

Avaliação da Percepção dos Servidores Sobre a Gestão dos Riscos nas Instituições Públicas de Ensino Superior no Estado do Pará – Brasil

Evaluation of the servants' perception of risk management in Public Higher Education Institutions in the State of Pará – Brazil

Evaluación de la percepción de los servidores sobre la gestión del riesgo en las Instituciones de Educación Superior Públicas del Estado de Pará – Brasil

Michelly Cristina Bacelar Tavares do Nascimento

Universidade Federal do Pará, Brasil

<https://api.crossref.org/funders/501100007382>

michellycb@ufpa.br

Bruno Rafael Dias de Lucena

Universidade Federal do Pará, Brasil

<https://api.crossref.org/funders/501100007382>

brunolucena@ufpa.br

Marinalva Cardoso Maciel

Universidade Federal do Pará, Brasil

<https://api.crossref.org/funders/501100007382>

marinalvamaciel@gmail.com

Ronaldo Rosales Mendoza

Universidad Nacional de Costa Rica, Costa Rica

<https://api.crossref.org/funders/100018951>

ronaldo.rosales.mendoza@una.ac.cr

Recepción: 07 Noviembre 2023

Aprobación: 19 Febrero 2025

Publicación: 30 Junio 2025

Resumo

Objetivo da pesquisa: O objetivo desta pesquisa é compreender a percepção dos servidores públicos sobre a eficiência do uso da Gestão de Riscos Corporativos (GRC) nas IES, devido à sua imersão, competência e relevância no processo de gestão abrangente dos riscos institucionais.

Enquadramento teórico: Gestão de Riscos desempenha um papel crucial devido à complexidade e multiplicidade das razões que a justificam. Visto que a incerteza pode resultar em eventos de risco que afetam o alcance dos objetivos, e uma vez que esses objetivos são de extrema importância para a organização, é imperativo adotar uma abordagem proativa para garantir que sejam alcançados.

Metodologia: A pesquisa bibliográfica foi conduzida por meio do portal de periódicos CAPES. No questionário adaptado foi utilizada uma escala Likert de 5 pontos. Como abordagem alternativa ao escore total, foi utilizada a Teoria da Resposta ao Item, além da construção do coeficiente Alfa de Cronbach.

Resultados: Foram confirmadas as hipóteses: (i) a não execução das diretrizes à luz das orientações da Gestão do Risco Corporativo pode gerar inconsistências na implementação da Governança Pública no ambiente das universidades; e (ii) o desconhecimento dos servidores públicos federais acerca das diretrizes estabelecidas como um vetor de desconformidade quanto à mitigação dos riscos institucionais, apontando que as IES, no estado do Pará, estão no estágio inicial na implementação da GRC, e ainda não possuem algo concreto e bem determinado em relação às diretrizes.

Originalidade: A GRC é amplamente utilizada no setor privado, mas sua aplicação no setor público, em especial nas instituições de ensino superior, é uma vertente de gestão relativamente nova. Como tal, há poucas pesquisas direcionadas a esse contexto, o que torna esta pesquisa inovadora.

Contribuições Teóricas e Práticas: Este estudo contribui para a literatura sobre GRC, fornecendo insights sobre o estágio atual de implementação nas IES e destacando áreas que requerem maior atenção. Além disso, oferece contribuições práticas para gestores e dirigentes, destacando a importância da Gestão de Riscos Corporativos como uma ferramenta organizacional que pode aprimorar o desempenho institucional.

Palavras-chave: Gestão do Risco Corporativo, COSO, Instituições de Ensino Superior, Teoria da Resposta ao Item.

Abstract

Research Objective: The objective of this study is to comprehend public servants' perceptions regarding the effectiveness of Corporate Risk Management (CRM) in higher education institutions (HEIs), given their immersion, competence, and relevance in the comprehensive management of institutional risks.

Theoretical Framework: Risk management plays a pivotal role due to its complexity and multiplicity of reasons. Uncertainty can lead to risk events that affect the achievement of objectives, and since these objectives are of the utmost importance to the organization, it is imperative to adopt a proactive approach to ensure their attainment.

Methodology: The bibliographic research was conducted through the CAPES journal portal. The adapted questionnaire utilized a 5-point Likert scale. The Item Response Theory (IRT) was employed as an alternative approach to the total score, in addition to the construction of Cronbach's Alpha coefficient.

Results: The hypotheses were confirmed: (i) the non-execution of guidelines in light of Corporate Risk Management principles may lead to inconsistencies in the implementation of Public Governance in university environments; and (ii) the lack of awareness among federal public servants regarding the established guidelines serves as a vector of non-conformity in mitigating institutional risks, indicating that HEIs in the state of Pará are in the initial stage of CRM implementation and still lack something concrete and well-defined concerning the guidelines.

Originality: CRM is widely employed in the private sector, but its application in the public sector, particularly in higher education institutions, constitutes a relatively new management approach. As such, limited research is focused on this context, rendering this study innovative.

Theoretical and Practical Contributions: This study contributes to CRM literature by providing insights into the current implementation stage in HEIs and highlighting areas requiring greater attention. Furthermore, it offers practical contributions to managers and administrators, emphasizing the significance of Corporate Risk Management as an organizational tool that can enhance institutional performance.

Keywords: Corporate Risk Management, COSO, Higher Education Institutions, Item Response Theory.

Resumen

Objetivo de la investigación: El objetivo de esta investigación es comprender la percepción de los servidores públicos sobre la eficiencia del uso de la Gestión de Riesgos Corporativos (GRC) en las Instituciones de Educación Superior (IES), debido a su inmersión, competencia y relevancia en el proceso de gestión integral de los riesgos institucionales.

Marco teórico: La Gestión de Riesgos desempeña un papel crucial debido a la complejidad y multiplicidad de las razones que la justifican. Dado que la incertidumbre puede dar lugar a eventos de riesgo que afectan el logro de los objetivos, y dado que estos objetivos son de extrema importancia para la organización, es imperativo adoptar un enfoque proactivo para garantizar que se alcancen.

Metodología: Se llevó a cabo una investigación bibliográfica a través del portal de revistas CAPES. En el cuestionario adaptado se utilizó una escala Likert de 5 puntos. Como enfoque alternativo al puntaje total, se utilizó la Teoría de la Respuesta al Ítem, además de la construcción del coeficiente Alfa de Cronbach.

Resultados: Se confirmaron las hipótesis: (i) la no ejecución de las directrices a la luz de las orientaciones de la Gestión de Riesgos Corporativos puede generar inconsistencias en la implementación de la Gobernanza Pública en el entorno de las universidades; y (ii) el desconocimiento de los servidores públicos federales acerca de las directrices establecidas como un vector de no conformidad en cuanto a la mitigación de los riesgos institucionales, indicando que las IES en el estado de Pará están en una etapa inicial en la implementación de la GRC y aún no tienen algo concreto y bien definido en relación a las directrices.

Originalidad: La GRC se utiliza ampliamente en el sector privado, pero su aplicación en el sector público, especialmente en las instituciones de educación superior, es una vertiente de gestión relativamente nueva. Como tal, hay pocas investigaciones dirigidas a este contexto, lo que hace que esta investigación sea innovadora.

Aportes Teóricos y Prácticos: Este estudio contribuye a la literatura sobre GRC, proporcionando ideas sobre el estado actual de implementación en las IES y resaltando áreas que requieren mayor atención. Además, ofrece contribuciones prácticas para gestores y líderes, destacando la importancia de la Gestión de Riesgos Corporativos como una herramienta organizacional que puede mejorar el desempeño institucional.

Palabras clave: Gestión de Riesgos Corporativos, COSO, Instituciones de Educación Superior, Teoría de la Respuesta al Ítem.

1 INTRODUCTION

Risk management has been used in Brazilian public administration since 2016, with Normative Instruction No. 01, issued by the Ministry of Planning, Development, and Management and directed to federal executive bodies (Brazil, Public Minister, Comptroller General of the Union, 2016). It was incorporated into their internal control systems as part of the operational process to promote growth and adaptation to the demands for goods and services, thereby enhancing efficiency, effectiveness, and cost savings.

In private corporations, awareness of potential outcomes through risk management, combined with the need to respond to rapid changes brought about by globalization and regulatory pressures (Shad et al., 2019), led to the adoption of risk management models and even the pursuit of international certifications, such as the ISO 31,000 family of standards and the COSO framework (Committee of Sponsoring Organizations of the Treadway Commission, 2007).

In 2009, the ISO 31,000 standard was incorporated into the Brazilian standards collection by the Brazilian Association of Technical Standards (ABNT) under the title Risk Management: Principles and Guidelines. In 2018, it received its most recent update, undergoing a comprehensive technical revision and being retitled Risk Management: Guidelines, which has since guided risk management regulations established in Brazil.

The essence of internal control in public institutions is to support the corporate risk management process across governance, finance, and operations (Vieira & Barreto, 2019), as well as to address external events that may expose the entity to vulnerabilities in achieving its goals and objectives (Avdiiskii, Bezdenezhnykh, & Yartseva, 2021). This process aims to enhance the value of the organization's existence, although it presents challenges both in terms of implementation and cultural adaptation (Chen, Jiao & Harrison, 2018). Value generation is maximized by establishing clear strategies and objectives to achieve an optimal balance between growth targets, returns, and associated risks (Vieira & Barreto, 2019).

Implementing risk control and management practices is a multifaceted and complex task, posing a challenge for organizations continuously operating under tight budgets and financial constraints (Wolke, 2017; Almeida et al., 2019). In addition to the standards' nonlinearity, the absence of comprehensive examples ultimately limits the usefulness of existing frameworks (Prewett & Terry, 2018; Gorzeń-Mitka, 2013; Leitch, 2010).

Nevertheless, regulatory acts mandate the implementation of mechanisms aimed at enhancing Public Governance in the face of potential adverse events affecting the interests tied to the delivery of goods or services. These acts define and establish systems designed to create and preserve value (Vieira & Araújo, 2020; Ching, Rahim & Chung, 2021). Risk is understood as the uncertainty or likelihood of the occurrence of one or more events that could affect one or more objectives of an organization (Hillson, 2010).

To prevent negative impacts on objectives, it is necessary to act proactively by assessing critical significance and developing responses (action protocols) that create opportunities to avoid, reduce, minimize, monitor, or even transfer the effects of threats (Hillson, 2010; Calôba, 2018).

The emergence and growing popularity of Enterprise Risk Management (ERM) stem from globalization and increasing regulatory pressure on organizations to manage risk holistically (Shad et al., 2019). Furthermore, Sprčić, Pecina, and Orsag (2017) argue that Governance, Risk, and Compliance (GRC) provides entities with a more

comprehensive approach than traditional models. The adoption of GRC has grown significantly in recent years due to a series of corporate frauds and financial scandals (Lechner & Gatzert, 2017; Agarwal & Kallapur, 2018).

According to Calôba (2018), the first step in risk management is to define its principles. The organization must value and practice these principles to ensure effective management. ISO 31000 establishes criteria for effective risk management, which include: a) protecting and creating value for the organization; b) being an integral part of all organizational processes; c) being considered in decision-making; d) being systematic, structured, and timely; e) being based on the best available information; f) taking into account human and cultural factors; g) being transparent and inclusive; h) being dynamic, interactive, responsive to change, and enabling the continuous improvement of organizational processes.

The implementation steps are carried out iteratively throughout the organization's life cycle and include: 1) risk management planning; 2) risk identification, assessment, and analysis; 3) development of risk responses; and 4) risk monitoring and review of the risk management process (Hillson, 2006).

The organization's senior management adopts this approach to address issues related to agency problems and information asymmetries within the firm. As a result of these imperfections, an organization may implement formal risk management even in the absence of external frictions, or, conversely, may fail to apply risk management practices even when such frictions are present (Jankensgård, 2019; Al-Farsi, 2020).

In this context, Enterprise Risk Management (ERM) becomes a crucial element of an effective corporate governance system. Governance, Risk, and Compliance (GRC) encompasses activities and strategies that enable the identification, measurement, mitigation, or exploitation, as well as the control and monitoring of exposure to various types of corporate risks—whether strategic, financial, or operational (Lacković, Kurnoga & Sprčić, 2021). According to Vieira and Araújo (2020), in the realm of Public Governance, evidence shows that risk management practices within ministries remain incipient, with few complying with the principles, structures, and processes required by law.

As discussed by Gil (2002), Low et al. (2013), and Fraser and Simkins (2016), solution development requires careful consideration of techniques and methodologies that demand agility. This involves the ability to incorporate variables and engage relevant actors at all stages of the assessment. Beyond the stakeholders directly involved, the international committee must also evaluate these solutions, as highlighted by Malik, Zaman, and Buckby (2020).

Perception is a variable that is not directly observable in a study. The literature refers to this variable type as a latent variable, latent trait, or construct (Bollen, 1989, 2002). It can be inferred from secondary variables related to it using techniques such as Factor Analysis or Item Response Theory (IRT), as applied by Faye et al. (2011) and Andrade and Valle (2000).

Lord (1952) introduced IRT models in psychometrics, initially in the context of educational assessment. However, they can be applied in various fields that require the construction of latent measures (not directly observed), such as attitudes, beliefs, skills, motivation, and social perception, among others (Furr, 2011; Vieira, Moreira Junior & Potrich, 2019; Soares & Alves, 2023). IRT links the responses given to test or questionnaire items with the latent trait or construct of interest through mathematical models. In Brazil, it is used to estimate student proficiency in standardized exams such as the National High School Exam (ENEM).

Several IRT models have been proposed in the literature, differing in their mathematical formulation and the number of parameters specified (Hambleton, Swaminathan & Rogers, 1991). The choice of model depends on the nature of the variable, the number of populations involved, and the number of latent traits being measured (Andrade & Valle, 2000). Overcoming some of the limitations of traditional methods, IRT does not assume normality and does not require the measurement error to be constant across all individuals taking a test or completing a questionnaire (Faye et al., 2011).

In light of current guidelines and regulatory requirements, this research aims to understand public servants' perceptions of the effectiveness of GRC practices in HEIs, given their involvement, competence, and relevance in the comprehensive management of institutional risks. The analysis focuses on the impressions and opinions of

civil servants directly involved in the administrative activities of the Pro-Rectorates of Higher Education Institutions (HEIs) in the State of Pará.

Using the aforementioned approaches, it was possible to construct the Item Response Theory Index (IRT) and calculate Cronbach's Alpha coefficient. Through a survey and analysis based on IRT, the following hypotheses were confirmed: a) the absence of Corporate Risk Management-based guidelines may lead to inconsistencies in the implementation of Public Governance within universities; and b) the lack of awareness among federal civil servants regarding established guidelines contributes to non-compliance in mitigating institutional risks.

2 THEORETICAL FRAMEWORK

Risk is the effect of uncertainty on objectives. In the corporate context, risk can be understood as an uncertainty that, if it materializes, will impact one or more of an organization's objectives (Hillson, 2010). The existence of risk and uncertainty enables the development of responses aimed at seizing opportunities and reducing the effects of threats (Calôba, 2018).

Risk events can potentially produce negative, positive, or both impacts on an organization's objectives. Negative impacts represent threats that may undermine or even destroy the organization's value. In contrast, positive impacts may offset threats or present opportunities that support achieving objectives and contribute to creating or preserving organizational value (Committee of Sponsoring Organizations of the Treadway Commission, 2007).

The fundamental purpose of Risk Management is to create and protect organizational value. It not only enhances performance but also fosters innovation and facilitates the achievement of established goals (ABNT – Brazilian Association of Technical Standards, 2018).

As Wolke (2017) emphasized, Risk Management plays a crucial role due to the complexity and variety of reasons that justify its application. Since uncertainty can give rise to risk events that affect the attainment of objectives—and since these objectives are of the utmost importance to the organization—it is imperative to adopt a proactive approach to ensure their fulfillment. In this regard, Risk Management assumes a central role (Hillson, 2010).

2.1 Enterprise Risk Management

According to Sprčić et al. (2017), the notion that the Enterprise Risk Management (ERM) approach offers a more comprehensive perspective than traditional Risk Management is gaining increasing acceptance among scholars. In Traditional Risk Management (TRM), different categories of risks are managed independently across various parts of the organization, without considering their interactions or the overall impact on the organization's objectives. In contrast, ERM is a systematic and integrated approach to managing all direct and indirect risks that may affect the execution of the organization's strategy, including their ultimate impact on organizational or corporate value.

The emergence and growing adoption of Enterprise Risk Management (ERM) principles are driven mainly by the need for organizations to adapt to rapidly changing global environments and rising regulatory demands for holistic risk management (Shad et al., 2019). The ERM approach has gained traction among both researchers and practitioners in the field (Shad et al., 2019). According to Lechner and Gatzert (2017), this trend has been fueled by a range of factors, including financial scandals, corporate fraud, the increasing complexity of risks, and pressure from regulatory bodies.

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) defines ERM as a comprehensive process involving the Board of Directors, senior management, and all organizational members. This process is designed to guide corporate strategy, identify potential events that may impact the entity, and

manage risks within the organization’s risk appetite, thereby providing reasonable assurance regarding achieving strategic objectives (Committee of Sponsoring Organizations of the Treadway Commission, 2007).

GRC principles are the foundation for effective risk management and must be embedded and practiced throughout the organization to ensure effectiveness and efficiency (Calôba, 2018). According to ISO 31000 and Calôba (2018), effective risk management should be guided by the following principles: (i) create and protect value for the organization; (ii) be integrated into all organizational processes; (iii) be considered in decision-making; (iv) be systematic, structured, and timely; (v) be based on the best available information; (vi) take into account human and cultural factors; (vii) be transparent and inclusive; and (viii) be dynamic, interactive, and responsive to change, enabling continuous improvement of organizational processes. These principles provide essential guidance on the features of effective and efficient risk management, articulating its value and clarifying its intent and purpose.

Corporate Risk Management is a cyclical, iterative process rather than a set of isolated phases. The steps involved in GRC include risk management planning, risk identification, risk assessment and analysis, development of risk responses, and monitoring and reviewing the risk management process (Hillson, 2006). To implement GRC effectively and efficiently, it is essential to consider a range of factors that can influence outcomes. Table 1 presents good GRC practices as identified in contemporary literature.

Table 1: Corporate Risk Management Practices

ITEM	CORPORATE RISK MANAGEMENT PRACTICES	REFERENCE
I	Implement GRC to support management in reasonably ensuring that objectives will be achieved.	Lechner e Gatzert, 2017; Hillson 2010; Jankensgård, 2019; Al-Farsi, 2020.
II	Ensure support and encouragement from senior management.	Wong 2021; Vieira, 2020.
III	Keep the GRC plan aligned with strategic planning.	Fraser, 2016; Vieira, 2020.
IV	Assign proper importance to risk managers to identify and manage risks effectively.	Al-Farsi, 2020; Wong 2021; Sprcic, 2017.
V	Maintain a structurally strong Risk Committee to support GRC processes effectively.	Malik, 2020; Vieira, 2020.
VI	Foster a Risk Management culture within the organization.	Wong 2021; Agarwal 2018.

Source: Prepared by the authors, 2022.

The effective implementation of GRC within an organization plays a fundamental role in providing reasonable assurance regarding achieving its objectives (Lechner & Gatzert, 2017; Hillson, 2010; Jankensgård, 2019; Al-Farsi, 2020). It is important to highlight that failure to meet objectives can cause substantial damage to the organization and may even compromise its reputation. Notably, the support of senior management is crucial for the successful implementation of GRC, as leadership plays a central role in establishing the organization's GRC guidelines (Ching et al., 2021; Vieira & Araújo, 2020).

Another critical factor is integrating GRC into the organization’s strategic planning. According to Fraser and Simkins (2016), the success of GRC implementation depends on the organization’s openness, willingness to share information, and promotion of collaboration between senior management and staff. Furthermore, the role of risk managers must be recognized, as they are vital in identifying and managing risks effectively. The influence and engagement of risk managers are also key to the success of GRC initiatives (Al-Farsi, 2020).

An additional essential element is the Risk Committee, whose structural robustness is vital for optimizing the effectiveness of GRC processes (Malik et al., 2020). Creating a Risk Committee is considered a best governance practice, as it prevents excessive concentration of power and responsibility within the organization’s highest governing body (Vieira & Araújo, 2020). Finally, cultivating a risk-aware culture plays a critical role in the

effectiveness of GRC. This culture integrates GRC and governance principles with organizational understandings of risk, beliefs, and values (Agarwal & Kallapur, 2018). Organizational culture and communication are also central to GRC practices. In many cases, information about risk exposure fails to reach board members, resulting in significant corporate risks being excluded from the decision-making process. It is clear that without effective communication, risk management—no matter how technically sound—will not have a meaningful impact on organizational performance (Sprčić et al., 2017).

2.2 Corporate Risk Management in the Brazilian Public Service and Public Higher Education Institutions

In Brazil, regulatory bodies encourage the adoption of GRC practices with the aim of consolidating progress and ensuring the achievement of institutional objectives, thereby improving the delivery of services to society. However, the GRC appears to be in the early stages of development. Despite efforts to establish regulations to support its implementation, numerous challenges persist in executing Risk Management in the public sector. Normative Instruction No. 01, issued by the Ministry of Planning, Development, and Management in conjunction with the Office of the Comptroller General of the Union, as well as the Public Governance Decree (Decree No. 9,203 of November 22, 2017, amended by Decree No. 9,901 of July 8, 2019), issued by the Presidency of the Republic, were introduced to support and promote the implementation of GRC in Brazil.

GRC is presented as a solution adopted by senior management to address issues related to agency problems and information asymmetries within organizations. Due to these imperfections, an organization may adopt formal risk management even in the absence of external frictions or, conversely, may fail to adopt Risk Management practices even when such frictions are present (Jankensgård, 2019).

In a study conducted by Vieira & Araújo (2020), the stages of Risk Management were analyzed from a ministerial perspective. The findings indicate that although Risk Management systems were incorporated into the governance structures established by the ministries following the publication of the Joint Normative Instruction MP/CGU, the activities required for effective implementation were consistently disrupted in most cases. These disruptions were due not only to the need to align with the guidelines outlined in the 2017 Governance Decree, but also to the ministerial restructuring of 2019, which led to a “complete review of governance structures” in many of these entities and a complete reconfiguration of systems that were in various stages of development or implementation.

According to Lacković et al. (2021), GRC is considered a vital component of an effective corporate governance system. It encompasses activities and strategies enabling an organization to identify, assess, reduce, exploit, control, and monitor its exposure to various corporate risks—including strategic, financial, and operational risks. The research by Vieira & Araújo (2020) provides evidence that Risk Management practices in Brazilian ministries remain incipient, with few institutions following the principles, structures, and processes aligned with a contemporary Public Governance approach.

A bibliometric review published in 2021, without a time restriction, found only five articles in Brazilian journals that addressed risk management in the public sector (Silva, Silva, Alves, & Santos, 2021). These figures suggest that oversight bodies' efforts still lack a deeper analysis of effectiveness, which is essential for advancing this field within the public sector.

In the context of the public sector, Enterprise Risk Management plays a critical role in Brazilian Higher Education Institutions (HEIs), given the complexity and multifaceted nature of the environments in which they operate. According to Sedrez and Fernandes (2011), HEIs face multiple challenges, ranging from budget constraints to increasing pressure to deliver high-quality education in a highly competitive environment for resources.

Moreover, issues such as governance, regulatory compliance, and information security are of paramount importance for HEIs, given their responsibility to manage public resources and protect sensitive data belonging to

students and the academic community. Implementing a robust risk management program enables HEIs to proactively identify and assess potential risks, develop effective mitigation strategies, and continuously improve their processes and practices. This not only enhances institutional resilience in the face of adversity but also fosters transparency, accountability, and public trust, ensuring that these institutions can fulfill their mission of promoting education, research, and community engagement effectively and sustainably.

Thus, there remains a need to institutionalize a Risk Management culture within the public service and Brazilian Higher Education Institutions. This includes adopting a long-term perspective to enable the effective implementation of Risk Management systems. Such systems are essential for supporting Brazilian public administration's goals, which aim to serve the public interest and uphold society's trust in public institutions.

3 MATERIALS AND METHODS

The bibliographic research was conducted using the CAPES journal portal, employing keywords such as "Enterprise Risk Management," "Budget," and "Financial." In a separate search, the keywords "Enterprise Risk Management" combined with "Risk Manager" and "Risk Culture" were used. Additionally, a search was carried out in the Scopus database using the terms "Enterprise Risk Management" and "Public Organization." For both searches, the analysis period was defined as spanning from 2017 to 2022.

The big data analysis of the textual data was performed using multivariate statistical techniques, including lemmatization (the study of the etymology of words), word frequency counting, hierarchical characterization of data, and clustering and principal component factor analysis. This method was also employed by Mendoza et al. (2023). The results of the principal component analysis were represented graphically.

Through the application of the survey, the opinions and perceptions of staff members from the following institutions were collected: the Federal University of Pará (UFPA), the Rural University of the Amazon (UFRA), the Federal University of Southern and Southeastern Pará (UNIFESSPA), the Federal University of Western Pará (UFOPA), and the Federal Institute of Pará (IFPA). These respondents work directly in administrative activities linked to the Pro-Rectorates, as shown in Table 2. Of a total population of 913 employees, 215 participated in the survey, conducted between September 26, 2022, and January 18, 2023. The confidence level adopted was 95%, with a margin of error of 6%. The questions were grouped into dimensions to facilitate data analysis.

Table 2 – Pro-Rectorates surveyed from HEIs in the State of Pará

University	Pro-Rectorate of	Acronym
UFPA	Administration	PROAD
	Personnel Development and Management	PROGEP
	Planning and Institutional Development	PROPLAN
	Undergraduate Education	PROEG
	Extension	PROEX
	Research and Graduate Studies	PROPESP
	International Relations	PROINTER
UFRA	Education	PROEN
	Extension	PROEX
	Research and Technological Development	PROPED
	Student Affairs	PROAES
	Human Resources	PROGEP
	Planning and Institutional Development	PROPLADI
	Administration and Finance	PROAF
UNIFESSPA	Administration	PROAD
	Personnel Development and Management	PROGEP
	Undergraduate Education	PROEG
	Extension and Student Affairs	PROEX
	Graduate Studies, Research, and Technological Innovation	PROFIT
UFOPA	Administration	PROAD
	Culture, Community, and Extension	PROCCE
	Undergraduate Education	PROEN
	Human Resources	PROGEP
	Student Management	PROGES
	Planning and Institutional Development	PROPLAN
	Research, Graduate Studies, and Technological Innovation	PROPPIT
IFPA	Administration	PROAD
	Personnel Development and Management	PROGEP
	Education	PROEN
	Extension	PROEX
	Graduate Studies	PROPPG

Source: Prepared by the authors (2023).

The questionnaire used in this research was adapted from Lacković, Kurnoga, and Sprčić (2021) and consists of 29 questions. The first five questions refer to identifying the institution to which each respondent belongs, while the remaining 24 questions specifically address Corporate Risk Management. A 5-point Likert scale was used for the responses. The response options were as follows: 1. Strongly disagree, 2. Partially disagree, 3. Neither agree nor disagree, 4. Partially agree, and 5. Strongly agree.

In the traditional analysis, the overall perception of each respondent is calculated by summing the scores obtained for each statement, resulting in a total score. Item Response Theory (IRT) was applied as an alternative to the total score.

The model's basic assumptions are unidimensionality, which means that all questionnaire items measure the same latent trait, and local independence, which assumes that responses to different questionnaire items are independent given a respondent's level of perception. Unidimensionality, which implies local independence (Hambleton, Swaminathan & Rogers, 1991), was confirmed by Factor Analysis using a polychoric correlation matrix. This method accounts for the responses' ordinal nature, as Bollen (1989) recommended.

Additionally, Mokken Scale Analysis (MSA) was used to confirm the assumptions and evaluate the adequacy of the method (Ark, 2007; Faye et al., 2011). According to Faye et al. (2011), although MSA is based on non-

parametric models, it is valid for parametric IRT models because both share the same assumptions. Internal consistency was measured using Cronbach's Alpha coefficient, which quantifies the reliability of a questionnaire on a scale ranging from 0 to 1. Given the Likert scale nature of the questionnaire, this study adopted the graded response model proposed by Samejima (1969).

In Samejima's graded response model, used in this study, the five response alternatives for each item i are assumed to be ordered, and Y is a random variable representing the graded response for item i , taking on values $y = 1, 2, 3, 4, 5$.

Each item is described by a slope parameter α_i and by four threshold parameters β_i^y (the number of threshold parameters equals the number of response options minus one). The slope parameter α_i represents the item's ability to discriminate between respondents with different levels of perception. In contrast, β_i^y represents the level of the latent trait required to respond above threshold y with 50% probability (Matteucci & Stracqualursi, 2006).

The latent trait, which corresponds to the respondent's perception, is denoted by θ , and the probability that respondent j , with perception level θ_j , gives response y for item i can be expressed by:

$$P_{iy}(\theta_j) = P_{iy}^*(\theta_j) - P_{i(y+1)}^*(\theta_j),$$

Where:

$$P_{iy}^*(\theta_j) = P(Y \geq y | \alpha_i, \beta_{iy}, \theta_j) = \frac{1}{1 + e^{-\alpha_i(\theta_j - \beta_{iy})}}$$

represents the probability that respondent j 's response to item i is equal to or greater than score y , conditional on the level of perception q . For the complete definition of the model, the probability that a respondent's answer is equal to or lower than the lowest score is given by $P_{i1}^*(\theta_j) = 1$, while the probability of a response above the highest category is $P_{i5}^*(\theta_j) = 0$.

The analysis was conducted using Stata software, which provided estimates for the parameters α_i , β_{iy} , and the latent variable—server perception— θ_j , along with their standard errors. The estimated values of θ_j typically range from -4 to 4 $[-4,4]$. However, for presentation purposes, a scale transformation can be applied. In this study, we chose to transform the scale to $(50,10)$, meaning the indicator has a mean of 50 and a standard deviation of 10.

A correlation was calculated between the total perception score (the sum of each respondent's item scores) and the perception estimate produced by Item Response Theory (IRT) to confirm the measurement's reliability. Additionally, the perception scale was segmented to identify which items are most strongly associated with employees' levels of perception. This facilitated understanding by linking the IRT-generated indicator to its constituent items.

To avoid segmentation by quartiles, the latent variable was estimated using the graded response model to create the interpretive groups. The decision not to divide the sample into quartiles was based on exploratory analysis, which revealed a high level of agreement across items; given the characteristics of the sample, quartile-based segmentation could have resulted in artificial or unnecessary groupings.

Using hierarchical cluster analysis, cases were grouped based on response probabilities for each item/category. The groupings were determined through the analysis of a dendrogram, a diagram that shows the structure of the clusters formed during the hierarchical clustering process.

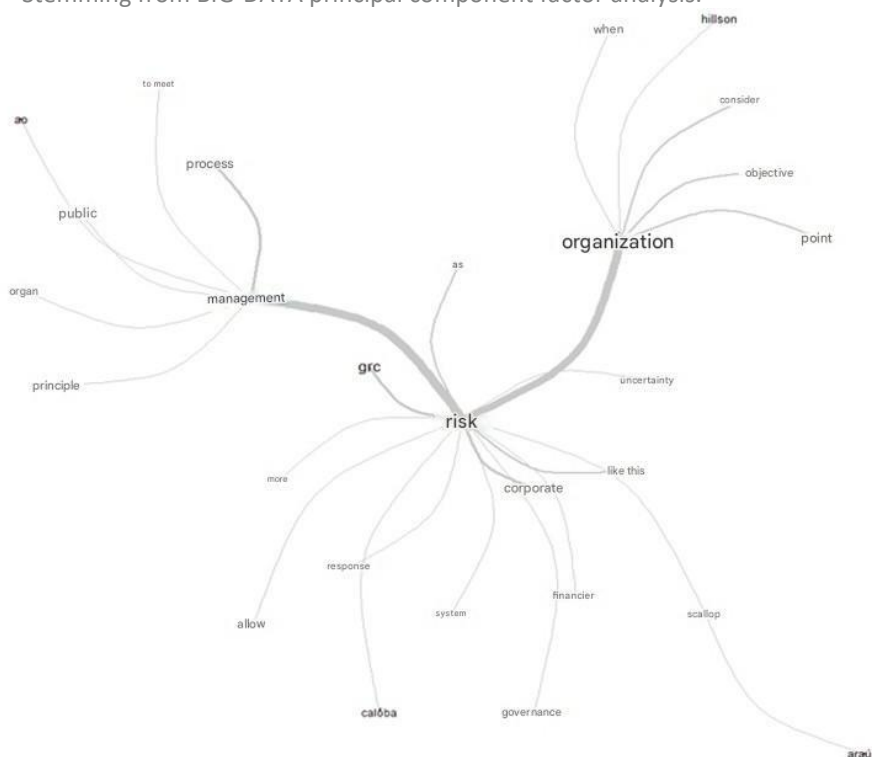
For analytical purposes, the 24 items were categorized into the following dimensions: 1) Creation of GRC Policies and Standards (5 items); 2) Risk Mapping in HEIs (5 items); 3) Risk Analysis and Treatment (2 items); 4) Internal and External Communication Regarding the GRC Process (8 items); and 5) Risk Assessment and Strategic Planning (4 items).

The data will be analyzed based on these groupings to facilitate the interpretation and presentation of the results. The initial stage will assess the scale's internal consistency and report the percentage distribution by response category.

4 RESULTS AND DISCUSSION

The results of the bibliographic analysis are presented in Figure 1, illustrating the relationships between words that highlight the corporate risk management approach. This approach is grounded in observing uncertainties and aims to establish a response system that enables and ensures effective governance. This perspective aligns with the principles outlined by Calôba (2018), as well as with the contributions of Chen, Jiao, and Harrison (2018), Vieira and Barreto (2019), and Avdiiskii, Bezdenezhnykh, and Yartseva (2021), in the pursuit of an optimal balance between growth objectives.

Figure 1 – Stemming from BIG-DATA principal component factor analysis.



Source: Prepared by the authors (2023).

Management, particularly in public agencies, focuses on processes aligned with the organization’s objectives, as discussed by Hillson (2010), Shad et al. (2019), and Vieira and Araújo (2020). The key is to develop resilient and adaptable processes and systems that incorporate interdisciplinary and multidisciplinary approaches, as Mendoza and Lima (2022) proposed in the context of the polymath solutions construct.

Regarding scale consistency, the overall Cronbach’s alpha coefficient was 0.97, indicating high internal consistency. For the individual dimensions, Cronbach’s alpha values ranged from 0.67 to 0.93; the highest coefficients were found in dimensions 1, 2, and 3, indicating stronger internal consistency within those areas. The results are presented in Table 3.

Table 3 – Dimensions and Cronbach's Alpha Coefficients

Dimension	Cronbach's Alpha
1. Policy and Standards Creation	0.92
2. Risk Mapping	0.92
3. Risk Analysis and Treatment	0.93
4. Internal and External Communication	0.67
5. Risk Assessment and Strategic Planning	0.73

Source: Prepared by the authors (2023).

In the analysis of response proportions (Table 4), it can be observed that in Dimension 1, the highest percentages of responses fall within the neutral and agreement categories (“Neither agree nor disagree” and “Agree”) across all items—except for Item 2: “I feel well-informed about corporate Risk Management practices,” where the percentage of partial disagreement exceeds that of neutrality. This item also shows a noteworthy percentage of total disagreement, with approximately 19% of respondents selecting this option. It is also worth noting that only in Item 3—“Senior management (Rector, Vice-Rector, Pro-Rectors) is continuously and proactively supporting the Risk Management process at the HEI you are part of”—does the percentage of neutral responses exceed the percentage of agreement.

Table 4 – Percentage of responses by item and dimension

Items / Dimension	1	2	3	4	5
Dimension 1 – Creation of GRC Policies and Standards (Cronbach's Alpha = 0.92)					
1. A policy, procedure, or official guideline for Risk Management is used at the HEI you are part of.	7.9	12.6	22.8	37.6	19.1
2. I feel well-informed about corporate Risk Management practices.	18.6	22.8	20.5	31.6	6.5
3. Senior management (Rector, Vice-Rector, Pro-Rectors) continuously and proactively supports the Risk Management process at the HEI you are part of.	9.3	15.3	31.7	28.4	15.3
4. A formal policy, procedure, guideline, or directive aimed at managing crises is used in the organization.	8.8	19.5	30.8	32.1	8.8
5. The organization uses clear guidelines for identifying corporate risks to standardize the methodology and risk identification process.	12.1	19.5	25.6	33.0	9.8
Dimension 2 – Risk Mapping in HEIs (Cronbach's Alpha = 0.92)					
6. The HEI uses corporate risk analysis that estimates the probability of each risk event and its impact on the organization's objectives.	8.4	16.7	36.8	26.5	11.6
7. Corporate risk identification and analysis are carried out at least once a year at the HEI you are part of, whether institutionally or within your work sector.	18.1	16.3	28.8	27.0	9.8

8. At the HEI you are part of, interdependencies among corporate risks are also analyzed once corporate risks are identified.	13.5	14.4	41.8	25.6	4.7
9. The HEI you are part of uses quantitative techniques for risk analysis.	8.4	12.6	46.0	24.2	8.8
10. The impact of risks on the organization's strategy and the indicators supporting the magnitude of these risks are quantified.	8.4	14.9	43.7	27.0	6.0
Dimension 3 – Risk Analysis and Treatment (Cronbach's Alpha = 0.93)					
11. Clear measures are defined for treating relevant corporate risks in your HEI.	12.1	17.2	35.3	29.8	5.6
12. A risk register containing information about all corporate risks to which the HEI is exposed and the response actions for relevant risks is available (e.g., as an internal/external website or accessible document).	14.4	15.3	39.2	23.7	7.4
Dimension 4 – Internal and External Communication on the GRC Process (Cronbach's Alpha = 0.67)					
13. The HEI conducts training courses, workshops, or corporate Risk Management events where managers and staff discuss topics such as risk exposure, types of risks, and Risk Management strategies.	11.6	14.9	21.4	34.0	18.1
14. Senior management periodically receives formal reports on the HEI's corporate Risk Management.	7.0	9.8	55.3	20.0	7.9
15. Currently, at the HEI I work for, there is an office/department responsible for disseminating information and encouraging corporate Risk Management practices.	14.4	10.2	25.6	27.0	22.8
16. At the HEI I am part of, there is an official communication channel for sharing information between management units (Pro-Rectorates) and administrative units regarding corporate Risk Management topics.	12.6	17.2	36.7	20.5	13.0
17. Senior management (rector and/or pro-rectors) is informed about risk management issues that exceed the authority of unit managers.	7.9	13.0	45.6	26.5	7.0
18. Senior management openly discusses Risk Management with lower-level leaders beyond cases where strategic plan objectives are at risk (e.g., to give feedback on risk reports, receive additional information, etc.).	19.5	13.5	40.0	23.7	3.3

19. The organization’s external stakeholders (academic community and society) are formally informed about the risks the organization is exposed to (through reports, documents, institutional websites, and/or other publicly available means).	17.2	19.5	44.7	15.8	2.8
20. The objectives of your HEI and the identified risks that threaten achieving those objectives are clearly communicated to staff at all organizational levels.	15.3	24.7	42.8	12.1	5.1
Dimension 5 – Risk Assessment and Strategic Planning (Cronbach’s Alpha = 0.73)					
21. Significant findings from the Risk Management process (weaknesses, major threats, opportunities, etc.) are formally incorporated into strategic decision-making at the HEI you are part of.	8.8	12.6	45.2	26.0	7.4
22. The strategy for managing identified risks and the exposure to internal and external risk factors is periodically reviewed and reassessed.	9.3	13.0	48.3	24.7	4.7
23. Information about the risks to which the HEI is exposed is considered when planning future strategic activities and setting strategic goals.	7.9	13.0	35.8	34.0	9.3
24. At the HEI I work for, a designated department or staff member continuously and actively oversees the corporate risk management process.	9.8	15.3	35.4	27.4	12.1

Source: Prepared by the authors (2023).

In Dimensions 2 and 3, the highest percentage of responses fell under the neutrality category for all items, followed by agreement. A notable exception appears in Item 7 — “Corporate risk identification and analysis are carried out at least once a year at the HEI you are part of, whether institutionally or within your work sector” — where the total percentage of disagreement was around 18%. Dimensions 2 and 3 essentially address the execution of risk analysis within a corporate context. Based on employee responses, it can be inferred that although internal standards exist, the actual implementation of the GRC process in HEIs is not perceived. In other words, the formal standards are not reflected in the internal regulations of the units and subunits, preventing the effective incorporation of a GRC culture in the HEIs.

In Dimension 4, six items had a higher percentage of neutral responses. Notably, 55% of respondents chose “neither agree nor disagree” for the statement: “Senior management periodically receives formal reports on the HEI’s corporate Risk Management.” According to ISO 31000, organizational managers and leadership are expected to communicate the value of risk management throughout the organization and to external stakeholders. Therefore, the results of this dimension point to a conceptual and practical gap: there is a lack of perceived communication between the organization’s leadership and its units and subunits regarding GRC.

On the other hand, agreement was the most frequent response in Items 13 and 15. This suggests that employees have had opportunities to expand their knowledge of risk management and that HEIs have identified the departments or individuals responsible for addressing the topic internally. However, this increased access to information and assignment of responsibility for GRC has not yet translated into a broader cultural shift within the organizations toward proactive risk management.

Highlights include Item 18, where approximately 20% of respondents strongly disagreed with the statement: “Senior management openly discusses Risk Management with lower-level leaders beyond cases where strategic plan objectives are at risk (e.g., to give feedback on risk reports, receive additional information, etc.),” and Item

15, where 23% of respondents strongly agreed with the statement: “Currently, at the HEI I work for, there is an office/department responsible for disseminating information and encouraging corporate Risk Management practices.”

In Dimension 5, most respondents selected neutral responses. These items are related to the employee’s ability to perceive the implementation of risk responses, whether through actions or process changes. This phase represents the final stage in the risk management cycle. A lack of perceived impact may suggest a low level of GRC maturity within the HEI. Conversely, only in Item 23 did the percentage of partial agreement exceed 30%, which may indicate that risk is being considered in the strategic planning revisions currently underway in the HEIs. While this is a positive development, it does not address the full range of risks encountered at the tactical and operational levels within the HEIs’ various units and subunits.

To apply the IRT model, unidimensionality was initially confirmed through Factor Analysis, which, using various factor-loading estimation criteria, identified a primary factor explaining over 80% of the total variance. Additionally, the assumptions were validated using Mokken Scale Analysis (MSA), which yielded an overall coefficient of 0.65. This coefficient indicates high discrimination among the items, ensuring greater confidence in ranking respondents according to the scores estimated by the graded IRT model. The estimated discrimination (α_i) and difficulty (β_i^y) parameters of the Graded Response Model are presented in Table 5.

Table 5 – Estimated Coefficients of the Graded IRT Model

Item	α_i	β_{i2}	β_{i3}	β_{i4}	β_{i5}
1	2.392064	-1.83924	-0.99096	-0.14483	1.099174
2	2.121074	-1.16387	-0.27536	0.410986	1.973299
3	2.611572	-1.66247	-0.81503	0.224699	1.230149
4	2.868063	-1.62821	-0.63895	0.273125	1.555123
5	3.909287	-1.33158	-0.51153	0.234031	1.386613
6	3.358199	-1.65015	-0.72114	0.391983	1.320822
7	2.454061	-1.13843	-0.46804	0.427333	1.575445
8	2.371196	-1.41932	-0.70698	0.634291	2.040124
9	3.656788	-1.61035	-0.86419	0.504021	1.459912
10	3.423966	-1.60538	-0.78749	0.487342	1.704708
11	3.354967	-1.36446	-0.5885	0.422468	1.761706
12	2.762963	-1.29425	-0.58529	0.599098	1.690926
13	1.861007	-1.68814	-0.8457	-0.03087	1.232338
14	3.075223	-1.73388	-1.09221	0.648967	1.581588
15	1.590368	-1.53751	-0.95554	0.054107	1.13886
16	2.224056	-1.48204	-0.67529	0.544148	1.427555
17	2.266401	-1.82356	-0.96192	0.549058	1.838524
18	2.547398	-1.06395	-0.52152	0.743284	2.152818
19	2.320514	-1.18668	-0.39453	1.083287	2.358996
20	1.829105	-1.40362	-0.33966	1.275933	2.272138
21	2.882274	-1.60665	-0.8833	0.520332	1.687553
22	2.968104	-1.58705	-0.85446	0.637789	1.92747
23	2.953029	-1.6966	-0.90986	0.208826	1.516342
24	2.592773	-1.59527	-0.8127	0.325786	1.392611

Source: Prepared by the authors (2023).

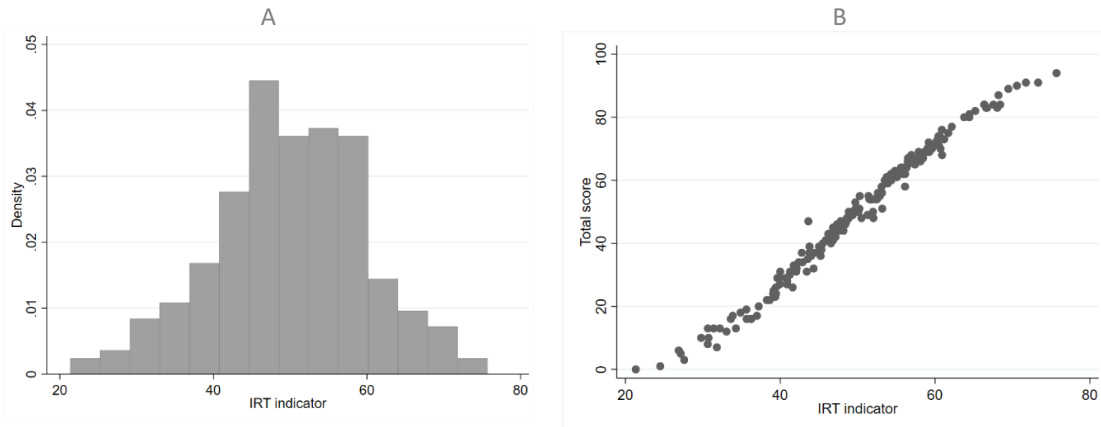
The estimates indicate that the items with the highest discriminatory power are: Item 5 in Dimension 1; Items 6, 9, and 10 in Dimension 2; Item 11 in Dimension 3; Item 14 in Dimension 4; and Items 22 and 23 in Dimension 5. These items most effectively differentiate employees across levels of perception. Items 8, 18, 19, and 20 are

considered the most difficult, as they require a high level of perception regarding Corporate Risk Management practices for respondents to agree with the statements with a probability above 50%.

Based on the estimated parameters, the perception indicators were calculated and then transformed to the (50,10) scale to improve readability. The frequency distribution of the indicator is presented in Figure 2a.

The values of the indicators are observed to be concentrated around the mean. The Pearson correlation coefficient was calculated to compare the indicator generated by the IRT with the traditional total score, yielding a value of 0.99. Figure 2b presents the scatter plot between the total perception score and the IRT-generated perception indicator, clearly showing a strong association between the two measures.

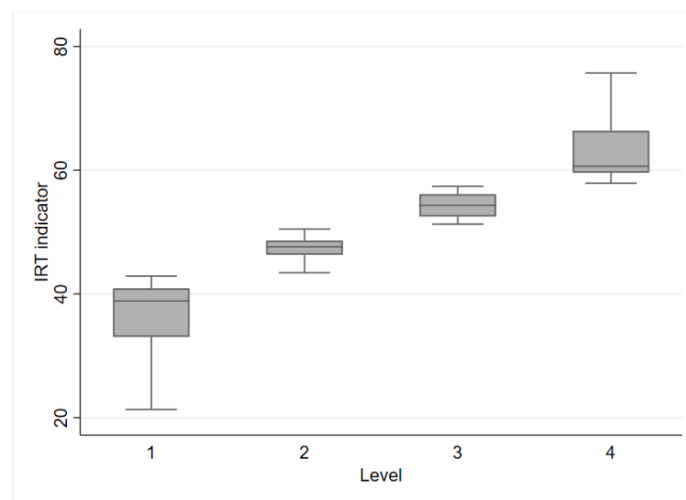
Figure 2 – A) Histogram of the IRT Indicator, B) Scatter Plot of Total Score vs. IRT Indicator



Source: Prepared by the authors (2023).

Based on Cluster Analysis, the estimated perception indicator was subdivided into four ascending levels of employee perception regarding Corporate Risk Management practices, as illustrated in Figure 3. The cluster analysis clearly distinguished the levels, and the difference between their means was confirmed using ANOVA (p -value = 0.000).

Figure 3 – Box Plot of the IRT Indicator by Perception Level



Source: Prepared by the authors (2023).

The perception levels were described based on the dimensions assessed in the survey. The aim is to identify which items stood out most in each dimension from the employees' perspective.

a) Level 1 – Employees with Low Perception

This level includes 50 employees (23% of the sample) who generally totally or partially disagreed with the statements across all items. In Dimension 1, the greatest level of disagreement was observed in Item 5: "The organization uses clear guidelines for identifying corporate risks to standardize the methodology and risk identification process." In Dimension 2, partial disagreement predominated, with Item 7 registering the highest percentage of total disagreement. In Dimension 3, both items showed a higher incidence of total disagreement. In Dimension 4, Item 18 recorded the highest percentage of total disagreement. In Dimension 5, all items were associated with partial disagreement.

b) Level 2 – Employees with Neutral Perception

This level includes 62 employees (29% of the sample), who predominantly selected neutral responses ("neither agree nor disagree") or partial disagreement. In Dimension 1, responses were mostly neutral, except for Item 6, which had the highest percentage of partial disagreement. In Dimensions 2 and 3, most employees expressed neutrality. In Dimension 4, responses were also mostly neutral, but Items 19 and 20 stood out for having the highest percentages of partial disagreement. In Dimension 5, neutrality also prevailed, although a small percentage of partial agreement was observed for Item 13.

c) Level 3 – Employees with High Perception

This level includes 55 employees (26% of the sample), whose responses ranged from neutral to partial agreement. In Dimension 1, the highest level of neutrality was found in Item 2, while the greatest percentage of partial agreement occurred in Item 1. In Dimension 2, neutrality prevailed, except for Item 6, which had the highest percentage of partial agreement. Neutral responses characterized dimension 3, as did Dimension 4, except for Item 13, which stood out for having a high percentage of partial agreement. In Dimension 5, employees were generally neutral, with Item 24 showing the highest percentage of partial agreement.

d) Level 4 – Employees with Very High Perception

This level includes 48 employees (22% of the sample), who generally expressed partial or total agreement with the statements across all items. Regarding the items on the creation of GRC policies and standards at their HEIs (Dimension 1), total agreement was highest for Items 1 and 3. For the items related to risk mapping at the HEIs (Dimension 2), employees generally agreed with the statements. This response pattern was also observed in the dimension of Risk Analysis and Treatment (Dimension 3). In Dimension 4, employees showed a higher percentage of total agreement with Item 15, while Items 18, 19, and 20 saw an increase in the proportion of respondents who neither agreed nor disagreed. Finally, employees agreed with the statements related to Risk Assessment and Strategic Planning (Dimension 5), with Item 23 recording the highest percentage of total agreement.

Following the analysis, it was possible to verify and confirm Hypothesis 1: failure to implement the guidelines in accordance with established directives may lead to inconsistencies in the implementation of Public Governance within the university environment. The results indicate that HEIs are still in the early stages of implementation and do not yet have concrete, well-defined structures related to the guidelines. Therefore, Hypothesis 1 is confirmed.

Regarding Hypothesis 2: the lack of knowledge among federal civil servants about the guidelines established by the GRC serves as a contributing factor to non-compliance in the mitigation of institutional risks. The interviews revealed that while many civil servants are aware of or have heard of these guidelines within their institutions,

they are unfamiliar with the content, implementation procedures, or the existence of formal standards, policies, or documents. A significant number of respondents chose neutral answers, suggesting a lack of knowledge about the process. Although there is a growing movement to train civil servants, the impact of these efforts is expected to be observed only in the future. Thus, Hypothesis 2 is also confirmed.

The study conducted by Araújo and Gomes (2021) on Brazilian federal universities found that a lack of staff training was a limiting factor for successful implementation, along with low levels of engagement among civil servants. However, in the case of HEIs in Pará, risk management training is perceived as being available, suggesting a higher level of GRC maturity compared to prior studies. Engagement, however, still appears to require additional incentives beyond training alone.

Furthermore, as Araújo and Gomes (2021) highlighted, the universities analyzed at the time lacked adequate structures to support effective risk management. In the context of Pará, employees perceive the existence of a department responsible for implementing and regulating GRC within institutions. However, this regulation has not been efficiently disseminated among staff, hindering the proper execution of risk management.

The research conducted by Pinto, Nogueira, and Cerquinho (2020) found a balanced level of compliance with Normative Instruction No. 01/2016, suggesting that most risk management policies adhered to more than half of the provisions established by the regulation. This reflects a significant effort to develop policies aimed at the effective implementation of risk management, beyond mere regulatory compliance.

On the other hand, the findings of this study reveal that, although GRC guidelines are present in the HEIs of Pará, they are not yet fully operational. These guidelines remain at a strategic level and have not been translated into practical actions within the institutions' internal units. This contrast suggests that although the policies and guidelines may have been developed with intent and dedication, their effective implementation in Pará's HEIs has yet to be realized, leaving them at an initial stage of practical application.

In summary, GRC in the HEIs of Pará is still in its early stages and requires more focused attention to be effectively implemented and produce positive institutional outcomes. Institutional leaders are clearly mobilizing to move this forward, but the challenges remain evident, largely because GRC represents a relatively new management approach. Even though regulatory frameworks were introduced more than six years ago, full implementation has yet to be achieved despite ongoing investments in staff training by unit managers.

5 CONCLUSIONS AND RECOMMENDATIONS

Corporate risk management is an issue that requires the commitment of all stakeholders, supported by open, continuous, persistent, competent, relevant, and transparent communication channels, as well as clear and precise accountability. It also demands the active participation of employees, customers, suppliers, legislators, and regulators.

It is important to emphasize the need for an agile approach that enables the participation of all stakeholders, regardless of their professional background, encourages collaboration, and promotes interdisciplinary work.

The results of the interviews and questionnaires administered to employees of higher education institutions in the state of Pará, Brazil—analyzed using Item Response Theory and Cronbach's Alpha coefficient—confirm that the failure to implement Corporate Risk Management guidelines in accordance with established directives may lead to inconsistencies in the implementation of Public Governance in universities. Furthermore, federal civil servants' lack of knowledge regarding the established guidelines represents a barrier to mitigating institutional risks.

The dimensions of internal and external communication (Cronbach's Alpha = 0.67) and risk assessment and strategic planning (Cronbach's Alpha = 0.73) highlight opportunities to avoid, reduce, minimize, manage, or even transfer risks by implementing communication and transparency programs in accountability processes.

The creation, monitoring, and tracking of indicators, such as Cronbach's Alpha coefficient, Factor Analysis, or Item Response Theory, serve as control tools in the process of continuous improvement. Therefore, it is

recommended that the procedures and techniques used to generate the history of these indicators be repeated, enabling periodic assessments and the identification of practices that should be replicated due to their accuracy, effectiveness, and consistency, as well as those that should be avoided or discontinued.

In addition to the findings presented, it is important to acknowledge the limitations encountered during the execution of this study. One of the main challenges was obtaining the professional email addresses of all employees at the participating Higher Education Institutions, despite efforts made through contact with the Vice-Rectorates for Management and the application of the Access to Information Law. This limitation made it impossible to ensure a proportionally balanced distribution of respondents across the different institutions.

For future studies, it is important to consider alternative strategies to overcome these limitations, such as exploring new data collection methods or seeking additional partnerships with institutions to ensure broader and more balanced representation.

Moreover, significant opportunities exist for further research in this field. Corporate Risk Management remains a topic that demands the engagement of all stakeholders, open communication channels, and active participation. An agile and collaborative approach—regardless of participants' professional backgrounds—can promote the effectiveness of risk management and strengthen the implementation of Public Governance in universities. These aspects warrant more profound and comprehensive exploration in future investigations.

6 ACKNOWLEDGEMENTS

We want to thank the Pro-Rectorate for Research and Graduate Studies (PROPESP) and the Pro-Rectorate for Human Resources Management (PROGEP) of the Federal University of Pará for their financial and institutional support, as well as the Universidad Nacional de Costa Rica for their valuable contributions.

REFERENCES

- Associação Brasileira de Normas Técnicas. (2018). *NBR ISO 31000: gestão de riscos – diretrizes*. ABNT.
https://edisciplinas.usp.br/pluginfile.php/4656830/mod_resource/content/1/ISO31000.pdf
- Agarwal, R., & Kallapur, S. (2018). Cognitive risk culture and advanced roles of actors in risk governance: a case study. *Journal of Risk Finance*, 19(4), 327–342.
<https://doi.org/10.1108/JRF-11-2017-0189>
- Al-Farsi, H. A. H. (2020). The influence of chief risk officer on the effectiveness of enterprise risk management: evidence from Oman. *International Journal of Economics and Financial Issues*, 10(1), 87–95. <https://doi.org/10.32479/ijefi.8932>
- Almeida, R., Teixeira, J. M., Silva, M. M., & Faroleiro, P. (2019). A conceptual model for enterprise risk management. *Journal of Enterprise Information Management*, 32(5), 843–868.
<https://doi.org/10.1108/JEIM-05-2018-0097>
- Andrade, D. F., & Valle, C. (2000). *Teoria da resposta ao item: conceitos e aplicações*. Associação Brasileira de Estatística.
- Araújo, A., & Gomes, A. (2021). Risk management in the public sector: challenges in its adoption by Brazilian federal universities. *Revista Contabilidade & Finanças*, 32(86), 241-254.
doi:10.1590/1808-057x202112300
- Ark, L. A. (2007). Mokken Scale Analysis in R. *Journal of Statistical Software*, 20(11), 1–19.
<https://doi.org/10.18637/jss.v020.i11>
- Avdiiskii, V. I., Bezdenezhnykh, V. M., & Yartseva, N. M. (2021). The risk-based approach in the development of the management of organizations. *International Journal of Agricultural Extension*, 9(Special Issue 2), 11–17. <https://doi.org/10.33687/ijae.009.00.3957>

- Brasil. Ministério Público. Controladoria Geral da União. (2016). *Instrução normativa conjunta nº 1, de 10 de maio de 2016: Dispõe sobre controles internos, gestão de riscos e governança no âmbito do Poder Executivo federal*. 1–10.
- Brasil. (2019). *Decreto Nº 9.901, De 8 De Julho De 2019: Altera o Decreto nº 9.203, de 22 novembro de 2017, que dispõe sobre a política de governança da administração pública federal direta, autárquica e fundacional*. https://www.in.gov.br/materia/asset_publisher/Kujrw0TZC2Mb/content/id/21519355/do1-2016-05-11-instrucao-normativa-conjunta-n-1-de-10-de-maio-de-2016-21519197
- Bollen, K. A. (1989). *Structural equations with latent variables*. John Wiley & Sons. <https://doi.org/10.1002/9781118356258.ch3>
- Bollen, K. A. (2002). Latent variables in psychology and the social sciences. *Annual Review of Psychology*, 53, 605–634. <https://doi.org/10.1146/annurev.psych.53.100901.135239>
- Calôba, G. (2018). *Gestão de riscos em projetos*. Alta Books.
- Chen, J., Jiao, L., & Harrison, G. (2018). Organizational culture and enterprise risk management: The Australian not-for-profit context. *Australian Journal of Public Administration*, 78(3), 432–448. <https://doi.org/10.1111/1467-8500.12382>
- Ching, W. C., Rahim, F. A. M., & Chuing, L. S. (2021). Enterprise risk management and risk culture in construction public listed companies. *Journal of Construction in Developing Countries*, 26(2), 17–36. <https://doi.org/10.21315/jcdc2021.26.2.2>
- Committee of Sponsoring Organizations of the Treadway Commission. (2007). *COSO Gerenciamento de Riscos Corporativos – Estrutura Integrada*. *PricewaterhouseCoopers LLP*, 1(2), 01–141. <https://auditoria.mpu.mp.br/pgmq/COSOIIRMEExecutiveSummaryPortuguese.pdf>
- Faye, O., Baschieri, A., Falkingham, J., & Muindi, K. (2011). Hunger and food insecurity in Nairobi’s slums: An assessment using IRT models. *Journal of Urban Health*, 88(suppl. 2), 235–255. <https://doi.org/10.1007/s11524-010-9521-x>
- Fraser, J. R. S., & Simkins, B. J. (2016). The challenges of and solutions for implementing enterprise risk management. *Business Horizons*, 59(6), 689–698. <https://doi.org/10.1016/j.bushor.2016.06.007>
- Furr, R. (2011). *Scale construction and psychometrics for social and personality psychology*. SAGE Publications Ltd. <https://doi.org/10.4135/9781446287866>
- Gil, A. C. (2002). *Como elaborar projeto de pesquisa*. Atlas S. A.
- Gorzeń-Mitka, I. (2013). Risk identification tools – polish msme companies practices. *Problems of Management in the 21st Century*, 7(1), 6–11. <https://doi.org/10.33225/pmc/13.07.06>
- Hambleton, R. K., Swaminathan, H., & Rogers, H. J. (1991). *Fundamentals of item response theory*. SAGE Publications Ltd.
- Hillson, D. (2006). *Integrated risk management as a framework for organizational success* [Conference session]. PMI Global Congress, Seattle, WA, United States. <https://www.pmi.org/learning/library/integrated-risk-management-framework-organizational-success-7980>
- Hillson, D. (2010). *Exploiting future uncertainty: creating value from risk*. Gower Publishing.
- Jankensgård, H. (2019). A theory of enterprise risk management. *Corporate Governance*, 19(3), 565–579. <https://doi.org/10.1108/CG-02-2018-0092>
- Lacković, D. I., Kurnoga, N., & Sprčić, D. M. (2021). Three-factor model of Enterprise Risk Management implementation: exploratory study of non-financial companies. *Risk Management*, 24(2), 101–122. <https://doi.org/10.1057/s41283-021-00086-3>
- Lechner, P., & Gatzert, N. (2017). Determinants and value of enterprise risk management: empirical evidence from Germany. *European Journal of Finance*, 24(10), 867–887. <https://doi.org/10.1080/1351847X.2017.1347100>

- Leitch, M. (2010). ISO 31000:2009 - The new international standard on risk management: Perspective. *Risk Analysis*, 30(6), 887–892. <https://doi.org/10.1111/j.1539-6924.2010.01397.x>
- Lord, F. (1952). *A Theory of Test Scores* (Psychometric Monograph No. 7). Psychometric Corporation. <https://www.psychometricsociety.org/sites/main/files/file-attachments/mn07.pdf?1576607452>
- Low, S. P., Liu, J. Y., Ng, S. H. M., & Liu, X. (2013). Enterprise risk management and the performance of local contractors in Singapore. *International Journal of Construction Management*, 13(2), 27–41. <https://doi.org/10.1080/15623599.2013.10773210>
- Malik, M. F., Zaman, M., & Buckby, S. (2020). Enterprise risk management and firm performance: Role of the risk committee. *Journal of Contemporary Accounting and Economics*, 16(1), 100178. <https://doi.org/10.1016/j.jcae.2019.100178>
- Matteucci, M., & Stracqualursi, L. (2006). Student assessment via graded response model. *Statistica*, 66(4), 435–447. <https://doi.org/10.6092/issn.1973-2201/1216>
- Mendoza, R. R., & Lima, A. M. (2022). The abductive method to generate polymath knowledge in technical-scientific production. *Civil Engineering Research Journal*, 13(3), 1–2. <https://doi.org/10.19080/CERJ.2022.13.555864>
- Mendoza, R. R., Lima A. M., Pimentel, M. A. S., Pontes, A. N., & Rocha, E. (2023). World development and generation of waste. *Environmental Science and Pollution Research*, 30(6), 14792–14804. <https://doi.org/10.1007/s11356-022-23106-5>
- Pinto, J., Nogueira, R., & Cerquinho, K. (2020). Avaliação das Políticas de Gestão de Riscos das Universidades Federais quanto ao Atendimento à Instrução Normativa 01/2016. *Brazilian Journal of Production Engineering*, 6(2), 277–244.
- Prewett, K., & Terry, A. (2018). COSO's updated enterprise risk management framework- a quest for depth and clarity. *Journal of Corporate Accounting & Finance*, 29(3), 16–23. <https://doi.org/10.1002/jcaf.22346>
- Samejima, F. (1969). Estimation of latent ability using a response pattern of graded scores. *Psychometrika*, 34, 1–97. <https://doi.org/10.1007/bf03372160>
- Sedrez, C., & Fernandes, F. (2011). Gestão de Riscos nas Universidades e Centros Universitários do Estado de Santa Catarina. *Revista Gestão Universitária da América Latina* (Edição Especial 2011), 70-93. <https://doi.org/10.5007/1983-4535.2011v4nespp70>
- Shad, M. K., Lai, F. W., Fatt, C. L., Klemeš, J. J., & Bokhari, A. (2019). Integrating sustainability reporting into enterprise risk management and its relationship with business performance: A conceptual framework. *Journal of Cleaner Production*, 208, 415–425. <https://doi.org/10.1016/j.jclepro.2018.10.120>
- Silva, D., Silva, J., Alves, G., & Santos, C. (2021). Gestão de riscos no setor público: revisão bibliométrica e proposta de agenda de pesquisa. *Revista do Serviço Público*, 72(4), 824-854. <https://doi.org/10.21874/rsp.v72.i4.3991>
- Soares, J. F., & Alves, M. T. G. (2023). Uma medida do nível socioeconômico das escolas brasileiras utilizando indicadores primários e secundários. *SSRN Papers*, 1–35. <http://dx.doi.org/10.2139/ssrn.4325674>
- Sprcic, D. M., Pecina, E., & Orsag, S. (2017). Enterprise risk management practices in listed Croatian companies. *UTMS Journal of Economics*, 8(3), 219–230. <http://hdl.handle.net/10419/195310>
- Vieira, K. M., Moreira Junior, F. J., & Potrich, A. C. G. (2019). Financial education indicator: Proposal of an instrument from the item response theory. *Educação e Sociedade*, 40, 1–33. <https://doi.org/10.1590/es0101-73302018182568>

- Vieira, J. B., & Araújo, A. B. (2020). Risk management in the Brazilian Federal Government: a ministerial analysis. *Revista do Serviço Público*, 71, 404–437. <https://doi.org/10.21874/rsp.v71ic.4466>
- Vieira, J. B., & Barreto, R. T. S. (2019). Governança, gestão de riscos e integridade. Enap. https://repositorio.enap.gov.br/bitstream/1/4281/1/5_Livro_Governan%C3%A7a%20Gest%C3%A3o%20de%20Riscos%20e%20Integridade.pdf
- Wolke, T. (2017). *Risk Management* (8a ed.). De Gruyter Oldenbourg.