Revista Catarinense da CIÊNCIA CONTÁBIL
ISSN 2237-7662, Florianópolis, SC, v. 25, 1-19, e3674, 2026
https://doi.org/10.16930/2237-7662202636742
Available at http://revista.crcsc.org.br

THE RELATIONSHIP BETWEEN PERFORMANCE MEASUREMENT SYSTEMS, RISK MANAGEMENT, AND ACCOUNTABILITY IN THE PUBLIC SECTOR

DIEGO SOARES ALVES[1]
Universidade Estadual do Oeste do Paraná, Centro de Ciências Sociais Aplicadas (CCSA), Cascavel, PR, Brazil
https://orcid.org/0000-0002-4215-6850
diegosalves456@gmail.com

VINICIUS ABILIO MARTINS
Universidade Estadual do Oeste do Paraná, Centro de Ciências Sociais Aplicadas (CCSA), Cascavel, PR, Brazil
https://orcid.org/0000-0002-5668-5518
vinicius.martins@unioeste.br

ABSTRACT

This article aimed to analyze the relationship between the use of Performance Measurement Systems (PMSs), Risk Management (RM) practices, and Accountability in the Brazilian public sector, specifically within the scope of the Federal Government. To achieve the proposed objective, a descriptive and quantitative approach was adopted through a survey conducted with 166 federal public institutions in 2024. The Partial Least Squares Structural Equation Modeling (PLS-SEM) technique and the Importance-Performance Map Analysis (IPMA) were applied using the SmartPLS4® software. The results indicated positive and significant relationships among the latent variables, with four of the five hypotheses confirmed. The study shows that the use of PMS for attention focusing positively influences RM, which, in turn, acts as a mediating mechanism in the relationship between PMS and Accountability. The IPMA analysis highlighted the identification of investment opportunities (Risk_03) and the focus on critical success factors (Atten_01) as key areas for public managers to enhance Accountability. The theoretical contribution of the study advances by specifying the organizational mechanism, namely the mediation of RM, through which the uses of PMS, in a complex normative environment, structure formal control practices that translate into Accountability. As practical implications, the study reinforces that public sector managers should strengthen risk identification practices and concentrate on critical success factors, as these actions may contribute to improving governance and management indicators.

Keywords: Risk Management. Accountability. Performance Measurement System. Public Sector.

Edited in Portuguese and English. Original version in Portuguese.

Article version presented at the VI ICMA/Cogecont in 2024.

[1] **Correspondence address:** Rua Salgueiro, número 26 | Parque Verde | 85807750 | Cascavel/PR | Brasil.

Received on November 14, 2025. **Last version received on** February 5, 2026. **Accepted on** February 24, 2026 by Rogério João Lunkes (Editor-in-Chief). **Published on** March 31, 2026. **Reviewers:** Schleiden Pinheiro Nascimento (Faesa Centro Universitario, Brazil). A reviewer did not authorize the disclosure of his or her identity.

Peer Review Report: The Peer Review Report is available at this link

1 INTRODUCTION

To meet diverse expectations, the public sector seeks to reduce the occurrence of irregularities, regulatory noncompliance, and mismanagement of public services. Achieving this objective requires sophisticated tools and strategies capable of fostering responsible administrative behavior (Rasid et al., 2019; Siddiquee, 2006). In this context, managers must use performance data to demonstrate that the resources allocated to their programs have been used efficiently, employing performance measurement as a tool to assess accountability (Newcomer, 1999).

Performance management plays an important role in this process because it improves the effectiveness of public services and, consequently, has a positive impact on outcomes for service users (Andrews, 2014). However, there are risks that may interfere with an organization's efforts to achieve its objectives (Rasid et al., 2019; Sobel & Reding, 2004). Therefore, Risk Management (RM) becomes relevant because it aims to improve decision making under conditions of uncertainty in order to maximize benefits and minimize costs for society (Hinna et al., 2018).

With the publication of Joint Normative Instruction MP/CGU No. 01/2016, governance was established within the Federal Executive Branch through the mandatory adoption of several mechanisms, including RM and Accountability. As a result, beginning in 2017, the Federal Court of Accounts (TCU) started conducting governance assessments directed at these institutions, incorporating them into the annual accountability reporting process. In this context, new challenges were imposed on public sector managers, who must develop the capacity to identify and manage risks and opportunities in order to ensure accountability (Queensland Treasury, 2020).

However, there is still limited knowledge regarding what organizations can gain from RM and its interaction with Performance Measurement Systems (PMSs) (Braumann et al., 2024; Hiebl, 2024). Research on this topic in the public sector remains scarce (Bracci et al., 2022; Palermo, 2014; Woods, 2009) and is predominantly concentrated on experiences from developed countries (Efriani, 2022), leaving the integrated investigation of these three factors in complex institutional contexts such as Brazil largely unexplored.

The absence of studies focusing on organizations in developing countries, such as Brazil, may lead to a limited understanding of how these practices operate in such contexts. In light of this, the research problem guiding this study is the following: how do the uses of PMSs (monitoring and attention focusing) relate to RM practices and Accountability in the Brazilian federal public sector? Accordingly, this study seeks to address this gap by using the Brazilian public sector as the empirical setting of investigation.

Therefore, the objective of this study is to analyze the relationship between the use of PMS, RM practices, and Accountability in the Brazilian public sector. Although the literature indicates associations between performance measurement and accountability (Tran & Nguyen, 2020) and discusses risk management in isolation (Woods, 2009), the organizational mechanism through which these elements interact in fragmented governance contexts remains unclear. Specifically, it has not been empirically demonstrated how the uses of PMS, within a complex normative environment such as that of the Brazilian Federal Government, structure formal risk practices and how these practices, in turn, translate into effective accountability mechanisms.

Addressing this explanatory gap, by moving beyond simple correlations to test a model of mediated relationships, constitutes the central contribution of this study. This research contributes to theory by investigating the drivers of RM practices, the interactions between these practices and Accountability, and how both relate to Performance Measurement System. It also responds to calls from scholars for further studies on risk management in the public sector (Palermo, 2014; Woods, 2009) and on the factors that influence its success (Rana et al., 2019).

From an empirical perspective, the findings of this study may provide useful insights for public managers regarding where to focus their efforts in order to improve their institution's ranking in the Public Sector Governance and Management Index (IGG). Improving IGG rankings may also contribute to the achievement of the Sustainable Development Goals (SDGs), particularly in efforts

to develop effective, accountable, and transparent institutions.

2 THEORETICAL BACKGROUND

2.1 Performance Measurement Systems

A prerequisite for improving the performance of any organization is the ability to measure that performance in a consistent and reliable manner (Goshu & Kitaw, 2017). This measurement relies primarily on performance metrics, which are essential tools for quantifying the efficiency and effectiveness of the actions undertaken. When these metrics are integrated and used systematically, they constitute what is known as a PMS (Neely et al., 1995).

Previous studies have identified different types of use for PMSs. Robert Simons (1990) proposed diagnostic and interactive uses. Stephen C. Hansen and Wim A. Van der Stede (2004) identified operational planning, performance evaluation, communication of objectives, and strategy formation as primary uses. Monica Franco-Santos et al. (2007) grouped uses into the following categories: performance measurement; strategic management; internal and external communication; benchmarking and regulatory compliance; influencing behavior; and learning and improvement.

Anne Henri (2006) defined four types of use: monitoring, attention focusing, strategic decision making, and legitimization. Among these classifications, the monitoring and attention focusing uses proposed by Henri (2006) have been empirically tested and shown to be relevant for performance measurement and decision making in the public sector (Rasid et al., 2019). These uses also encompass comprehensive diagnostic functions, providing information and supporting the coordination of resources (Koufteros et al., 2014).

2.1.1 Performance Measurement Systems in the Context of the Brazilian Federal Government

Within Brazilian federal organizations, PMSs operate in a complex and multifaceted environment. The operational architecture encompasses instruments ranging from the Sistema Integrado de Administração Financeira (SIAFI) and the recent Programa de Gestão de Desempenho (PGD) to the indicators established in the Plano Plurianual (PPA) and management contracts. This institutional plurality was further reinforced by the Tribunal de Contas da União (TCU), which, beginning in 2014, required the Índice de Governança e Gestão Públicas (IGG) as a self-assessment instrument.

This institutional plurality is not merely contextual but constitutes a structural condition. It compels managers to integrate, prioritize, and assign meaning to multiple and often contradictory informational flows (Choong, 2014), thereby transforming the management of performance information into a critical organizational capability. The scenario was further redefined by the Joint Normative Instruction MP/CGU No. 01/2016, which established the governance policy as a normative framework. This regulation explicitly mandates the connection between performance measurement, risk management, and accountability.

Within this context, the role of the Tribunal de Contas da União (TCU) and the logic of contemporary public governance function as mechanisms of behavioral induction. The use of PMS for monitoring and attention focusing (Henri, 2006) ceases to be a discretionary managerial choice and becomes an institutionally induced and auditable practice, materializing the concept of audit-induced accountability (Almquist et al., 2013). It is at this intersection between management control theories and the concrete institutional context, characterized by such inductive mechanisms, that the present investigation positions itself to analyze the implications of this normative governance for management practices.

2.1.2 Uses of Performance Measurement Systems

The use of performance measurement for monitoring is based on a feedback system in which targets are defined in advance, results are measured and compared, and adjustments are made as

necessary (Henri, 2006). This monitoring is essential because performance measures can provide early signals to the RM department regarding potential deviations that may compromise the achievement of targets, thereby facilitating the identification and mitigation of risks (Arena & Arnaboldi, 2014).

The attention-focusing use, in turn, involves the communication, through performance measures, of top managers' perspectives regarding the organization, its critical success factors, and its main uncertainties (Henri, 2006). This approach guides organizational members on strategic issues and promotes integration (Koufteros et al., 2014), while also establishing boundaries and constraints on employee behavior (Burney & Widener, 2007).

By prioritizing critical success factors, top management fosters integration among organizational units, ensuring the maintenance of high performance standards (Koufteros et al., 2014). In this sense, established performance indicators guide the management team in controlling essential aspects, providing measurable criteria to assess the effectiveness of RM in achieving organizational objectives (Loosemore et al., 2005).

2.2 Risk Management Practices

There is a broad body of literature addressing the definition of the concept of risk. Risk is defined as an uncertain future event that may interfere with an organization's efforts to achieve its objectives (Sobel & Reding, 2004). Hill (2006) defines it as the probability that an event, whether favorable or unfavorable, will occur in the future. Risk carries this characteristic of uncertainty in any organizational environment. However, when it is structured through identification, analysis, evaluation, and treatment, it becomes manageable (Power, 2007).

RM (RM) provides several benefits, including increased organizational efficiency and effectiveness in operations (Hopkin, 2018), improved capacity to achieve organizational objectives (Ramos et al., 2021), and enhanced performance and quality of public services delivered (Mahama et al., 2020; Soin & Collier, 2013). Despite these advantages, in the specific case of the Brazilian public sector, the development of RM practices has been largely driven by pressure exerted by oversight bodies. This pressure, particularly in recent years, has played a significant role in the dissemination and adoption of such practices within public organizations (Souza et al., 2020).

One activity that composes RM practices is risk identification, which focuses on recognizing risk sources and their causes, as well as potential future consequences (ABNT, 2018). The standard indicates that the objective is to generate a comprehensive list of risks that may distort the achievement of organizational objectives. This process is fundamental to ensure that all risks are included in subsequent analyses. From a holistic perspective, risks are identified at all organizational levels, encompassing the strategic level, daily operational activities, and special projects (Purdy, 2010).

Another important activity that integrates RM practices is risk assessment. This practice evaluates the probability of risk occurrence and the severity of its consequences and effects (Loosemore et al., 2005). Probability and impact are combined to determine the inherent level of risk and to assess whether a given risk is acceptable, tolerable, or unacceptable. The organization's level of risk is compared with established risk criteria, and this comparison leads to decisions regarding risk treatment (ABNT, 2018).

Risk monitoring is another practice focused on overseeing and analyzing the risk management process as a whole. This activity involves continuous observation of any variations, from targets to regular verification and surveillance (ABNT, 2018). The progress of the risk management process and its expected effects must be monitored, and the results should be regularly communicated to other managers within the organization. Through reports, awareness of existing risks is maintained, forming the organization's risk documentation (Tworek, 2018).

The public sector views RM as a mechanism of good governance aimed at achieving organizational objectives (Woods, 2009), and this characteristic was incorporated into the content

of Joint Normative Instruction MP/CGU No. 01/2016. In the Brazilian context, this perception is formalized and induced by this regulation, which makes RM a mandatory component of federal public governance, aligning it with international conceptions. Consequently, public sector managers must develop the capacity to identify and manage risks and opportunities in order to ensure accountability (Queensland Treasury, 2020).

2.3 *Accountability*

Several meanings are associated with accountability, which may be understood as: (a) the delegation of power from stakeholders (principals) to managers (agents) (Broadbent et al., 1996); (b) the obligation to provide explanations for certain actions taken by those who are required to justify them (Parker & Gould, 1999); (c) the idea of reporting and or responsibility for one's actions (Medeiros et al., 2013); and (d) control, transparency, obligation, responsibility, and the duty of those holding public office to render accounts in accordance with legal parameters (Silva, 2018).

Accountability serves as a guideline for administrative decision making and service delivery (Wang, 2002; Wulaningrum et al., 2020). It consolidates and evaluates expectations regarding the performance of public authorities and the ways in which agencies and employees address both internal and external expectations (Romzek & Dubnick, 2001). It also focuses on assigning responsibility for service performance, employing different approaches, mechanisms, and practices to ensure the desired outcomes (Paul, 1992).

Given the diversity of meanings and applications attributed to accountability in the literature, measuring this concept can be challenging. In this context, Brody (2001) made an important contribution by establishing a logical relationship between accountability and commitment to operational standards, offering a practical and applicable model. She identified four fundamental components for nonprofit organizations: (a) fiscal responsibility and fraud mitigation; (b) good governance; (c) adherence to mission and donor guidelines; and (d) demonstration of program effectiveness (Geer et al., 2008).

In the public sector, accountability mechanisms are considered within the broader context of governance (Almquist et al., 2013), including organizational structures and management tools. This characteristic was also incorporated into the content of Joint Normative Instruction MP/CGU No. 01/2016. In Brazil, this incorporation materialized through the mandatory establishment of structures such as governance committees, risk management units, and accountability channels, which together form the institutional framework audited by the Federal Court of Accounts (TCU) through the Governance and Management Index (IGG). Therefore, to ensure their effectiveness, managers must be able to operate these mechanisms in an integrated manner, thereby reducing the risk of failure in public service delivery (Tarek Rana & Rana, 2021).

2.4 Development of the Research Hypotheses

Initially, PMSs are expected to be positively related to RM, although empirical studies have so far produced inconclusive results. Beasley et al. (2005) indicated that Balanced Scorecards measure an organization's progress, functioning as PMSs, while Enterprise RM helps leaders reflect on factors that may affect the achievement of their objectives. However, Calandro and Lane (2006) recommended that risk scorecards be separated from performance scorecards.

Rasid et al. (2017) found that integrating Enterprise RM with PMSs does not improve organizational performance. However, in a subsequent study, Rasid et al. (2019) found that the types of use of PMSs proposed by Henri (2006) are positively associated with RM.

Nielsen and Pontoppidan (2019) observed that managers assign considerable importance to risk management and attempt to avoid or encapsulate risk through administrative control systems. In contrast, Rana et al. (2019) found that issues related to RM are not properly integrated within Management Control Systems. Based on this debate, the first two research hypotheses are formulated:

H1A: There is a positive relationship between the use of PMSs for monitoring and RM practices within the organization.

H1B: There is a positive relationship between the use of PMSs for attention focusing and RM practices within the organization.

RM is also expected to be positively related to accountability. However, empirical studies have not yet reached definitive conclusions. Soin et al. (2014) identified that RM expands and adapts to incorporate accountability, although this process is not yet fully understood. Rothstein et al. (2013) found that risk-based governance is associated with the alignment of forecasts of adverse outcomes with governance standards and accountability structures in national policies.

Palermo (2014) highlighted the relevance of RM as an accountability tool, noting that the top-down approach focuses on meeting public accountability expectations, while the bottom-up approach reveals the dependence of risk management tools on relational competencies, experience, and business knowledge. Conversely, Tekathen and Dechow (2013) found that Enterprise RM promotes risk management processes throughout the organization and creates social spaces that direct attention to priority issues but does not guarantee shared understanding or ensure intelligent accountability.

Rasid et al. (2019) indicated that RM practices may improve accountability in the public sector. However, Yudiyanto and Ningsih (2023) complemented these findings by emphasizing that such improvement depends on strengthening internal controls and increasing the capacity of the Government Internal Supervisory Apparatus. This discussion supports the third research hypothesis:

H2: RM practices are positively related to accountability.

PMSs are also expected to be positively related to accountability. Nevertheless, this relationship is not yet fully understood. Melo et al. (2010) found that professional accountability mechanisms reinforce the managerial accountability of academics following the introduction of PMSs. Tran and Nguyen (2020) reported that PMSs contribute to improved public accountability and organizational performance. This finding is corroborated by Wulaningrum et al. (2020), who identified that the use of PMSs plays an important role in increasing accountability in local government agencies. Although Zahra and Bouckaert (2021) suggested that performance measurement has a significant effect on the use of accountability in federal ministries in Pakistan, this practice occurred only to a small or moderate extent.

3 METHODOLOGICAL PROCEDURES

This descriptive study was conducted through a survey, whose target population consisted of the Brazilian federal public sector within the Executive Branch, including organizations from both the direct administration (ministries) and the indirect administration (autonomous entities, foundations, public companies, and mixed-capital companies).

To identify organizations with formal RM practices, a documentary analysis was carried out on the official transparency and governance portals of all institutions listed on the Federal Government's Transparency Portal between January and February 2024. The objective was to locate explicit evidence of the adoption of RM, such as institutional policies, dedicated committees, internal regulations, or specific organizational units. The analysis identified 287 institutions that declared the existence of such structures or practices at some level, thereby establishing the inclusion criterion for the study.

Based on this population, potential respondents were identified. For each of the 287 institutions, official websites and transparency portals were consulted in order to locate professionals whose roles were directly related to the constructs of the study. The search focused on positions listed in organizational charts or in sections dedicated to Governance and Internal Control. The following profiles were considered: Executive Secretary, Director, General Coordinator, Advisor, Division Chief, or equivalent public servant, provided that their responsibilities explicitly included functions related to governance, risk management, strategic planning, internal control, or

internal auditing.

Data collection was conducted through an online survey, using a questionnaire hosted on the Google Forms® platform. The questionnaire link was sent by institutional email to the identified respondents. The target audience included managers, governance advisors, risk managers, strategic planning managers, and internal auditors. A total of 287 invitations were therefore sent. The data collection period lasted four months, from March to June 2024, initially resulting in 194 responses. After applying the exclusion criteria, the final sample consisted of 166 valid responses, representing a response rate of 57.8 percent in relation to the target population. The sample includes organizations from both the direct administration (ministries) and the indirect administration (autonomous entities, foundations, public companies, and mixed-capital companies).

To ensure the statistical power of the analyses, the required sample size was calculated a priori using the G*Power 3.1 software (Faul et al., 2007). The parameters defined were a medium effect size (f^2) of 0.15, statistical power ($1-\beta$) of 0.80, and a significance level (α) of 0.05. The calculation indicated a minimum of 68 respondents for the analysis of the proposed structural equation model (PLS-SEM). The final sample of 166 cases meets and exceeds this requirement, ensuring analytical robustness.

The criteria for excluding 28 responses were: (i) incomplete questionnaires with more than 20 percent of items unanswered; (ii) invalid response patterns, such as selecting the same option for all questions within a block; and (iii) incompatible completion time suggesting inattentive responses, defined as less than one third of the average response time.

The research instrument was a structured questionnaire composed of 21 closed items measured on a five-point Likert scale (1 = “Strongly Disagree” to 5 = “Strongly Agree”). The construct scales, originally validated in other contexts (for example, Henri, 2006; Rasid et al., 2019), underwent a rigorous adaptation process. This process included semantic adaptation and content validation by two academic experts and one senior public manager, aiming to align language and concepts with the context of the Brazilian federal public administration. Additionally, a pre-test was conducted with five public managers and two academics, whose feedback resulted in minor terminological adjustments to improve the clarity and relevance of the questions.

Table 1
Constructs and indicators of the research instrument

CONSTRUCT	INDICATOR	DESCRIPTION	REFERENCES
PMS-UM	Moni_1	To track progress toward targets	Henri (2006); Rasid et al. (2019);
	Moni_2	To review key performance measures	
	Moni_3	To compare results with expectations	
	Moni_4	To monitor outcomes	
PMS-UAF	Atten_1	To focus on critical success factors	
	Atten_2	To enable discussion in meetings with superiors, subordinates, and peers	
	Atten_3	To discuss results, underlying assumptions, and action plans	
RMP	Risk_1	Systematic identification of risks	Al-Tamimi and Al-Mazrooei (2007); Rasid et al. (2019);
	Risk_2	Changes in risk are recognized through defined roles and functions	
	Risk_3	Procedures for the systematic identification of investment opportunities	
	Risk_4	Assesses the probability of risk	
	Risk_5	Assesses risk using qualitative analysis methods	
	Risk_6	Analyzes and evaluates opportunities	
	Risk_7	Assesses the costs and benefits of dealing with risk	

	Risk_8	Monitors the effectiveness of Risk Management	
	Risk_9	The level of risk control is appropriate	
	Risk_10	Reporting and communication processes support Risk Management	
ACC	Acco_1	Evaluates the efficiency and effectiveness of its services	Brody (2001); Geer et al. (2008); Rasid et al. (2019).
	Acco_2	Responses to complaints	
	Acco_3	Reviews mission and objectives regularly	
	Acco_4	Written policy on conflicts of interest	

Note. ACC=*Accountability*; RMP = Risk Management Practices; PMS-UAF = Performance Measurement System – Use for Attention Focusing; PMS-UM = Performance Measurement System – Use for Monitoring.
Source: Research data.

Regarding data analysis, the Structural Equation Modeling (PLS-SEM) technique, also known as Partial Least Squares, was employed. In developing the analysis plan, Microsoft Excel 365® and the statistical software SmartPLS4® were used, following the procedures below: (i) tabulation and coding of the database; (ii) statistical and descriptive analysis with the determination of frequencies for the dataset; (iii) Confirmatory Factor Analysis; and (iv) Structural Equation Modeling. The theoretical basis was drawn from the studies of Hair et al. (2014) and Ringle et al. (2014).

For hypothesis testing and for analyzing the significance of the relationships (p-value) between variables in the structural model, the bootstrapping procedure was used (Hair et al., 2011). The blindfolding procedure was applied to obtain the Q^2 value and to assess whether the endogenous variables have predictive relevance (Hair et al., 2011).

Finally, an Importance-Performance Map Analysis (IPMA) was conducted in order to extend the results obtained from the PLS-SEM application and thus gain additional insights into the constructs and indicators of the model (Ringle & Sarstedt, 2016). The IPMA allows the identification of areas with relatively high importance but relatively low performance, enabling the implementation of appropriate management tools that may lead to improvements (Sternad Zabukovšek et al., 2022).

4 RESULTS

Respondents are predominantly male (61 percent), aged between 41 and 60 years (54 percent), hold degrees in Administration or Accounting (44 percent), primarily work in RM (68 percent), and have less than six years of experience in their current role (71 percent). Regarding responses related to the PMS constructs, the study obtained an overall mean of 3.42 for monitoring and 3.27 for attention focusing, indicating that these practices are used at a moderate level within Federal Public Institutions.

The RM construct presented a result below 4.00 for its overall mean, with a particularly low value for the item "systematic identification of opportunities," which appeared less frequently as an activity (mean of 2.90). This result supports the assumption that RM is practiced at a moderate level within Federal Public Institutions. Despite this, top management strongly agreed with the use of qualitative methods to assess identified risks (mean of 4.13). Accountability obtained an overall mean of 4.00, suggesting that it is strongly practiced within Federal Public Institutions.

4.1 Measurement Model

The final usable sample included 166 respondents, which is adequate for conducting PLS-SEM analysis (Cohen, 1992). The constructs used in this study were tested for convergent validity based on factor loadings, composite reliability (CR), and average variance extracted (AVE) (Hair et al., 2014).

The factor loadings for most construct items reached the recommended value of 0.708 (Hair Jr. et al., 2014), with the exception of two items from the Accountability construct: Acco_3 – Reviews mission and objectives regularly (0.688) and Acco_4 – Written policy on conflicts of interest (0.592). Hair et al. (2009) note that when loadings fall below 0.7, they may still be considered significant, although there is more error variance than explained variance in the measurement. Thus, when considering other quality indicators, all items demonstrated satisfactory levels of indicator reliability.

Table 2 presents the composite reliability (rho_c) values for monitoring use of the PMS (0.956), attention-focusing use of the PMS (0.944), RM practices (0.951), and Accountability (0.806). Composite Reliability values ranging between 0.7 and 0.9 indicate internal consistency among the items and the constructs they represent. Therefore, the items used in this study were considered reliable measures.

Table 2
Validity and Reliability of the Measurement Model

Variables	ACC	RMP	PMS-UAF	PMS-UM
ACC	**0.716**			
RMP	0.557	**0.814**		
PMS-UAF	0.567	0.675	**0.922**	
PMS-UM	0.542	0.630	0.830	**0.957**
AVE > 0.50	0.513	0.663	0.850	0.915
Composite reliability > 0.70	0.806	0.951	0.944	0.956
Cronbach's alpha > 0.70	0.684	0.943	0.912	0.908

Note: ACC=*Accountability*; RMP = Risk Management Practices; PMS-UAF = Performance Measurement System – Use for Attention Focusing; PMS-UM = Performance Measurement System – Use for Monitoring.
Source: Research data.

Convergent validity was found to be adequate, and all items of the three constructs were considered valid measures, with AVE values greater than 0.5 (Table 2). Discriminant validity was assessed using two techniques: (1) the Fornell-Larcker criterion and (2) cross-loadings. The results indicated that the square roots of the AVE (in bold) for all constructs exceeded their correlations with other constructs (values outside the diagonal), and the cross-loading results were also satisfactory. Based on the results of both techniques, discriminant validity was established.

4.2 Structural Model and Hypothesis Testing

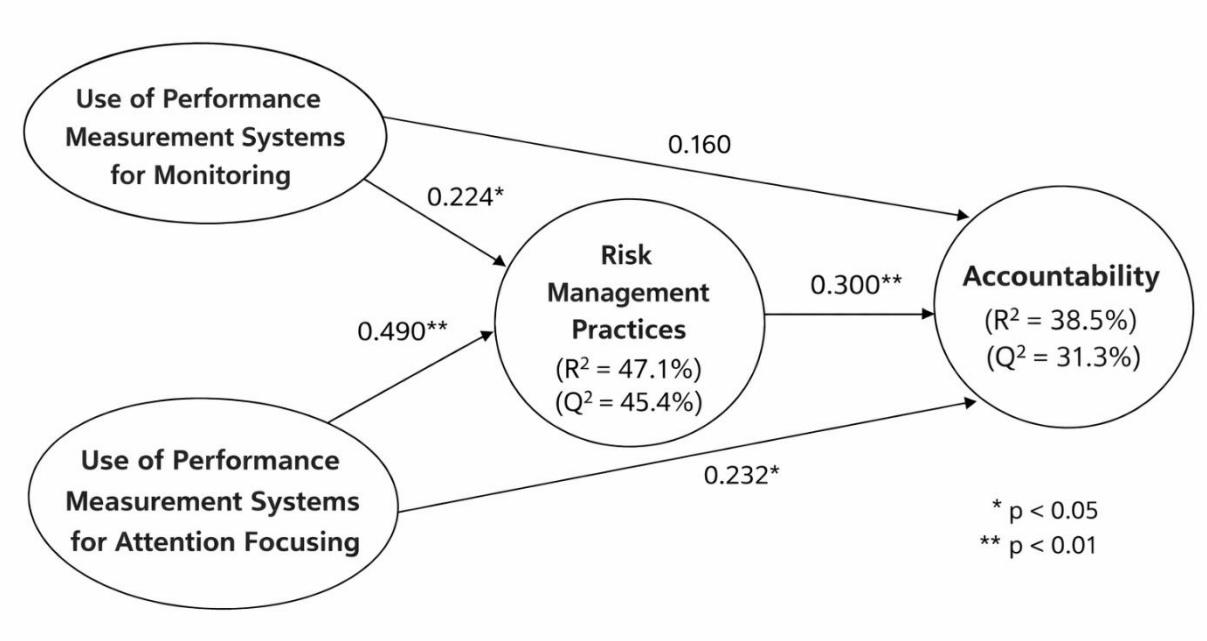
The evaluation of the structural model examines the collinearity among constructs, the coefficient of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), and path coefficients (β) (Hair et al., 2014).

Collinearity among the predictor constructs was tested and, after adjustments, the results proved adequate for all items, with variance inflation factor (VIF) values below 5, indicating suitability for subsequent evaluation. Next, the coefficient of determination (R^2) was assessed. According to Cohen (1988), an R-squared value for endogenous latent variables above 0.26 is considered large. The adjusted R^2 values recorded were 0.465 for RM practices and 0.374 for Accountability, both considered large (Cohen, 1988).

Regarding the f^2 effect size of the constructs, the endogenous variable Accountability shows a positive relationship with the exogenous constructs. While RM practices present an f^2 effect size of 0.077, the uses of the PMS show effect sizes of 0.013 (monitoring) and 0.024 (attention focusing) in explaining Accountability. RM, positioned as an endogenous variable, also demonstrates a positive relationship with its exogenous constructs. The PMS used for monitoring and attention focusing presents effect sizes of 0.029 and 0.141, respectively. All effects were considered small according to Cohen (1988).

The blindfolding technique was applied, and the results indicate that the Q^2 values for both Accountability (0.313) and RM practices (0.454) were greater than zero. This demonstrates that the model has predictive relevance.

Figure 1
Structural Model



Source: Research data.

After applying the bootstrapping procedure, the structural model was examined regarding the direct effects of hypotheses H1A, H1B, H2, H3A, and H3B. In the first hypothesis test, RM practices were directly affected by the use of the PMS for monitoring ($\beta = 0.224$, $t = 1.968$, $p < 0.05$). Thus, H1A was confirmed. In the second test, RM practices were also directly affected by the use of the PMS for attention focusing ($\beta = 0.490$, $t = 4.632$, $p < 0.01$). Therefore, H1B was also confirmed.

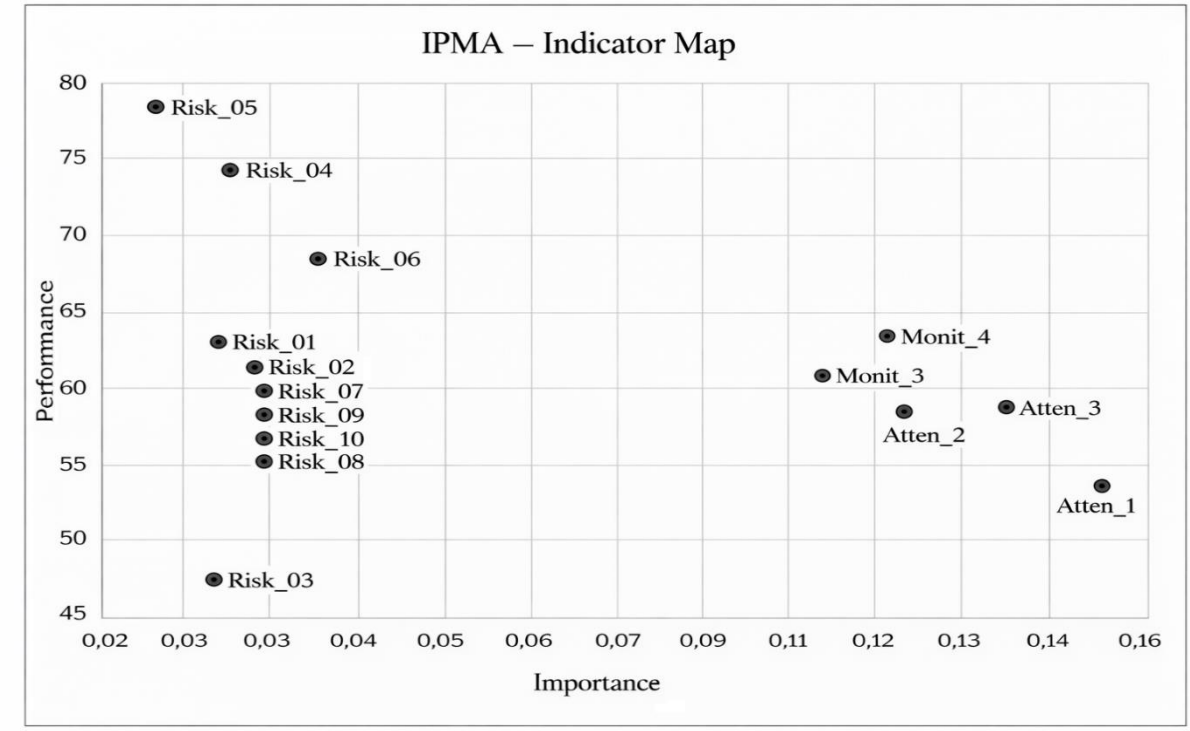
In the third test, Accountability was directly affected by RM practices ($\beta = 0.300$, $t = 3.379$, $p < 0.01$). As a result, H2 was confirmed. In the fourth hypothesis test, the data suggest that Accountability was not affected by the use of the PMS for monitoring ($\beta = 0.160$, $t = 1.350$, $p > 0.05$). This indicates that the use of the PMS for monitoring showed a small positive relationship with Accountability, but it was not statistically significant. Therefore, H3A was rejected.

In the fifth test, Accountability was directly affected by the use of the PMS for attention focusing ($\beta = 0.232$, $t = 1.989$, $p < 0.05$). This suggests that the use of the PMS for attention focusing was positively related to Accountability and was statistically significant. Therefore, H3B was confirmed.

4.3 Importance–Performance Map Analysis (IPMA)

The IPMA was performed using the SmartPLS4 software, combining the analysis of the dimensions of importance and performance. Figure 2 presents both dimensions of the indicators that influence the dependent variable Accountability. The IPMA results are displayed in a two-dimensional graph, where the horizontal axis represents the importance (total effect) of the influencing factors, using a scale from 0 to 1, while the vertical axis represents their performance, using a scale from 0 to 100.

Figure 2
IPMA of the Indicators



Source: Research data.

The analysis of the IPMA data showed that the indicators related to RM Practices present importance values ranging from 0.027 (Risk_05) to 0.045 (Risk_06). Performance values, however, vary widely. Risk_03 (systematic identification of investment opportunities) shows the lowest performance (47.440). Therefore, Risk_03 stands out as a critical area for improvement.

The indicators related to the PMS, for both uses (monitoring and attention focusing), are close in terms of importance, ranging from 0.115 to 0.150. They present considerable importance, particularly Atten_1 (focus on critical success factors), which has the greatest impact. The performance of all these indicators is relatively low, indicating an opportunity for improvement, with particular emphasis on Atten_1.

4.4 Discussion of Results

The results confirm positive relationships among the constructs investigated, which may at first appear intuitive. The distinctive contribution of this study, however, lies in clarifying the specific organizational mechanism through which this intuition materializes within the institutional context of the Brazilian Federal Government. The findings demonstrate that the relationship between performance measurement and accountability is neither direct nor automatic. Instead, it is mediated and structured by formal RM practices.

In other words, PMSs, especially when used for attention focusing, function as a cognitive and informational architecture that shapes and directs the RM process. This structured process subsequently generates the inputs, such as identification, assessment, and documentation, that support the concrete mechanisms of accountability. This dynamic transforms the triad of PMSs, RM, and Accountability from an abstract normative principle, as established in Joint Normative Instruction MP/CGU No. 01/2016, into an observable and actionable management control mechanism.

Thus, the confirmation of the hypothesis indicating a positive relationship between the use of PMSs for monitoring and attention focusing and RM practices allows for an operational

conclusion. The expansion of systematic monitoring enables public institutions to collect and analyze data continuously or at regular intervals. This provides a clear view of performance (Henri, 2006) and can help monitor the achievement of organizational strategic objectives, trigger risk identification (Arena & Arnaboldi, 2014), and determine risks and their causes that could hinder the achievement of targets (Beasley et al., 2005).

Another important finding of this study suggests that the use of PMSs for attention focusing influences risk assessment by directing managers toward critical or problematic areas identified through performance indicators (Henri, 2006). In this context, RM acts as the central mechanism through which PMSs fulfill their role in reducing uncertainty (Kominis et al., 2022). By focusing attention, Federal Public Institutions are more likely to assess accurately the risks associated with their critical success factors and objectives (Bracci et al., 2022).

The results of this study emphasize the positive relationship between RM practices and Accountability. This suggests that the practices of risk identification, assessment, particularly highlighted, and monitoring are important in promoting Accountability within Federal Public Institutions. Therefore, it can be concluded that managing risks leads to improved public sector accountability, as also demonstrated by Rasid et al. (2019). The development of a comprehensive list of risks derived from managers across different departments provided stakeholders with information that supports better decision making. This result corroborates the argument that RM is relevant as a tool of Accountability (Palermo, 2014).

The data did not support the hypothesis of a significant positive relationship (H3A) between the use of PMSs for monitoring and Accountability, and several explanations may account for this result. Joint Normative Instruction MP/CGU No. 01 of 2016 may have required a substantial effort from organizations that lacked the maturity or technical capacity to fully meet its requirements. This explanation is plausible because developing a performance measure involves much more than defining a robust formula and may lead to dysfunctional behavior when measures are poorly designed (Neely et al., 1997).

Another important aspect is the considerable diversity of structures and measurement systems existing within the Federal Public Administration. This lack of uniformity may generate different levels of capacity to respond to accountability demands. This conclusion is consistent with previous studies indicating that there is still no consensus regarding a formal structure for PMSs due to variations in their use across organizations (Choong, 2014; Goshu & Kitaw, 2017).

On the other hand, this study concluded that Federal Public Institutions that use information from PMSs to focus attention can improve Accountability, although this effect is considered small. The study by Zahra and Bouckaert (2021) corroborates these results, indicating that in the context of Accountability, attention to the use of PMSs is primarily directed toward compliance with targets, legality, and adherence to rules, at a small or moderate level within federal ministries in Pakistan. However, Rasid et al. (2019) identified a positive indirect effect on Accountability through RM practices in the Malaysian public sector.

Regarding practical implications, the study identified which indicators related to each construct deserve particular attention. The indicators Risk_03 (systematic identification of investment opportunities) and Atten_1 (focus on critical success factors) represent critical areas for intervention by public managers, and their improvement may significantly enhance Accountability and consequently have a positive impact on governance (Almquist et al., 2013).

Therefore, by identifying the indicators associated with the constructs that present high importance but relatively low performance, this study contributes to public sector managers' efforts to improve governance indices, such as the Governance and Management Index (IGG) periodically assessed by the Federal Court of Accounts. The conclusions of this study are consistent with Yudiyanto and Ningsih (2023), who argued that Public Institutions with higher scores in the risk management implementation index tend to present higher levels of Accountability.

5 CONCLUSION

This study investigated the relationships between the uses of PMSs, RM Practices, and Accountability within the Brazilian Federal Government and offers three main contributions. It contributes to theory by integrating the literature on the uses of PMSs with that on risk management in the public sector. The study proposes and empirically validates a model in which RM acts as the central mediating mechanism between PMSs and accountability. This advances beyond generic associations by specifying how performance information is translated into responsive control. The research addresses the gap identified regarding the mechanism through which these elements interact in contexts of fragmented and normatively dense governance, such as the Brazilian case, going beyond the study by Efriani (2022) by testing and confirming a mediation model.

The methodological contribution lies in the combined application of PLS-SEM and IPMA, which provided not only hypothesis testing but also an actionable managerial diagnosis. The results indicate that the systematic identification of investment opportunities (Risk_03) and the focus on critical success factors (Atten_1) represent priority leverage points for managers. The practical contribution is that the findings offer a clear roadmap for managerial action and for the design of governance policies, suggesting that central oversight bodies, such as the Comptroller General of the Union (CGU) and the Federal Court of Accounts (TCU), may strengthen accountability by encouraging PMS practices that focus on strategic attention and RM practices that actively seek opportunities in addition to risks.

This study has some limitations that should be considered. From a methodological perspective, the quantitative approach limits the investigation with regard to understanding the feelings, impressions, and perspectives of respondents. Furthermore, this study employed a cross-sectional design in which data were collected from Federal Public Institutions, including central government and decentralized entities, which does not allow firm conclusions regarding the causal direction of the relationships between exogenous and endogenous variables. Although the sample is robust and presents a high response rate, it is non-probabilistic and focused on organizations that had already declared RM practices. This may introduce selection bias and limit the generalization of the results to the entire population of the Federal Executive Branch.

Therefore, future research may consider a longitudinal research design to examine the continuity of responses and track changes over time. It is also possible to expand the study by examining potential mediation or moderation effects, such as organizational culture and the characteristics of performance measures within the same relationships. In addition, qualitative studies are recommended to deepen the understanding of the mechanisms identified and to investigate how the plurality of PMSs in Brazil is managed in everyday practice in order to produce the effects measured in this study.

REFERENCES

ABNT. (2018). *ABNT NBR ISO 31000:2018*.

Almquist, R., Grossi, G., Helden, G. J. van, & Christoph Reichard. (2013). Public sector governance and accountability. *Critical Perspectives on Accounting*, *24*(7–8), 479–487. https://doi.org/10.1016/j.cpa.2012.11.005

Al-Tamimi, H. A. H., & Al-Mazrooei, F. M. (2007). Banks' risk management: A comparison study of UAE national and foreign banks. *The Journal of Risk Finance*, *8*(4), 394–409. https://doi.org/10.1108/15265940710777333

Andrews, R. (2014). *Performance Management and Public Service Improvement*.

Arena, M., & Arnaboldi, M. (2014). Risk and performance management: Are they easy partners? *Management Research Review*, *37*(2), 152–166. https://doi.org/10.1108/MRR-08-2012-0180

Beasley, M. S., Clune, R., & Hermanson, D. R. (2005). Enterprise risk management: An empirical analysis of factors associated with the extent of implementation. *Journal of Accounting and Public Policy*, *24*(6), 521–531. https://doi.org/10.1016/j.jaccpubpol.2005.10.001

Bracci, E., Mouhcine, T., Rana, T., & Wickramasinghe, D. (2022). Risk management and management accounting control systems in public sector organizations: A systematic literature review. *Public Money and Management*, *42*(6), 395–402. Scopus. https://doi.org/10.1080/09540962.2021.1963071

Braumann, E. C., Hiebl, M. R. W., & Posch, A. (2024). Enterprise Risk Management as Part of the Organizational Control Package: Review and Implications for Management Accounting Research. *Journal of Management Accounting Research*, *36*(2), 7–29. https://doi.org/10.2308/JMAR-2021-071

Broadbent, J., Dietrich, M., & Laughlin, R. (1996). The development of principal–agent, contracting and accountability relationships in the public sector: conceptual and cultural problems. *Critical Perspectives on Accounting*, *7*(3), 259–284. https://doi.org/10.1006/cpac.1996.0033

Brody, E. (2002). Accountability and public trust. In L. M. Salamon (Ed.). *The state of nonprofit America* (pp. 471–498). Brookings Institution Press.

Burney, L., & Widener, S. K. (2007). Strategic Performance Measurement Systems, Job-Relevant Information, and Managerial Behavioral Responses—Role Stress and Performance. *Behavioral Research in Accounting*, *19*(1), 43–69. https://doi.org/10.2308/bria.2007.19.1.43

Calandro, J., & Lane, S. (2006). An introduction to the Enterprise Risk Scorecard. *Measuring Business Excellence*, *10*(3), 31–40. https://doi.org/10.1108/13683040610685775

Choong, K. K. (2014). The fundamentals of performance measurement systems: A systematic approach to theory and a research agenda. *International Journal of Productivity and Performance Management*, *63*(7), 879–922. https://doi.org/10.1108/IJPPM-01-2013-0015

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Lawrence Erlbaum Associates.

Efriani, T. N. (2022). *Risk management and organisational performance in the Indonesian public sector: An empirical study* [Doctoral dissertation, Murdoch University]. Murdoch University Research Repository. https://researchrepository.murdoch.edu.au/id/eprint/72115/

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Franco-Santos, M., Kennerley, M., Micheli, P., Martinez, V., Mason, S., Marr, B., Gray, D., & Neely, A. (2007). Towards a definition of a business performance measurement system. *International Journal of Operations & Production Management*, *27*(8), 784–801. https://doi.org/10.1108/01443570710763778

Freire, D., Galdino, M., & Mignozzetti, U. (2020). Bottom-up accountability and public service provision: Evidence from a field experiment in Brazil. *Research & Politics, 7*(2), Article 2053168020914444. https://doi.org/10.1177/2053168020914444

Geer, B. W., Maher, J. K., & Cole, M. T. (2008). Managing Nonprofit Organizations: The Importance of Transformational Leadership and Commitment to Operating Standards for Nonprofit Accountability. *Public Performance & Management Review*, *32*(1), 51–75. https://www.jstor.org/stable/20447708

Goshu, Y. Y., & Kitaw, D. (2017). Performance measurement and its recent challenge: A literature review. *International Journal of Business Performance Management*, *18*(4), 381–402. https://doi.org/10.1504/IJBPM.2017.087103

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados* (6. ed.) Bookman Editora.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Hair Jr., J. F., Gabriel, M. L. D. da S., & Patel, V. K. (2014). Modelagem de Equações Estruturais Baseada em Covariância (CB-SEM) com o AMOS: Orientações sobre a sua aplicação como uma Ferramenta de Pesquisa de Marketing. *ReMark - Revista Brasileira de Marketing*, *13*(2), Artigo 2. https://doi.org/10.5585/remark.v13i2.2718

Hansen, S. C., & Stede, W. A. V. der. (2004). Multiple facets of budgeting: An exploratory analysis. *Management Accounting Research*, *15*(4), 415–439. https://doi.org/10.1016/j.mar.2004.08.001

Heinrich, C. J. (2002). Outcomes-based performance management in the public sector: Implications for government accountability and effectiveness. *Public Administration Review, 62*(6), 712–725. https://doi.org/10.1111/1540-6210.00250

Henri, J. (2006). Organizational culture and performance measurement systems. *Accounting, Organizations and Society*, *31*(1), 77–103. https://doi.org/10.1016/j.aos.2004.10.003

Hiebl, M. R. W. (2024). The integration of risk into management control systems: Towards a deeper understanding across multiple levels of analysis. *Journal of Management Control*, *35*(1), 1–16. https://doi.org/10.1007/s00187-024-00373-6

Hill, S. (2006). Guia sobre a gestão de riscos no serviço público. http://www.enap.gov.br/index.php?option=content&task=view&id=258

Hinna, A., Scarozza, D., & Rotundi, F. (2018). Implementing Risk Management in the Italian Public Sector: Hybridization between Old and New Practices. *International Journal of Public Administration*, *41*(2), 110–128. https://doi.org/10.1080/01900692.2016.1255959

Hopkin, P. (2018). *Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management*. Kogan Page Publishers.

Kominis, G., Dudau, A., Favotto, A., & Gunn, D. (2022). Risk governance through public sector interactive control systems: The intricacies of turning immeasurable uncertainties into manageable risks. *Public Money & Management*, *42*(6), 379–387. https://doi.org/10.1080/09540962.2021.1965729

Koufteros, X., Verghese, A. (John), & Lucianetti, L. (2014). The effect of performance measurement systems on firm performance: A cross-sectional and a longitudinal study. *Journal of Operations Management*, *32*(6), 313–336. https://doi.org/10.1016/j.jom.2014.06.003

Loosemore, M., Raftery, J., Reilly, C., & Higgon, D. (2005). *Risk Management in Projects*. Routledge. https://doi.org/10.4324/9780203963708

Machado, A., Terra, R., & Tannuri-Pianto, M. (2024). Higher education responses to accountability. *Economics of Education Review, 98*, Article 102493. https://doi.org/10.1016/j.econedurev.2023.102493

Mahama, H., Elbashir, M., Sutton, S., & Arnold, V. (2022). Enabling enterprise risk management maturity in public sector organizations. *Public Money & Management, 42*(6), 403–407. https://doi.org/10.1080/09540962.2020.1769314

Medeiros, A. K. de, Crantschaninov, T. I., & Silva, F. C. da. (2013). Estudos sobre accountability no Brasil: Meta-análise de periódicos brasileiros das áreas de administração, administração pública, ciência política e ciências sociais. *Revista de Administração Pública*, *47*, 745–775. https://doi.org/10.1590/S0034-76122013000300010

Melo, A. I., Sarrico, C. S., & Radnor, Z. (2010). The Influence of Performance Management Systems on Key Actors in Universities: The case of an English university. *Public Management Review*, *12*(2), 233–254. https://doi.org/10.1080/14719031003616479

Neely, A., Gregory, M., & Platts, K. (1995). Performance measurement system design: A literature review and research agenda. *International Journal of Operations & Production Management*, *15*(4), 80–116. https://doi.org/10.1108/01443579510083622

Neely, A., Richards, H., Mills, J., Platts, K., & Bourne, M. (1997). Designing performance measures: A structured approach. *International Journal of Operations & Production Management*, *17*(11), 1131–1152. https://doi.org/10.1108/01443579710177888

Newcomer, K. E. (1999). A preparação dos gerentes públicos para o século XXI. *Revista do Serviço Público*, *50*(2), Artigo 2. https://doi.org/10.21874/rsp.v50i2.344

Nielsen, S., & Pontoppidan, I. C. (2019). Exploring the inclusion of risk in management accounting and control. *Management Research Review*, *43*(1), 82–112. https://doi.org/10.1108/MRR-10-2017-0342

Nyland, K., & Pettersen, I. J. (2015). Hybrid controls and accountabilities in public sector management: Three case studies in a reforming hospital sector. *International Journal of Public Sector Management*, *28*(2), 90–104. https://doi.org/10.1108/IJPSM-07-2014-0085

Palermo, T. (2014). Accountability and Expertise in Public Sector Risk Management: A Case Study. *Financial Accountability and Management*, *30*(3), 322–341. Scopus. https://doi.org/10.1111/faam.12039

Parker, L. D., & Gould, G. (1999). Changing public sector accountability: Critiquing new directions. *Accounting Forum*. http://eprints.gla.ac.uk/128891/

Paul, S. (1992). Accountability in public services: Exit, voice and control. *World Development*, *20*(7), 1047–1060. https://doi.org/10.1016/0305-750X(92)90130-N

Power, M. (2007). *Organized Uncertainty: Designing a World of Risk Management*. OUP Oxford.

Purdy, G. (2010). ISO 31000:2009—Setting a New Standard for Risk Management. *Risk Analysis*, *30*(6), 881–886. https://doi.org/10.1111/j.1539-6924.2010.01442.x

Queensland Treasury. (2020). *A Guide to Risk Management*.

Ramos, K. H. C., Montezano, L., & Costa Junior, R. L. da. (2021). Panorama da produção científica nacional de gestão de riscos corporativos na administração pública de 2013 a 2018. *REVISTA DE CONTABILIDADE DO MESTRADO EM CIÊNCIAS CONTÁBEIS DA UERJ*, *25*(1), Artigo 1. http://atena.org.br/revista/ojs-2.2.3-06/index.php/UERJ/article/view/3466

Rana, T., Hoque, Z., & Jacobs, K. (2019). Public sector reform implications for performance measurement and risk management practice: Insights from Australia. *Public Money & Management*, *39*(1), 37–45. https://doi.org/10.1080/09540962.2017.1407128

Rasid, S., Golshan, N., Mokhber, M., Tan, G., & Mohd-Zamil, N. (2017). Enterprise risk management, performance measurement systems and organizational performance in malaysian public listed firms. *International Journal of Business and Society*, *18*(2), 311–328.

Rasid, S. Z. A., Bakar, B. A., Rizal, A. M., & Baskaran, S. (2019). Risk Management Practices to Strengthen Public Sector Accountability. *Asian Journal of Business and Accounting*, *12*(1), Artigo 1. https://doi.org/10.22452/ajba.vol12no1.1

Ringle, C. M., Silva, D. da, & Bido, D. de S. (2014). Structural equation modeling with the SmartPLS. *Brazilian Journal of Marketing, 13*(2), 56–73. https://doi.org/10.5585/remark.v13i2.2717

Ringle, C. M., & Sarstedt, M. (2016). Gain more insight from your PLS-SEM results: The importance-performance map analysis. *Industrial Management & Data Systems*, *116*(9), 1865–1886. https://doi.org/10.1108/IMDS-10-2015-0449

Romzek, B. S., & Dubnick, M. J. (2001). Accountability in the Public Sector: Lessons from the Challenger Tragedy. Em *Democracy, Bureaucracy, And The Study Of Administration*. Routledge.

Rothstein, H., Borraz, O., & Huber, M. (2013). Risk and the limits of governance: Exploring varied patterns of risk-based governance across Europe. *Regulation & Governance*, *7*(2), 215–235. https://doi.org/10.1111/j.1748-5991.2012.01153.x

Siddiquee, N. (2006). Paradoxes of public accountability in Malaysia: Control mechanisms and their limitations. *International Public Management Review*, *7*(2), 43–65. http://www1.imp.unisg.ch/org/idt/ipmr.nsf/ac4c1079924cf935c1256c76004ba1a6/01df11571bc8c13ec125722d0046c0fa/$FILE/IPMR_7_2_2006_SIDDIQUE_FINAL_001.pdf

Silva. (2018). *Accountability e Teoria da Agência no setor público: Análise dos Consórcios Intermunicipais de Saúde de Minas Gerais* [Universidade Federal de Viçosa]. https://locus.ufv.br//handle/123456789/20943

Simons, R. (1990). The role of management control systems in creating competitive advantage: New perspectives. In A. Bhimani (Ed.), Management accounting: European perspectives (pp. 127–143). Oxford University Press.

Sobel, P. J., & Reding, K. F. (2004). Aligning corporate governance with enterprise risk management: Melding enterprise risk management with governance means directors, senior management, internal and external auditors, and risk owners must work interdependently. *Management Accounting Quarterly*, *5*(2), 29–29. https://go.gale.com/ps/i.do?p=AONE&sw=w&issn=15285359&v=2.1&it=r&id=GALE%7CA118890702&sid=googleScholar&linkaccess=abs

Soin, K., Huber, C., & Wheatley, S. (2014). Management Control and Uncertainty: Risk Management in Universities. In D. Otley & K. Soin (Orgs.), *Management Control and Uncertainty* (p. 178–192). Palgrave Macmillan UK. https://doi.org/10.1057/9781137392121_12

Souza, F. S. R. N. de, Braga, M. V. de A., Cunha, A. S. M. da, & Sales, P. D. B. de. (2020). Incorporação de modelos internacionais de gerenciamento de riscos na normativa federal. *Revista de Administração Pública*, *54*, 59–78. https://doi.org/10.1590/0034-761220180117

Sternad Zabukovšek, S., Bobek, S., Zabukovšek, U., Kalinić, Z., & Tominc, P. (2022). Enhancing PLS-SEM-Enabled Research with ANN and IPMA: Research Study of Enterprise Resource Planning (ERP) Systems' Acceptance Based on the Technology Acceptance Model (TAM). *Mathematics*, *10*(9), Artigo 9. https://doi.org/10.3390/math10091379

Tarek Rana, & Rana, T. (2021). *Embedding a Risk Management Framework in Public Sector Governance, Performance, and Accountability Practices**. 49–68. https://doi.org/10.4324/9781003004080-4-6

Tekathen, M., & Dechow, N. (2013). Enterprise risk management and continuous re-alignment in the pursuit of accountability: A German case. *Management Accounting Research*, *24*(2), 100–121. https://doi.org/10.1016/j.mar.2013.04.005

Tran, Y. T., & Nguyen, N. P. (2020). The impact of the performance measurement system on the organizational performance of the public sector in a transition economy: Is public accountability a missing link? *Cogent Business and Management*, *7*(1). Scopus. https://doi.org/10.1080/23311975.2020.1792669

Tworek, P. (2018). Public Risk Management: Risk-Taking and Innovation in Public Service Organizations - Selected Problems. *Studia Ekonomiczne / Uniwersytet Ekonomiczny w Katowicach*, *nr 362*, 141–158. http://bazekon.icm.edu.pl/bazekon/element/bwmeta1.element.ekon-element-000171547319

Wang, X. (2002). Assessing Administrative Accountability: Results from a National Survey. *The American Review of Public Administration*, *32*(3), 350–370. https://doi.org/10.1177/0275074002032003005

Woods, M. (2009). A contingency theory perspective on the risk management control system within Birmingham City Council. *Management Accounting Research*, *20*(1), 69–81. https://doi.org/10.1016/j.mar.2008.10.003

Wulaningrum, P. D., Akbar, R., & Sari, M. R. (2020). Isomorphism, Human Resource Capability and Its Role in Performance Measurement and Accountability. *Journal of Asian Finance, Economics and Business*, *7*(12), 1099–1110. Scopus. https://doi.org/10.13106/JAFEB.2020.VOL7.NO12.1099

Yudiyanto, Y., & Ningsih, S. (2023). The Role of Risk Management Implementation in Increasing Accountability: A Study of All Regency/Municipality Governments. *Jurnal Borneo Administrator*, *19*(2), Artigo 2. https://doi.org/10.24258/jba.v19i2.1143

Zahra, A., & Bouckaert, G. (2021). Will what is measured be used? An analysis of performance management systems in Pakistani state organizations. *International Journal of Public Sector Management*, *34*(3), 274–291. https://doi.org/10.1108/IJPSM-03-2020-0073

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding this submitted work.

DATA AVAILABILITY

The dataset supporting the results of this study is not publicly available.

AUTHOR CONTRIBUTIONS

Roles	1st author	2nd author
Conceptualization	♦	♦
Data Curation	♦	
Formal Analysis	♦	
Funding Acquisition		
Investigation	♦	
Methodology	♦	♦
Project Administration	♦	
Resources	♦	
Software	♦	♦
Supervision		♦
Validation	♦	♦
Visualization	♦	
Writing – Original Draft	♦	
Conceptualization	♦	♦