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Risk management and contingency factors in a public educational institution

Gestión de riesgos y factores contingenciales en una institución de educación pública

Gestão de riscos e fatores contingenciais em uma instituição de ensino pública

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Abstract

Purpose: The objective of this study was to examine the contingency factors that may affect risk management practices in a public Higher Education Institution (HEI).

Methodology: This is a case study with a quantitative-qualitative approach. Twenty participants who performed risk management functions at the HEI were selected. To achieve the research objective, a questionnaire was used and analyzed using descriptive statistics, and a semi-structured interview was conducted, with analysis based on content analysis and the construction of word clouds.

Results: The results relate to the analyzed contingency factors. In the external environment, regulation and the performance of control bodies stood out. In the organizational structure, the interference of intellectual capital and physical structure was observed. Regarding technology, the most relevant variable was data storage, along with the evident need for specialized risk management software. In the contingency factor "strategy", the improvement of management processes and the quality of resource use were identified as essential. In the "organizational size" factor, the strong influence of budgetary resources was noted. Finally, in the "organizational culture" factor, the need for greater internal cooperation among the institution's members was highlighted.

Contributions of the Study: This research identified contingency factors and obstacles that hinder the improvement of risk management within the institution. It was observed that the lack of knowledge among those responsible for risk management, the absence of an adequate organizational structure, the need for technological improvements, and the lack of regulatory support in ensuring compliance with regulations represent significant challenges to effective risk management.

Keywords: Risk management; Contingency Theory; Accounting.

Resumen

Objetivo: Identificar los factores de contingencia que pueden afectar las prácticas de gestión de riesgos en una Institución de Educación Superior (IES) pública.

Metodología: Se trata de un estudio de caso con un enfoque cuantitativo-cualitativo. Se seleccionaron veinte participantes que desempeñaban funciones relacionadas con la gestión de riesgos en la IES. Para lograr el objetivo de la investigación, se utilizó un cuestionario, analizado mediante estadística descriptiva, y una entrevista semiestructurada, cuyo análisis se basó en el análisis de contenido y en la construcción de nubes de palabras.

Resultados: Los resultados se relacionan con los factores de contingencia analizados. En el entorno externo, destacaron la regulación y el desempeño de los organismos de control. En la estructura organizacional se observó la interferencia entre el capital intelectual y la

infraestructura. En cuanto a la tecnología, la variable más relevante fue el almacenamiento de datos, así como la evidente necesidad de software específico para la gestión de riesgos. En el factor de contingencia "estrategia", se identificaron como esenciales la mejora de los procesos de gestión y la mejora de la calidad en el uso de los recursos. En el factor "tamaño organizacional", se observó una fuerte influencia de los recursos presupuestarios. Finalmente, en el factor "cultura organizacional", se destacó la necesidad de una mayor cooperación interna entre los miembros de la institución.

Contribuciones del estudio: Esta investigación contribuyó a identificar factores de contingencia y obstáculos que dificultan la mejora de la gestión de riesgos en la institución. Se observó que la falta de conocimiento por parte de los responsables de la gestión de riesgos, la ausencia de una estructura organizativa adecuada, la necesidad de mejoras tecnológicas y la falta de apoyo de los organismos de control para el cumplimiento normativo representan desafíos importantes para una gestión eficaz de riesgos.

Palabras clave: Gestión de riesgos; Teoría de la Contingencia; Contabilidad.

Resumo

Objetivo: Averiguar os fatores contingenciais que podem afetar as práticas de gestão de riscos em uma Instituição de Ensino Superior (IES) pública.

Metodologia: Trata-se de um estudo de caso com abordagem quantitativa-qualitativa. Foram selecionados 20 participantes que exerciam funções relacionadas à gestão de riscos na IES. Para atingir o objetivo da pesquisa, utilizou-se um questionário, analisado por meio de estatística descritiva, e uma entrevista semiestruturada, cuja análise foi realizada por meio de análise de conteúdo e da construção de nuvens de palavras.

Resultados: Os resultados estão relacionados aos fatores contingenciais analisados. No ambiente externo, destacaram-se a regulamentação e a atuação dos órgãos de controle. Na estrutura organizacional, observou-se a interferência entre o capital intelectual e a estrutura física. Quanto à tecnologia, a variável mais relevante foi o armazenamento de dados, além da evidenciada necessidade de um software específico para a gestão de riscos. No fator contingencial "estratégia", identificaram-se como essenciais o aprimoramento dos processos gerenciais e a melhoria na qualidade do uso dos recursos. No fator "tamanho organizacional", observou-se a forte influência dos recursos orçamentários. Por fim, no fator "cultura organizacional", evidenciou-se a necessidade de maior cooperação interna entre os membros da instituição.

Contribuições do Estudo: Esta pesquisa contribuiu para a identificação de fatores contingenciais e obstáculos que dificultam o aperfeiçoamento da gestão de riscos na instituição. Observou-se que a falta de conhecimento por parte dos responsáveis pela gestão de riscos, a ausência de uma estrutura organizacional adequada, a necessidade de melhorias tecnológicas e a falta de apoio dos órgãos de controle no cumprimento das regulamentações representam desafios significativos para uma gestão eficaz de riscos.

Palavras-chave: Gestão de riscos; Teoria Contingencial; Contabilidade.

1 Introduction

The control of an organization, as defined by Decree No. 9,203/2017, is seen as a structured tool to reduce potential risks and achieve institutional goals. In this way, risk management is a process overseen by senior management that aims to identify, evaluate, and handle potential events that could impact the entity. Additionally, its goal is to enhance the effectiveness of organizational internal control (Brazil, 2017a).

There is growing concern among internal users of entities about the mapping and control of risks within the organizational context, highlighting the relevance of risk management. Furthermore, through this tool, it is possible to identify and minimize the adverse effects of the internal and external environments in which the entity operates, expanding opportunities and enhancing performance in both public and private sector entities (Nascimento et al., 2020).

It is noticeable that, in the public sector, there is concern that entities are not adequately responding to pressures to introduce formal risk management systems driven by external factors. In this regard, the normative requirements and the imposition of legitimacy through society and external control bodies to which these entities are exposed stand out (Carlsson-Wall et al., 2019).

In federal public administration organizations, risk management is considered a recent development, as its mandatory nature was only established through Joint Normative Instruction MP/CGU No. 01, of May 11, 2016 (Brazil, 2016). Within federal public entities, Higher Education Institutions (HEIs) stand out, as they must use public resources efficiently and comply with existing regulations to optimize their evaluation and position in national or international rankings, and to acquire social legitimacy (Mapolón, 2008; Cartagena García & Martínez, 2010).

It should also be noted that an organization's risk management maturity is determined by its capacity in areas such as leadership, policies and strategies, the preparedness of its people for risk management, and the application of these skills across processes and partnerships. This is reflected in the results achieved in improving the entity's performance in fulfilling its institutional mission of producing value for stakeholders (TCU, 2018).

In 2018, according to the latest survey by the Federal Court of Accounts (TCU), the Federal University of Paraíba (UFPB) ranked 6th among Brazilian federal universities in the Integrated Index of Public Governance and Management (iGG). Even so, its iGG is still considered intermediate, which highlights the need for improvement to reach a higher level (UFPB, 2020).

Additionally, understanding Contingency Theory is necessary because it enables the identification of variables, called contingency factors, that may be related to the entity's internal or external environment. Furthermore, these factors can interfere with the introduction of tools, including risk management (Soares et al., 2019).

Contingency Theory seeks to understand how contingent factors—technology, culture, and the external environment—impact behavior and processes in organizations. Furthermore, it acknowledges that no two structures are the same, as each has its own characteristics and therefore interacts differently with its environment (Hu & Islam, 2012).

Given this, the following research problem arises: **How do contingent factors impact risk management practices in a public higher education institution (HEI)?** Therefore, this study aims to investigate the contingent factors that can affect risk management practices

through a case study at UFPB (Federal University of Paraíba). Furthermore, it seeks to contribute to identifying contingent factors that hinder the improvement of this practice in the public sector and to understanding how the organizational context can influence risk management.

It is worth mentioning that the choice of the institution studied was due to the ease of access to research data, since the researcher is a student at the institution. It should be noted that risk management aims to ensure the provision of services in the best possible way, balancing risks and benefits (Brazil, 2018d). Therefore, this research may help other federal Higher Education Institutions (HEIs) implement risk management effectively. The goal is to deliver services to society more efficiently and to enhance the understanding of risk management qualities in the administration of public HEIs from the perspective of their internal users.

2 Theoretical framework

2.1 Risk Management in the Public Sector and in the Brazilian Public Sector

In an increasingly complex, constantly changing environment, a risk management approach is fundamental to helping public organizations respond to their challenges. Successful implementation of risk management can lead to improvements in the quality of public services (Ávila, 2016).

Risk management is complex and may require extensive investigation to understand its realities. It is a key resource that can improve performance, decision-making, and control in the public sector, enhancing accountability. It must also provide accurate information for communication throughout the organization and to interested external stakeholders (Bakar et al., 2019).

The role of risk managers—control agents—is to influence the decision-making process by collecting and providing relevant information to strategic levels (Rana et al., 2019). In the public sector, however, this alignment is challenging, as a lack of regulatory support hampers the introduction of risk management. In this sense, there are obstacles to its development, in addition to the perspective of financial-accounting control (Klein Júnior, 2020).

It is known that the global financial crisis transformed the notion of risk into a central theme in the management of private and public entities. In light of this, the importance of risk management in replacing traditional technology-related procedures became evident. For this reason, several globally recognized frameworks were developed, such as the Committee of Sponsoring Organizations of the Treadway Commission (COSO) and ISO 31000, initially conceived for the private sector but later adapted for the public sector. Furthermore, similar frameworks were published in Canada in 2001; in the United Kingdom in 2004; and in Australia and New Zealand in 2014 (Rana et al., 2019).

Models such as COSO ERM and ISO 31000:2009 have been adopted as a basis for implementing risk management in the federal public administration. The objective is to create an internationally accepted legacy, although the Brazilian standards studied show a strong link with these international models. The way they are structured, with general guidelines, allows for the maintenance of national autonomy and their customization within the organizational context (Souza et al., 2020).

In Brazil, the publication of Joint Normative Instruction No. 1 was the first requirement regarding risk management for bodies of the Federal Executive Branch. In addition to any pilot approaches carried out, Law No. 13.303, of June 30, 2016, known as the State-Owned

Enterprises Law, also stands out, as it establishes, in its article 6, the obligation to adopt risk management practices for all public or mixed-economy entities (Brazil, 2013).

Joint Normative Instruction CGU/MP No. 1 of 2016 requires federal entities to implement, maintain, monitor, and review a risk management process compatible with their mission and strategic objectives. The regulation addresses the use and updating of the risk management model, which must be verified by senior management and all its employees or staff (Brazil, 2016).

In 2013, the Ministry of Budget, Planning and Management, within the scope of the National Program for Public Management and Debureaucratization (GesPública), established by Decree No. 5,378/2005 — later revoked by Decree No. 9,404/2017 — presented a translation of the British standard The Orange Book, entitled "Guidance Guide for Risk Management", to introduce the topic into the Brazilian public sector (Brazil, 2013b).

Regarding risk management in Brazilian public sector entities, despite the recognition of the pursuit and concern of various government bodies to issue standards aligned with international risk standards (COSO, ISO, Orange Book), the subject remains recent (Araújo, 2019).

From this perspective, the Brazilian Federal Court of Accounts (TCU) has the responsibility of ensuring the effective and proper management of public resources for the benefit of society. In 2018, a Risk Management Manual was introduced, outlining a systematization based on international best practices and promoting the adoption of risk management in public organizations (Brazil, 2018b). Figure 1 illustrates how the risk management process should be implemented and visualized in public organizations, according to the TCU, based on ISO 31000.

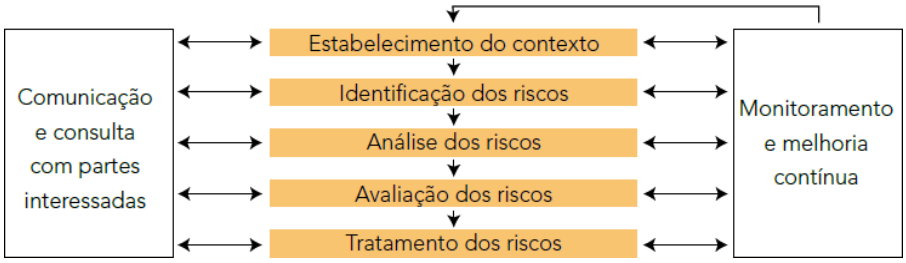

Figure 1 *Risk management process*
Source: *Brazil (2018c).*

As shown in Figure 1, several stages of the risk management process are evident. The first stage, establishing the context, involves understanding the external and internal environments in which the risk management object is embedded. Furthermore, it aims to identify parameters and criteria to be considered in the risk management process. The second stage, risk identification, involves recognizing and presenting the risks related to the objectives or results of the risk management object (Brazil, 2018c).

In the third stage, risk analysis, the focus is on understanding the risk and determining its level. The fourth stage, risk assessment, involves comparing the risk level with the exposure limit to determine whether the risk is acceptable. Finally, the risk treatment phase consists of planning and actions taken to modify the risk level in the entity (Brazil, 2018c).

2.2 Contingency Theory and Contingency Factors

In the 1950s, Contingency Theory emerged from the idea that entities can be compared to organisms; that is, they are open to their environments and need to reach a certain level of equilibrium with them. Also called the open systems approach, this school of thought had a significant impact on how organizations are conceptualized. The essential principle is that an effective organizational structure, operating in a specific environment, may not yield positive results in a different environment (Kulkarni, 2017).

Contingency Theory investigates how organizational factors, such as the decision-making process, are influenced by uncertain environments and the level of available information. Therefore, this theory raises possible variables that can interfere with this process, called contingencies. Furthermore, the uncertain environment Brazilian organizations have been facing—given the widespread dissemination of information about the political and economic crisis—has likely led entities to adopt new strategies and reorganize their structures. Thus, information in the managerial context is driven by environmental contingencies in the decision-making process (Soares et al., 2019).

Finally, Oliveira and Callado (2018) argue that Contingency Theory is fundamental for scientific studies to demonstrate the importance of organizations adapting to their operating context. Research using this theory identifies specific aspects of organizational operations associated with specific circumstances. This reveals an appropriate match that depends on the specific circumstances in which the organization finds itself (Otley, 1980).

According to Beuren and Fiorentin (2014), changes in the social context, technological advances, globalization, and a highly competitive market create uncertainties in organizational decision-making, affecting their survival. In short, the focus of Contingency Theory is to discover the relationship between organizational activities and specific contingencies (Macahon et al., 2015).

The changes occurring in the organizational structure of a Brazilian federal public university need to be observed, studied, and investigated. The focus should be on analyzing the external and internal contingent factors that generate changes in the organization's structures, in their form and function. Conducting studies on these factors is relevant because it enables the identification and development of alternatives in the structure and organization of a sector with distinctive characteristics. Furthermore, this provides opportunities to improve the organizational structure and the efficient performance of knowledge construction and reconstruction, as well as their transmission and dissemination (Santos et al., 2019).

Conceptually, contingency factors are elements that exert varying levels of influence on an entity, whether internal or external. Examples of these factors include aspects of the external environment, organizational structure, culture, and strategic leadership (Dutra, 2014).

The external environment is an important contextual variable, the basis of scientific studies on contingency, shaped by rising social pressure across environmental ecology, the economy, and the social well-being of employees and society. The environment can be classified into two types: uncertainty and risk. It is noteworthy that the former is among the most relevant aspects in environmental matters. The latter refers to situations involving the probability of events, whereas uncertainty arises when probabilities cannot be calculated and aspects of the environment are unpredictable (Chenhall, 2003).

Organizational structure, or the way an entity operates, results from how the management team responds to and adapts to the environment in which the organization conducts its operations to achieve certain levels of performance. Furthermore, it is formed by

various business processes and policies that the organization adopts over a long period, definitively incorporating these processes as constituent parts of the entity (Romero-Silva et al., 2018).

Another contingent factor is technology, which, in the organizational environment, is linked to the set of structured information of various types, provided by diverse sources, obtained through different methods, and used in the production of goods and services (Fleury, 1990). It is worth noting that, according to Rezende and Abreu (2000), Information Technology is defined as a set of computational resources for the manipulation and generation of information, composed of the following components: hardware, software, telecommunications systems, and data and information management.

Strategy is a contingent factor that managers can influence, shaping the external environment, the organization's technologies, structural mechanisms, culture, and management control systems (Chenhall, 2003). According to Silva (2013), strategy is a variable focused on the organization's decisions and strategic positioning, serving as the basis for Contingency Theory. Furthermore, it can affect the organizational structure, the type of management information required, and how that information is used.

Organizational culture is a contingent factor formed by standardized, interrelated traditions, constituted by inherent characteristics such as habits, customs, morals, laws, knowledge, beliefs, and art that people acquire in civil society and that directly or indirectly influence the entire existence of an entity (Chenhall, 2003). Previous research has demonstrated that norms, values, and beliefs within organizations exert a substantial impact on performance, sustainability, leadership, and organizational effectiveness (Ramadan & Borgonovi, 2015).

The contingent factor of size is considered one of the organizational elements that influence management methods, capable of explaining the complexity of entities and the need to implement and use performance management systems (Wadongo & Abdel-Kader, 2014). Considering the available resources, a larger organization presents more favorable conditions to take advantage of opportunities for operational expansion and to make greater investments in its practices. Thus, there is a greater obligation to control activities and employees through organizational tools (Klein & Almeida, 2017).

3 Methodological Procedures

3.1 Research Typology

This research is characterized, according to Vergara's (2016) criteria, by the relationship between ends and means. In terms of ends, it is classified as a descriptive study, since it sought to collect perceptions from the researched subjects and practices related to a specific phenomenon, aiming to describe the contingent factors that can affect risk management in a public Higher Education Institution (HEI).

Furthermore, the research is exploratory, since the analyzed theme contains little accumulated and systematized knowledge. Regarding the methods, according to Vergara's (2016) definition, the study can be considered a case study. It is worth noting that one of its characteristics is its limited scope, though it is deep and detailed.

The approach is quantitative-qualitative, combining diverse methods to obtain multiple perspectives on the object of study.

3.2 Research Subjects

The research subjects were selected through intentional non-probabilistic sampling, which, according to Gil (2019), aims to ensure that participants are representative and can provide relevant information for the study. In this sense, the interest fell on public servants who perform functions and hold positions in the Higher Education Institution (HEI) related to risk management and who have influence over others' opinions.

The inclusion criteria considered employees whose functions are associated with risk management practices in the researched entity. Conversely, employees whose activities do not involve risk management were excluded, as only those directly involved in this practice can provide more precise and fundamental information to address the research problem under investigation.

Furthermore, the research was submitted to the Ethics Committee, and its analysis can be consulted through the Certificate of Presentation for Ethical Appraisal (CAAE) No. 49803821.2.0000.5188, as well as through opinion No. 5.958.283.

Table 1 presents the research participants, comprised of subjects from the Pro-Rectorate for Planning and Development (PROPLAN), an auxiliary body of the entity's senior management, responsible for ensuring the efficiency of institutional actions and good governance through dimensions such as planning, evaluation, compliance, risk management, information management, and budget management (UFPB, 2021a).

Thus, all PROPLAN coordinators were selected, except the planning coordinator, who is the supervisor of this research, to avoid bias in the data. Therefore, of the four coordinators, three participated. An administrative assistant and an economist from PROPLAN were also included in the sample because, like the coordinators, they are involved in verifying institutional goals and their respective risks, and are jointly responsible for the Institutional Development Plan (PDI).

It was also decided to select collaborators from Internal Audit (AUDIN), as these professionals monitor and evaluate the effectiveness of risk management and control processes across the entity. Of the nine internal auditors, five agreed to participate in the study. In addition, two individuals from the Pro-Rectorate of Administration (PRA) were selected, who have functions delegated by the rector and assist senior management and staff in matters relating to risk management (UFPB, 2021b).

Furthermore, the research subjects include three superintendents from the public Higher Education Institution (HEI) – Campus I, as they are directly subordinate to the rector and have duties defined in the Rector's Office Regulations. Also participating were the compliance coordinator, a member of the HEI Governance Committee (CONGOV); the head of the Foreign Trade Advisory Office; the director of the Agreements and Conventions Division; and the coordinator of Accounting and Finance, all managers associated with the practice of risk management in the researched entity (UFPB, 2019b).

It can be seen that, from a universe of 24 individuals, 20 research participants were selected, as described in Table 1, and all responded to the research questionnaire. However, only 12 subjects participated in the semi-structured interview due to accessibility issues. To ensure participants' confidentiality, interviewees were identified by alphanumeric codes (A1, A2, A3, etc.). Subjects who only answered the questionnaire were marked with "**" for differentiation, as shown in Table 1.

Table 1

Research subjects

Research subjects	Designation in the interview
Administrative Assistant – PROPLAN	A1
AUDIN Coordinator	A2
Compliance Coordinator	A3
Information Coordinator – PROPLAN	A4
Agreements Coordinator – PROPLAN	A5
Superintendent of General Services	A6
Superintendent of Logistics and Transportation	A7
Budget Coordinator – PROPLAN	A8
Director of the Administration Coordination Advisory Office – PRA	A9
Head of the Foreign Trade Advisory Office	A10
Director of the Agreements and Conventions Division	A11
Vice-Rector – PRA	A12
Auditor – AUDIN	**
Auditor – AUDIN	**
Auditor – AUDIN	**
Auditor – AUDIN	**
Superintendent of Budget and Finance	**
Economist – PROPLAN	**
Accounting and Finance Coordinator	**
Budget and Finance Coordinator at SOF	**

Legend: PROPLAN = Vice-Rectorate for Planning and Development; AUDIN = Internal Audit; PRA = Vice-Rectorate for Administration; ** = Participants only in the research questionnaire

Source: *research data (2021).*

3.3 Data Collection

3.3.1 Instrument for collecting quantitative data

To obtain quantitative data, a structured questionnaire, adapted from Cavichioli (2017) and Araújo and Gomes (2021), was used. This instrument consisted of closed-ended questions aligned with the objectives proposed in this research. The questionnaire was divided into two blocks: Block I, tailored to the respondent's profile, and Block II, regarding contingent factors that affect risk management practices. The questions were formulated using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Initially, the questionnaire underwent a pre-test. Subsequently, it was administered in two ways: in person, through the researcher's visits to subjects at the institution; and virtually, via the Google Forms platform, sent to participants for whom in-person contact was not possible. Email addresses were provided by the institution, along with authorization to conduct the research, formalized through a letter of consent.

3.3.2 Instrument for collecting qualitative data

Qualitative data collection was carried out through semi-structured interviews, developed by the author based on an adaptation of Cavichioli's (2017) study and drawing on the theoretical

framework of this research. The objective was to describe the participants' perception of how contingency factors can affect risk management practices in Higher Education Institutions (HEIs).

The interviews were conducted in two ways: online via Google Meet with subjects working from home, and in person with participants at the higher education institution during the data collection period.

3.4 Results Analysis

In the analysis of quantitative data, descriptive statistics were used to present the frequency distribution of the results. The data were processed using Stata software (Software for Statistics and Data Science).

For the treatment of qualitative data, content analysis was adopted as proposed by Bardin (2011), which follows three main stages: (a) pre-analysis; (b) exploration of the material; and (c) treatment of the results, including inference and interpretation. Additionally, the ATLAS.ti software was used to generate word clouds from the interviews conducted.

4 Results and Analysis

4.1 Profile of Respondents

The participants in this research comprise a profile of 60% male and 40% female. The predominant age range is 31-50 years, accounting for 40% of respondents.

Regarding the highest academic qualification, 45% of participants hold a master's degree or are specialists, 15% hold a doctorate, and 5% have only an undergraduate degree, as shown in Table 2.

Table 2
Profile of respondents

Gender	Percentage	Age	Percentage	Degree	Percentage
Feminine	40%	Up to 30 years	5%	Undergraduate Degree	10%
		Between 31 and 40 years old	40%	Specialization Course	30%
Masculine	60%	Between 41 and 50 years old	40%	Master's	45%
		Over 50 years old	15%	PhD	15%

Source: *Research data (2021).*

4.2 Contingency Factors in Risk Management at Higher Education Institutions

4.2.1 External environmental factor

Table 3 presents data on the external environment's interference with the risk management process at the Higher Education Institution (HEI). It can be observed that the regulatory environment and control bodies are the variables that most impact risk management at the institution, with an average of 5.0. Next, social demands in management practice stand out, with an average of 4.15, and finally, the economic climate and the quality of services offered, both with an average of 4.0.

Cavichioli's (2017) study presents results that corroborate this research's findings, demonstrating that regulatory bodies are external environmental factors that exert intense pressure on public bodies' practices. Furthermore, Braga (2017) emphasizes that the regulatory environment directly affects risk management practices.

Table 3

External environment in risk management

External environment	Average	Median	Standard Deviation	Min	Max
1. The demands of society	4,15	4	0,82	2	5
2. Economic climate	4	4	0,93	2	5
3. Services offered	4	4,2	0,89	2	5
4. Regulatory environment	5	4,65	0,6	3	5
5. Control bodies	5	4,75	0,55	3	5

Source: *Research data (2021).*

4.2.2 Organizational structure factor

When examining how the contingent factor of organizational structure influences risk management in higher education institutions, as presented in Table 4, descriptive statistics show that the most prominent variables are the professional training of employees, with an average of 4.75 — demonstrating a greater impact on risk management — followed by decision-making (average of 4.5) and physical and human structure (average of 4.4).

Silva (2013) highlights that the organizational structure strongly influences the entity's strategic vision. Therefore, because risk management is conducted by employees directly involved in the organizational strategy, their decision-making and professional development significantly affect the effectiveness of risk management in higher education institutions.

Table 4

Organizational structure in risk management

Organizational Structure	Average	Median	Standard Deviation	Min	Max
1. Physical and human structure	4,4	4,5	0,76	2	5
2. New employees hired	3,6	4	1,19	1	5
3. Professional training	4,75	5	0,72	2	5
4. Organizational distribution	2,9	3	1	1	5

5. Decision making	4,5	5	0,76	2	5

Source: *Research data (2021).*

4.2.3 Organizational Size Factor

It is known that the resources available to an institution are directly related to investments in its practices, structure, and staff training (Klein & Almeida, 2017). Therefore, it is crucial to analyze participants' perceptions of the possibility that the higher education institution's budget could impact risk management.

Table 5 indicates that the majority of participants agree that the HEI's budget influences its risk management, evidenced by an average of 4.2.

Table 5
Organizational size in risk management

Organizational Size	Average	Median	Standard Deviation	Min	Max
1. Entity budget	4,2	4	0,9	2	5

Source: *Research data (2021).*

4.2.4 Technology Factor

Table 6 presents the technology contingency factor variables that most impact risk management in the HEI. All variables analyzed showed high averages, with data storage (4.40), operating systems (4.23), and the communication system (4.15) standing out.

These results are consistent with the study by Wadesango and Mhaka (2017), which highlights the need for greater central government investment in information technology, with a focus on strengthening risk management processes in public entities. Furthermore, the Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2017) highlights information systems as one of the essential principles for effective risk management.

Table 6
Technology in risk management

Information Technology	Average	Median	Standard Deviation	Min	Max
1. Operating systems (software)	4,23	3,45	0,94	2	5
2. Support from a professional with knowledge in technology	4	4	1,2	1	5
3. Data storage	4,40	4,25	0,79	3	5
4. Communication system	4,15	3,9	1	2	5
5. Data integration	4	4,1	1	2	5

Source: *Research data (2021).*

4.2.5 Organizational Culture Factor

Analyzing the data related to the organizational culture contingency factor in Table 7, it is observed that organizational cooperation (average 3.5) and organizational consensus (average

3.35) are the variables that most interfere with the risk management of the HEI, followed by the variables receptiveness (average 2.95) and proactivity (average 2.85).

In this sense, it is understood that cooperation and organizational consensus shape risk management practices in higher education institutions (HEIs). Borgonovi (2015) reports that organizational culture constitutes a contingent factor that directly influences the performance of organizational activities. Therefore, it is no different in HEIs, where these variables exert a strong influence on risk management practice.

Table 7
Organizational culture in risk management

Organizational Culture	Average	Median	Standard Deviation	Min	Max
1. Proactivity	2,85	3	0,93	1	4
2. Receptivity	2,95	3	1	1	4
3. Organizational cooperation	3,5	4	1,3	1	5
4. Organizational consensus	3,35	3,5	1	1	5

Source: *Research data (2021).*

4.2.6 Organizational Strategy Factor

As shown in Table 8, the results for the organizational strategy contingency factor indicate the following variables: improvement of management processes (4.25), quality in the use of resources (4.15), government budget programs (4.05), and federated entities (3.7).

It is worth mentioning that, according to Silva (2013), strategy is a contingent factor that impacts decision-making. Therefore, Table 8 highlights the need for managerial improvements and the quality of resource use as significant factors influencing risk management in higher education institutions.

Table 8
Organizational strategy in risk management

Strategy	Average	Median	Standard Deviation	Min	Max
1. Management process improvement	4,25	4	0,8	2	5
2. Government budget programs	4,05	4	0,94	2	5
3. Federated entities	3,7	4	1	1	5
4. Quality of resource use	4,15	4	0,74	3	5

Source: *Research data (2021).*

4.3 Analysis of the Interviews

4.3.1 External Environment

The research participants were asked about variables related to the external environment, such as the economic climate, social observatories, society, legislation, institutions, and oversight bodies that affect risk management in higher education institutions. According to respondents' statements, the data corroborate Cavichioli's (2017) research, which identified intense pressure from oversight bodies on practices in public entities.

The statements of interviewees A1 and A6 highlight the impact of the Comptroller General of the Union (CGU) on risk management. Furthermore, joint oversight of universities by the Federal Court of Accounts (TCU) and the CGU exists to ensure these organizations adopt best practices in public governance. This is because good governance requires effective risk management practices (Brazil, 2014a). These findings align with Braga's (2017) study, which emphasizes that oversight bodies provide legal frameworks to strengthen risk management and internal controls in public entities. This situation is no different in higher education institutions.

Furthermore, respondents A2 and A8 emphasized the role of society, the need for transparency, and the impact of the economy on risk management practices in higher education institutions. In this sense, it is observed that risk management was introduced in higher education institutions through social pressure for greater transparency, the use of public resources, compliance with legislation mandating its practice, oversight by regulatory bodies, and improved access to information within the institution. Among the responses from these research participants, the following stand out:

"I believe the changes made by the higher education institution regarding the implementation of risk management were due to legal demands and regulatory bodies" (A1).

"Risk management prevents failures in the public budget and, in the face of this crisis and budget reduction, any optimized saving of public expenditure reverts to the benefit of society. In this sense, the practice of risk management is beneficial" (A2).

"There is a demand for greater transparency, but it is also clear that the CGU (Brazilian Federal Comptroller General) was an external observer that influenced the adoption of risk management practices" (A6).

"There has been a trend since the 1988 Constitution itself regarding transparency in the use of public resources, which has evolved through various regulations, as well as the access to information law, and I believe that societal pressure influences the pursuit of better use of public resources. Therefore, regarding risk management to improve the use of public resources, I believe there has indeed been social pressure (A8)."

4.3.2 Strategy

The results obtained from the interviews show that the findings are similar to those of the research by Sedrez and Fernandes (2011), who already highlighted one of the biggest concerns of managers: the use of risk management tools for strategic risks. Thus, the research participants were asked how achieving strategic objectives in the higher education institution influences the risk management process.

In their responses, participants highlighted that risk management at the HEI seeks to reduce risks associated with strategic objectives, thereby facilitating the achievement of the goals outlined in the HEI's Institutional Development Plan (IDP) and enabling revisions to institutional planning. The word cloud (Figure 2) reveals the most frequently cited terms: objectives, goals, strategic, and planning.

Figure 2 *Word cloud strategy*
Source: research data (2021).

4.3.3 Technology

During the interview, participants in this research were asked how operating systems (software) and other technological resources assist in risk management practice.

It was therefore observed that some interviewees stated they were unaware of the use of specific risk management software, as evidenced by the responses of participants A3, A4, A8, and A10. However, their statements clearly demonstrated the need for software to optimize this practice within the public entity studied. For example, A3 highlighted the search for partnerships with other universities to learn how to use technologies that benefit risk management, as well as partnerships with other public higher education institutions to meet the demand for suitable software.

Participant A4 stated that the institution already has an action plan to acquire software to support risk management. On the other hand, A8's statement indicates dissatisfaction with the use of Excel as a risk management tool at the institution.

In contrast, interviewee A6 reported using the SIPAC system to map and identify risks at the higher education institution.

Thus, most findings are similar to those of Wadesango and Mhaka (2017), which highlight the need for the central government to provide and monitor systems that promote sound risk management processes, thereby reducing violations of corporate governance. Therefore, it is clear that the technology contingency factor is deficient in the HEI, compromising the efficiency of risk management, as illustrated in the following statements:

"To my knowledge, we do not have them, but I am participating in some courses in partnership with UFRN and UFPE, where the government itself will provide these technological tools. In fact, a new one will be launched this September and will be available to all Federal Institutions (IFs) free of charge and as open source. However, currently we only use the risk scales and matrices that are part of the risk management planning; more advanced software will greatly help in management (A3)."

"We have a technology plan, and in that plan, we always consider various items that relate to risk management in the use of software. There is a demand for software that assists in the risk management of the higher education institution (A4)."

"I am not aware of any software directly related to risk management (A6)."

"Here we use forms and documents provided by the TCU (Brazilian Federal Court of Accounts) itself, such as checklists and risk maps; we use those recommended by the TCU, but if any software exists, I am unaware of it (A10)."

"I know of a system called AGATA, created by the Ministry of Economy, that could be implemented here at the institution. A process has been opened for implementation because I personally do not like using Excel spreadsheets for risk management, and the AGATA system supports risk management. We could adopt this software project (A8)."

4.3.4 Organizational Culture

In analyzing the contingency factor of culture, the first step was to ask research participants how the higher education institution's organizational culture affected risk management practices. Were the employees resistant or receptive to the new practice? After this inquiry, it was observed that there were both resistant and receptive public servants to the practice of risk management.

The word cloud in Figure 3 brings together all the responses from this research. It is noted that the words resistance, neutrality, overload, and management were the most frequent. Therefore, greater resistance among public servants at higher education institutions (HEIs) to risk management practices is observed. When this occurs, it is possible to perceive that the contingent factor of culture, according to Borgonovi (2015), can negatively impact the entity through a lack of cooperation with new ideas and regulations, and a lack of consensus among HEI leaders and employees.

Figure 3 *Word Cloud: Organizational Culture*
Source: *research data (2021).*

4.3.5 Organizational Structure

In the research subjects' statements, it was expressed that intellectual capital, physical structure, technological aspects, and training influence risk management activity, consolidating the assertions of Romero et al. (2018), who highlight that organizational structure impacts operations, which also applies to the execution of risk management, as follows*:*

"The institution has very well-prepared technicians; however, there are some processes in the physical structure that need improvement. However, in theory, from a macro perspective, the institution is prepared to put risk management into practice (A2)".

"I understand that today the physical structure and human capacity of the higher education institution are not sufficient (A12)."

5 Final Considerations

The overall objective of this research was to investigate the contingent factors that can affect risk management practices in Higher Education Institutions (HEIs). To this end, multiple sources of evidence were used to broaden the understanding of the phenomenon under

investigation. In a case study at the HEI, key information was gathered through a questionnaire and interviews.

The results indicate that, regarding the external environment contingent factor, oversight bodies exert a substantial impact, encouraging public higher education institutions to adopt best practices in public governance, primarily through the efficiency of the risk management implemented. However, HEI managers need greater support from these bodies, especially in training, guidance, and effective risk management models, to ensure the requirements are fully met.

Regarding the contingent factor of organizational structure, the interviews revealed that intellectual capital, physical structure, technology, and training influence risk management activities. The variables Improvement of management processes (4.25), Quality of resource use (4.15), Budgetary government programs (4.05), and Federated entities (3.7) presented the highest averages, indicating a significant impact of this factor.

Regarding the technology contingency factor, the qualitative data indicated the need to implement software to optimize risk management at the HEI. For this reason, staff are seeking partnerships with other universities to improve the use of technologies to benefit this practice. The variables with the most significant impact were Data storage (4.40), Operating systems (4.23), and Communication systems (4.15).

Regarding the contingency factor of strategy, the variables with the highest averages were improvement of management processes (4.25), Quality of resource use (4.15), Government budgetary programs (4.05), and Federated entities (3.7). The responses indicated that risk management in the HEI seeks to reduce risks associated with strategic objectives, thereby facilitating the achievement of the goals outlined in the Institutional Development Plan (IDP).

Regarding the contingent factor of size, most participants agreed that the HEI's budget directly influences risk management, since the practice demands investment, and the lack of resources compromises the evolution and improvement of management.

Regarding the contingent factor of culture, the variables Organizational Cooperation (3.5) and Organizational Consensus (3.35) stood out as those that most interfere with risk management. Most employees showed resistance to new practices, and the lack of training contributes to reluctance towards innovation in the public sector, a situation repeated in the institution studied.

The benefits of this study lie in the new findings that broaden knowledge of risk management, identify opportunities for improvement, and pinpoint bottlenecks that limit its efficiency in higher education institutions, enabling targeted improvements. Furthermore, the research may assist other Federal Institutions of Higher Education (IFES) in identifying challenges to the proper implementation of risk management, with a view to providing more efficient services to society and strengthening the understanding of the characteristics of this management from the perspective of internal users.

Thus, this study is relevant to practice, given the need for appropriate risk management in response to oversight from internal and external control bodies. Furthermore, it is hoped that managers of public higher education institutions will reflect on the existing obstacles and aim to increase the maturity of risk management in their institutions.

Finally, some limitations should be considered when interpreting the data, mainly because the sample is restricted to employees of a single institution, thereby limiting generalizability. However, these limitations suggest future research that could expand the sample to include all federal higher education institutions to explore characteristics and

challenges across different institutional contexts, as well as to include contingent factors not considered in this study.

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