negative consequences. As noted earlier, quantitative methods, such as mathematical methods, are considered the most effective. The universal scheme of HEI risk identification proposed above contributes to the completeness of information and effective use of quantitative methods of assessment.

In the expert academic environment, various methodologies have been developed to assess the maturity of a HEI in the field of risk management (Delotte, 2024). The analysis of these methodologies allows us to formulate a number of basic parameters related to the assessment of the responsibility of the leadership, managers and other employees of the university. It should be noted that these parameters are adaptive in nature, taking into account the academic specifics of the university. We propose the formulation of parameters and their universal characterization:

1) Existence of institutional architecture of risk management at the HEI. The HEI applies a documented methodology of risk management, approved glossary, which provides a clear definition of the term "risk" taking into account its complex nature, i.e. its ability to have both negative and positive impact on strategic objectives. The architecture includes requirements for the university's infrastructure to ensure effective risk management, including IT solutions, training, and integration into the QMS.

2) Reasonable distribution of responsibilities among the HEI employees. Risk management is carried out in all spheres of HEI activity and at all levels of vertical-horizontal paradigm, it is reflected in statutory documents, job descriptions, regulations of structural units. The university has appointed "risk owners" within the areas of activity, coordinator of risk management at the institutional level. Jointly-differentiated work of divisions with risks is aimed at improving the performance and improvement of the system.

3) Special responsibility of top management in risk management. The rector and vice-rectors of the university develop managerial decisions, including the development of the risk management system.

4) Transparency in identifying and assessing risks, as well as in determining measures to eliminate or minimize them. Information about risks and risk management is available. All officials understand the structure of the system, have the opportunity to take initiative in working with risks.

5) Availability of mechanisms of supervision and control of the risk management system. The three-dimensional paradigm "Monitoring - Analysis - Control" is implemented effectively in the university.

Conclusions

The practice of introducing risk management system in HEIs took place in the conditions of selection and adaptation of models developed for organizations of financial and industrial sectors. The adaptation process was carried out on the basis of scientific principles in empirical conditions, which were actively developed in Western HEIs. As a result, an expert perception of universal HEI risks based on both economic and academic factors was developed. This has significantly promoted the idea of the expediency of introducing risk management in HEIs in Europe and the post-Soviet space, making it a part of the reforms of the management system as a whole.

At this stage of comprehension of the problem of risk management in education, there is a scientifically substantiated idea of universal approaches to modeling and compilation of methodological tools. This can be a favorable basis for the development of concepts of risk management in higher education institutions of Kazakhstan.

Funding information

This article was prepared within the framework of the project funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan (IRN grant № AP19679435 - Scientific and methodological support of the process of implementation of risk management in higher education institutions of Kazakhstan).

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

References

- Agarkov, G.A. (2015). Features of building a risk management system in federal universities of the Russian Federation. *University management: practice and analysis*, 6, 109-117.
- Ahn, A. (2013) Risk-management in education. *Vestnik KazNU. Series economic*, 5 (99), 117-121.
- AIRMIC, ALARM, IRM, (2002). Standards of Risk Management. *AIRMIC, ALARM, IRM: 2002, translation copyright FERMA: 2003.*
<http://www.ferma.eu/app/uploads/2011/11/a-risk-management-standardrussian-version.pdf>
- Belyaeva, M.A. (2014). Risk as a subject of scientific analysis in pedagogy and education. *Pedagogical Education in Russia*, 11, 16-23.
- Chubarova O.I. (2005) Educational risk as an economic category, its essence. *Polzunov Bulletin*, 1, 199-208.
- Delotte, (2024). Official web site of the international audit-consulting corporation. <https://www2.deloitte.com/global/en.html>.

- Higher Education Funding Council for England, (2001). Risk management: A guide to good practice for higher education institutions. *Technical report. Higher Education Funding Council for England - HEFCE (2001/28)*. ERIC Number: ED453709, 42. <https://eric.ed.gov/?id=ED453709>
- Higher Education Funding Council for England, (2005). Risk management in higher education. *A guide to good practice, prepared for HEFCE by Pricewater - house Coopers*, 41. https://dera.ioe.ac.uk/5600/1/05_11.pdf
- Huber, C. (2009). Risks and Risk-Based Regulation in Higher Education Institutions. *Tertiary Education and Management*, 15, 83-95. <https://www.researchgate.net/publication/233072297>
- Kazstandart. (2020). Risk Management. Guidelines. National State Standard of the Republic of Kazakhstan (ISO Standard No. 31000-2020). <https://www.kazinst.kz>.
- Kostyukova, T.P., & Lysenko, I.A. (2011). Risk management model of an educational institution. *Information-management systems*, 2, 73-76.
- Merna, T., & Al-Thani, F. (2008). Corporate risk management. *John Wiley & Sons, Ltd.*, 12, 22-26.
- Ministry of Education and Science of the Republic of Kazakhstan. (2021). Code of corporate governance of non-profit joint-stock company in the sphere of higher and postgraduate education from April 19, 2021, № 171 "On approval of the Code of corporate governance of non-profit joint-stock company in the sphere of higher and postgraduate education" (with amendments and additions from 21.04.2022g.) https://online.zakon.kz/Document/?doc_id=35234330
- Narayan, A.K. & Kommunuri, J. (2021) New development: The behavioral effects of risk management in higher education. *Public Money & Management*, 5, 1-3. <https://doi.org/10.1080/09540962.2021.1959985>
- Raanan Y. (2009). Risk management in higher education - do we need it? *Sinergie Journal*, 78, 43-56. https://www.researchgate.net/publication/260386067_Risk_Management_in_Higher_Education_-_Do_We_Need_it
- Shunkeeva, S.A., & Dyakov, D.V. (2023) To the issue of introducing risk management in higher education institutions of Kazakhstan (from the experience of Karaganda University named after E.A.Buketov). *Proceedings of the University, Section "Pedagogy of higher school. Economics"*, 3, 394-399. https://doi.org/10.52209/1609-1825_2023_3_394
- Utemov, V.V., & Ershova, S.V. (2021). Risk management in educational projects and programs. *Scientific and methodical electronic journal "Concept"*, 03 (March), 97-107. <https://doi.org/10.24412/2304-120X-2021-11017>.
- Zhetpisbaeva, B.A. (2023) Risk management as a factor of competitiveness of Kazakhstan universities. *Bulletin of Karaganda University. Series "Pedagogy"*, 3 (111), 39-45. <https://doi.org/10.31489/2023Ped3/39-45>.

Information about authors

Zhetpisbayeva Bakytgul Asylbekovna – Doctor of Pedagogical Sciences, Professor, Astana IT University, Astana, Kazakhstan, e-mail: zhetpisbajeva@mail.ru

Dyakov Dmitry Viktorovich – Candidate of Philological Sciences, Associate Professor of the Karaganda University named after Academician E.A. Buketov, Karaganda, Kazakhstan, e-mail: diakovd@mail.ru

Akybayeva Gulvira Sovetbekovna – Candidate of Economic Sciences, Associate Professor, Professor of the Karaganda University named after Academician E.A. Buketov, Karaganda, Kazakhstan, e-mail: akubaeva_g@mail.ru

Shunkeyeva Saule Alisherovna – PhD, Associate Professor at the Department of Pedagogy and Subject Methods at the National Center for Professional Development "Orleu" in the Karaganda Region, Karaganda, Kazakhstan, e-mail: saule_shunk@mail.ru