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RECOMMENDATIONS FOR IMPLEMENTING OF COST INFORMATION SYSTEMS IN THE PUBLIC SECTOR TO PROMOTE OF TRANSPARENCY AND ACCOUNTABILITY

RECOMENDAÇÕES PARA IMPLANTAÇÃO DE SISTEMA DE INFORMAÇÕES DE CUSTOS NO SETOR PÚBLICO EM PROL DA TRANSPARÊNCIA E DA ACCOUNTABILITY

RECOMENDACIONES PARA LA IMPLANTACIÓN DE UN SISTEMA DE INFORMACIÓN DE COSTOS EN EL SECTOR PÚBLICO EN FAVOR DE LA TRANSPARENCIA Y LA ACCOUNTABILITY

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ABSTRACT

The objective purpose of this article is to categorize and present recommendations for the implementation and use of Cost Information Systems (CISs), based on the perceptions of civil servants responsible for their management in five Brazilian states, the Federal District, and the federal government. This exploratory, qualitative, and interpretive study research is grounded in semi-structured interviews conducted with seven teams working in the analyzed entities. Methodologically, the technique of template analysis is used. Based on the data collected, guidelines are formulated,

elaborated, developed for the implementation, use, and consolidation of these practices in the Brazilian public sector. The results findings also show demonstrate the potential of cost information to improve enhance public administration performance. The study contributes to its incorporation into management processes and proposes strategies to promote the effectiveness and institutionalization of this resource as a support for efficiency, transparency and *accountability*.

Keywords: implementation; public sector cost information systems; diagnosis and recommendations; transparency of public spending; accountability.

RESUMO

O objetivo deste artigo é categorizar e apresentar recomendações para a implantação e o uso de sistemas de informações de custos (SICs), com base nas percepções de servidores públicos responsáveis por sua gestão em cinco estados brasileiros, no Distrito Federal e no governo federal. A pesquisa, de caráter exploratório, qualitativo e interpretativo, fundamenta-se em entrevistas semiestruturadas realizadas com sete equipes atuantes nas entidades analisadas. Metodologicamente, utiliza-se a técnica de análise de templates. A partir dos dados coletados, são formuladas orientações para a implementação, a utilização e a consolidação dessas práticas no setor público brasileiro. Os resultados evidenciam, ainda, o potencial das informações de custos para o aprimoramento do desempenho da administração pública. O estudo contribui para sua incorporação aos processos gerenciais e propõe estratégias para promover a efetivação e a institucionalização desse recurso como suporte à eficiência, à transparência e à accountability.

***Palavras-chave**: implantação; sistemas de informações de custos no setor público; diagnóstico e recomendações; transparência do gasto público; accountability.*

RESUMEN

El objetivo de este artículo es clasificar y presentar recomendaciones para la implantación y el uso de sistemas de información de costos (SIC), a partir de las percepciones de los funcionarios públicos responsables de su gestión en cinco estados brasileños, en el Distrito Federal y en el Gobierno federal. La investigación, de carácter exploratorio, cualitativo e interpretativo, se basa en entrevistas semiestructuradas realizadas a siete equipos que trabajan en las entidades analizadas. Desde el punto de vista metodológico, se utiliza la técnica de Template Analysis. A partir de los datos recopilados, se formulan orientaciones para la implementación, el uso y la consolidación de estas prácticas en el sector público brasileño. Los resultados ponen de manifiesto, además, el potencial de la información de costos para mejorar el desempeño de la administración pública. El estudio contribuye a su incorporación a los procesos de gestión y propone estrategias para promover la aplicación efectiva y la institucionalización de este recurso como apoyo a la eficiencia, la transparencia y la accountability.

***Palabras clave**: implantación; sistemas de información de costos en el sector público; diagnóstico y recomendaciones; transparencia del gasto público; accountability.*

1 INTRODUCTION

In the international context, organizations dedicated to public sector accounting and management have emphasized the relevance of cost and performance information for improving efficiency, transparency, and decision-making.

In Brazil, the evolution of this debate was accompanied by the consolidation of legal and normative frameworks that began to require and guide cost measurement in public administration, particularly the Fiscal Responsibility Law (Lei de Responsabilidade Fiscal, LRF), accounting standards applied to the public sector, and regulations related to integrated budgetary and financial execution systems.

Despite these legal requirements, the literature registers resistance to the implementation and use of cost information in public administration. Cultural factors and preference for traditional budgeting models are pointed out as barriers, which contributes to the predominance of budgetary and financial information in management (van Helden; Adhikari; Kuruppu, 2021; Mohr, 2016; Padrones; Santos; Colares, 2017).

The adoption of cost systems also remains limited. According to the State Finance Managers Group (Grupo de Gestores das Finanças Estaduais – Gefin) (Gefin, 2020), until 2020, only the states of Pernambuco (PE), Bahia (BA), Santa Catarina (SC), Rio Grande do Sul (RS), and São Paulo (SP), in addition to the Federal District (DF) and the federal government had consolidated experiences. In the other federative entities, there are initiatives at early stages of implementation. For this reason, there are few robust empirical studies that systematically evaluate the effectiveness, advantages, and limitations of these initiatives and identify good practices and challenges.

An important challenge concerns the customization of the products and services offered by governments – graduated students, patients served, assisted vulnerable populations, events, traffic, among other public deliverables, while also complying with the requirements established in Article 50, Paragraph 3, of the LRF.

Considering this context, the research seeks to answer the following questions: What critical aspects of the implementation and use of the CIS are perceived by managers in entities already benefiting from the system? What additional practical recommendations may guide other federative entities in adopting the CIS, aiming at greater efficiency and transparency in public management?

Therefore, the objective of this article is to categorize and offer provide recommendations on the implementation and use of the CIS, based on the perceptions of civil servants involved in managing this tool in the Brazilian states where the systems have already been implemented, as well as in the Federal District and the federal government. Thestudy. It is intended to present strategic guidelines that complement the current regulatory instruments and serve as a practical guide for the federative entities intending to adopt it in order to improve efficiency and transparency in public management.

The institutionalization process is adopted, following the model of Tolbert and Zucker (2010) together with hierarchical coding of King's (2004) Template Analysis. This choice is motivated by the observation that the design, implementation, and usefulness of information systems in the public sector generally go through the stages of pre-institutionalization, semi-institutionalization and, finally, full institutionalization of their use in the organization.

Semi-structured interviews are conducted with civil servants responsible for leading the CISs already established in the subnational governments and at the federal level. The objective is to map and understand the implementation process, context, and meanings of the phenomena associated with the customization of public services implemented in Brazil.

The results allow enable the creation of a structured set of recommendations and propositions based on empirical perceptions and observations. These guidelines contemplate strategic, regulatory, organizational, managerial, cultural, and technical aspects related to the measurement and use of cost information in Brazilian public administration.

The study seeks to make a significant contribution to the integration of cost information into public management by proposing practical strategies that foster the institutionalization of this instrument as an essential element for increasing efficiency, improving transparency, and strengthening accountability. By addressing best practices and challenges, the research drives the development and consolidation of cost systems, highlighting their relevance not only for more informed decision-making, but also for the promotion of a more responsive and accountable public administration.

2 LITERATURE REVIEW

In the organizational context, Gupta, Dirsmith, and Forgaty (1994) point out that the success of a management system, such as the Cost Information System (CIS),

depends on adequate support during implementation, including political commitment, training, and skills development. The literature highlights these elements as fundamental to the success of accounting innovations (Chenhall, 2003; Cavalluzzo; Ittner, 2004; van Dooren, 2005).

Patterson and Lapsley (2003) reinforce that accounting in the public sector has evolved from a purely administrative function to a strategic cost management tool. This reflects the growing need to optimize resource allocation by using cost management as a support for decision-making.

Previous studies, referenced in Table 1 below, indicate that the Brazilian public administration faces difficulties in implementing the CIS.

Table 1 – Difficulties in the implementation of Cost Information Systems (CIS)

Difficulty identified	Source
Fear of disclosing details of public expenditure	Reis and Lavarda (2017)
Cultural and/or economic barriers	Padrones, Santos and Colares (2017)
Resistance to change	Monteiro (2018)
Lack of qualified personnel and absence of adequate structure	Santos and Voese (2019)
Lack of control mechanisms to penalize non-compliance in implementation	Pereira and Romão (2015)
Resistance among public managers to the use of cost information, with a preference for traditional budgetary approaches	Mohr (2016)

Source: prepared by the authors.

International studies, such as Study 12 – Perspectives on Cost Accounting for Governments, published in 2000 by the Public Sector Committee of the International Federation of Accountants (IFAC-CSP), and the Recommended Practice Guideline 3 – Reporting Service Performance Information (RPG 3), published in 2015 by the International Public Sector Accounting Standards Board (IPSASB), emphasize the importance of cost-effective systems to improve efficiency, transparency, and decision-making in public management.

Study 12 offers important guidelines for the development and implementation of CISs in governments and has been widely used as a foundational reference, as it aims to assist governments in improving efficiency in the use of public resources, in the provision of goods, and in the delivery of services to society. The document highlights the need for a robust cost system to support fiscal management and decision-making. RPG 3, on the other hand, focuses on the presentation of service performance information in General Purpose Financial Reports (GPFRs).

These documents are in line with the principles of the New Public Management (NPM), which seek greater efficiency, transparency, and effectiveness in public administration, especially with respect to cost measurement under the accrual basis. It is an accounting method that provides a broader financial perspective, favors asset management, and directs attention toward results, thereby contributing to more informed decision-making and, consequently, to strengthening fiscal responsibility.

In Brazil, on May 4, 2000, Supplementary Law No.101, known as LRF (Brasil, 2000), was enacted. This legislation represents a landmark in Brazilian public finance by requiring public administration to maintain cost systems to enable the evaluation and monitoring of the budgetary, financial, and asset management of public organizations.

On November 5, 2020, Decree 10,540 (Decreto 10.540) established the minimum quality standard for the Integrated System for Budgetary Execution, Financial management, and Control (Sistema Único e Integrado de Execução Orçamentária, Administração Financeira e Controle – Siafic) – an instrument designed to integrate different levels of government and strengthen public resources oversight (Brasil, 2020) and establishes, among its requirements, that the system must allow the accumulation of records by cost centers. It also set the year 2025 as the deadline for the Siafic implementation.

In 2021, the Federal Accounting Council (Conselho Federal de Contabilidade – CFC) issued the Brazilian Standard on Accounting Applied to the Public Sector 34, NBC TSP 34 – Costs in the Public Sector (Norma Brasileira de Contabilidade Aplicada ao Setor Público 34 – NBC TSP 34 – Custos no Setor Público) (Brazil, 2021), updating the former NBC T 16.11, of 2011 (Brazil, 2011) and establishing new mandatory guidelines

for measurement and use of cost information in the public sector as of 2024. The standard aims to reinforce transparency and efficiency in the management of public resources by promoting more accurate and responsible asset management.

Subsequently, Decreto 11.644, of August 16, 2023, amended Decreto 10.540/2020 and instituted an exceptional implementation plan, providing staggered deadlines for compliance with specific requirements of Siafic.

At the institutional level, it is also worth highlighting the Support Program for Fiscal Management in Brazil (Programa de Apoio à Gestão dos Fiscos do Brasil – Profisco), coordinated by the Ministry of Finance (MF), which provides a support/financing framework for projects to modernize the fiscal, financial, and asset management of subnational entities, with a focus on improving administrative and informational capacities. By supporting initiatives aimed at improving the efficiency of public expenditure and strengthening management systems and processes, Profisco serves as a mechanism of institutional inducement that may advantage the creation (or maturation) of informational arrangements necessary for the measurement and use of costs in the public sector (Brazil, 2023).

However, despite mandatory implementation and measurement of costs in the Brazilian public sector, provided for in NBC TSP 34 and in Decreto 10.540, the situation is still incipient. To date, most Courts of Accounts have not expressly ruled before their jurisdictions on the requirement to adopt cost systems.

The only exception is the Court of Accounts of the State of Espírito Santo (TCE-ES), which issued Normative Instruction (Instrução Normativa 96), of May 6, 2025, approving the *Guidance manual for the implementation and use of cost systems in public administration by municipalities in the state of Espírito Santo* (*Guia de orientação para implementação e uso de sistema de custos na administração pública* pelos municípios capixabas) (Espírito Santo, 2025).

Therefore, these regulatory and institutional frameworks underscore the urgency of concrete advances and, simultaneously, the misalignment between the legal obligation and the effective implementation of Cost Information Systems. In summary, the

literature indicates that the adoption of CISs in the public sector is driven by the pursuit of greater allocative efficiency, transparency, and accountability, as well as compliance with legal and normative requirements. In this sense, international guidelines (IFAC, 2000; IPSASB, 2015) and national frameworks (LRF and NBC TSP 34) reaffirm the CISs as instruments for decision support and governance improvement, although previous studies point to the persistence of cultural, organizational, and technological barriers that continue to limit their institutionalization and effective use.

To understand how a CIS transitions from formal adoption to effective use, the approach perpective of institutional theory proposed by Tolbert and Zucker (2010) is adopted as a theoretical lens, according to which the institutionalization of new organizational structures occurs in three stages: **habituation**, in which arrangements arise as a response to specific problems and are formalized in policies and procedures; **objectification**, in which they gain social consensus and acquire normative status; and **sedimentation**, in which they become enduring elements embedded in the organization's culture and structure. This model has previously been used in the analysis of managerial innovations in the Brazilian public sector. Reis *et al.* (2017), when investigating the budget model adopted by federal universities, used the three stages to identify factors that promoted and inhibited institutionalization and found the presence of inhibiting factors in all of them. Similarly, Reis and Lavarda (2017), in their analysis of the accounting change process within a local government, identified, among the obstacles to the consolidation of accounting innovations, the fear of disclosing details of public expenditure (Table 1). These findings support the suitability of the Tolbert and Zucker model (2010) for categorizing managers' perceptions about the implementation and use of the Cost Information Systems.

At the analytical level, the study draws on Lukka and Modell (2010), who argue that the validity of interpretative research in management accounting derives from the plausible articulation between empirical evidence, pre-existing theoretical concepts, and the categories that emerge from the data. This perspective justifies the use of the stages of Tolbert and Zucker (2010) as a preliminary coding structure (template), following King (2004), without preventing categories emerging from the interviews from being incorporated into the analysis, a procedure detailed in Section 3.

3 METHODOLOGY

This study adopts a qualitative and exploratory approach, based on semi-structured interviews with civil servants responsible for the implementation and management of cost systems in Brazilian states, the Federal District and the federal government. This type of interview is recognized in the literature for providing flexibility to researchers, allowing in-depth exploration of interviewees' perceptions and experiences (Minayo, 2012; Yin, 2016).

A semi-structured protocol containing 20 questions was developed based on pertinent literature and the researcher's experience (Minayo, 2012; Yin, 2016). The questions were designed to investigate critical factors pointed out in previous studies on the institutionalization of cost systems – for example, top management support, team training, technological resources, and systems integration, conceptual guidelines adopted and cultural/organizational aspects (such as resistance to change), thereby aligning with the specific objectives of the research. Nevertheless, interviewees were also given the opportunity to freely present other aspects that they considered relevant.

Submission of the interview protocol to an ethics committee was not required, as the study complied with ethical guidelines applicable to research in the humanities and social sciences. Considering that the collection was limited to accounts and opinions of civil servants in the performance of their duties, with guaranteed anonymization and no identification of participants in the dissemination of results, the protocol was classified as exempt from registration and evaluation by the system formed by the Research Ethics Committees (CEPs) and the National Research Ethics Committee (Conep) – CEP/Conep System, under the terms of the Resolution of the National Health Council (Resolução do Conselho Nacional de Saúde (CNS) 510), of April 7, 2016 (Brazil, 2016).

Table 2 illustrates the logic "linking" the elaboration of the questions, based on Template Analysis, as proposed by King (2004) and adapted from Tolbert and Zucker (2010). In this table, each question in the protocol was linked to an analytical category (factor) and its corresponding research objective, within the general goals associated

with each theoretical stage of institutionalization. Therefore, it becomes evident which questions investigate each defined subcategory and how they relate both to the study's specific objectives and to the theoretical phases (habituation, objectification and sedimentation) of Tolbert and Zucker (2010). Such an articulating structure ensures that the process of coding and interpreting data remains aligned with the theoretical framework and the purposes of the research.

Table 2 – Template Analysis "linking"

Continues

1st level code (goal categories)	2nd level code (specific objectives)	3rd level code (categorized factors)	4th level code (semi-structured questions)
1 Pre-institutionalization/ habituation stage	1.1 Understanding the history, political environment, resources, and conditions under which the state's CIS was or is being implemented.	1.1.1 History	1.1.1.1 What is the history?
		1.1.2 CIS team Composition	1.1.2.1 What is the current composition of the civil servants of the staff involved in the CIS team?
			1.1.2.2 Have the available human resources been sufficient to implement the system?
		1.1.3 Financial resources for CIS implementation	1.1.3.1 Have the financial resources made available and/or raised been sufficient for the implementation of the CIS?
		1.1.4 Technological maturity for CIS implementation	1.1.4.1 What is the level of technological commitment of the CIS?
		1.1.5 Strategic planning and CIS	1.1.5.1 Is there strategic planning and are there goals to be achieved regarding the definitive adoption of the CIS?
		1.1.6 Political and/or top management sponsorship	1.1.6.1 To what extent is political commitment (from top management) sufficient to implement the cost accounting system?
			1.1.6.2 To what extent do changes in government or general secretariats affect the introduction of the cost accounting system?

Continuation

1st level code (goal categories)	2nd level code (specific objectives)	3rd level code (categorized factors)	4th level code (semi-structured questions)
2 Semi-institutionalization/ objectification stage	2.1 Understanding the main conceptual modeling guidelines.	2.1.1 Conceptual guidelines adopted	2.1.1.1 What are the main guidelines for the conceptual modeling of the CIS?
		2.1.2 Influence of International Public Sector Accounting Standards (IPSAS) and accounting	2.1.2.1 To what extent has the new Accounting Applied to the Brazilian Public Sector (converged with IPSAS) influenced on the introduction of the cost accounting system?
	2.2 Understanding of cultural, behavioral and organizational aspects.	2.2.1 Resistance to change	2.2.1.1 Is resistance to change a characteristic of the organization, for the purposes of adopting cost information?
		2.2.2 Cost Information *vs.* Organizational Performance	2.2.2.1 To what extent is cost information by activities and products important for measuring organizational performance?
		2.2.3 Training and capacity building	2.2.3.1 To what extent do you consider training and professional development to be actually necessary for implementing the cost accounting system?
	2.3 Understanding the level of interaction of core systems and ease/difficulty in data collection.	2.3.1 Difficulties in data collection	2.3.1.1 Are there any difficulties in collecting data to feed the CIS? To what extent?
		2.3.2 Interaction between core systems	2.3.2.1 To what extent do existing information systems in your organization present limitations to implement (feed) the cost accounting system?
			2.3.2.2 To what extent is the CIS integrated with the state's accounting information system?

1st level code (goal categories)	2nd level code (specific objectives)	3rd level code (categorized factors)	4th level code (semi-structured questions)
3 Institutionalization/ sedimentation	3.1 Understanding the level of maturity, external oversight requirements, use and utility.	3.1.1 Overall CIS Maturity	3.1.1.1 What is the overall maturity level of the CIS? What has already been accomplished, what still needs to be done, and what are the future prospects?
		3.1.2 Influence of the Courts of Accounts	3.1.2.1 At state level, does the State Court of Accounts request cost information or require the existence of a cost system?
		3.1.3 Main information generated or to be generated by the CIS	3.1.3.1 What are the main products/objects of costs, information, and reports generated or expected to be generated by the CIS for internal and external users?
		3.1.4 Recommendations for States at an Early Stage	3.1.4.1 Based on the experience in developing the CIS, what would you recommend to states that are initiating or intend to start the process?

Source: Tolbert and Zucker (2010), adapted.

The study encompassed five states, the Federal District, and the federal government, all of which had operational cost systems at the time of the research, although at different stages of institutional development. The total number of participants, with details by state, is presented in Table 3. Interviews were conducted between October and December 2020, and took place virtually through teleconferences, using the *Google Meet* platform. The process sought to ensure standardization in data collection, as well as favorable conditions for interviewees to report their experiences, respecting the autonomy and availability of each participant.

To ensure a structured and coherent research development, the methodological model based on the studies by Tolbert and Zucker (2010) was adopted, which divides the process of institutionalization of organizational systems into three main phases. The first phase, called habituation, refers to the creation of new organizational arrangements, which arise as a response to specific problems, and are subsequently

formalized through policies and procedures. The second phase, objectification, occurs when these arrangements begin to gain social consensus within the organization, being recognized as consolidated norms of a more permanent nature. Finally, the sedimentation phase marks the perpetuation of these norms, which become widely accepted and incorporated into the organizational culture, becoming an integral part of the entity's structure (Tolbert; Zucker, 2010). In the Brazilian public sector, this same typology was applied by Reis *et al*. (2017) to identify motivating and inhibiting factors for the institutionalization of the budget model adopted by federal universities, which corroborates its suitability to the context of the present study.

The three phases highlight the importance of the continuous process of adaptation and acceptance of changes within the organization, ranging from initial creation to full institutionalization of norms and practices.

The study is structured in four stages: *i)* semi-structured interviews with managers and civil servants of the CISs, categorizing their perceptions as facilitators or barriers; *ii)* qualitative analysis, to map discourses, organizing them into predefined categories and factors; *iii)* organization of the contents into three phases (habituation, objectification, and sedimentation), to deepen the theoretical understanding; and *iv)* formulation of practical recommendations, to support the implementation of CISs by interested public entities.

Representatives of the teams responsible for the CISs in the five states, the Federal District, and the federal government that had already implemented the system at the time of the study (Gefin, 2020) were intentionally selected. This sampling criterion sought to ensure that all interviewees had direct involvement in the implementation and management of the CISs, to provide qualified insights into the difficulties and facilitating factors observed in the institutionalization process.

Table 3 – Profile of Interviewees

Interviewees	Date/Time	Team Building	Other information
E1 (Pernambuco), two interviewees	10/28/2020 1h56	Business Administration. Bachelor's degree in accounting with postgraduate studies in Finance	Both were treasury auditors of the State of Pernambuco
E2 (Bahia), one interviewee	11/4/2020 1h30	Law degree with postgraduate studies in Government Financial Administration	Tax auditor of the Bahia State Treasury Department; 30 years of service; member of the CIS-Bahia team since 2005
E3 (São Paulo), three interviewees	11/18/2020 1h37	All held bachelor's degrees in accounting	One accountant-general of the Secretariat of Finance and Planning of São Paulo; two planning, budget and finance analysts of the Secretariat of Finance and Planning of São Paulo
E4 (Santa Catarina), three interviewees	11/23/2020 1h37	All held bachelor's degrees in accounting	All accountants of the Santa Catarina State Treasury Department
E5 (Rio Grande do Sul), three interviewees	11/19/2020 2h34	All held bachelor's degrees in accounting	Head of the Strategic Information Division of the Rio Grande do Sul State Treasury Secretariat; two accountants of the Rio Grande do Sul State Treasury Secretariat
E6 (Federal District), two interviewees	12/3/2020 1h35	All held bachelor's degrees in accounting	Government cost coordinator of the Federal District Accounting Undersecretariat and a cost manager
E7 (federal government), three interviewees	12/4/2020 2h15	All held bachelor's degrees in accounting	One cost information coordinator and two government audit officers from the National Treasury Secretariat

Source: prepared by the authors.

The interviews were audio-recorded with the participants' prior consent, ensuring free and informed authorization for recording. Subsequently, all interviews were transcribed in full to enable data analysis.

The research was conducted through the articulation of interview excerpts, existing theoretical concepts, and emerging theoretical categories (Lukka; Modell, 2010), requiring three analytical stages: *i)* first-order analysis, in which we sought to understand the contents of the interviewees' statements, through the segregation into attributes of facilitation (motivation) and restriction (obstacles) by categorized factors. This material was stratified from the interview transcripts; *ii)* second-order interpretation, carried out in the results phase of the research through the gradual

consolidation of the contents categorized by factors and aligned with goals, which were grouped into five and subsequently encompassed by the three stages of institutional theory as proposed by Tolbert and Zucker (2010); *iii)* third-order analysis, through the consolidation of the results of the main findings and the presentation of empirical recommendations, thereby fulfilling the objective of the research.

Regarding data structuring, the categorization of factors or determinants was conducted using King's (2004) technique of model analysis or Template Analysis. This technique allows the insertion and creation of hierarchies of items – goals, factors, questions, among other analytical elements, in a flexible and unrestricted manner. Additionally, codes may emerge both from literature and from the data themselves.

It should be noted that the application of Template Analysis in this study began with the definition of a preliminary set of codes, derived from the theoretical categories identified in literature and from the research objectives. Next, interview transcripts were read in full and coded manually, without the aid of specialized software, according to this initial template – adding new codes and adjusting category hierarchy whenever relevant concepts emerged from the empirical data. This iterative refinement process continued until a consolidated category structure was established, ensuring that the analysis accurately captured both the theoretically predicted elements and those emerging from the interviewees' narratives.

From an ethical standpoint, the study complied with the standards applicable to research involving human participants. All interviewees were informed about the objectives of the research at the beginning of the recorded sessions. Measures were also adopted to protect participants' identities and ensure the confidential treatment of the information provided.

The analysis was performed manually, without the use of specific software, following the methodological rigor of Template Analysis, with systematic application of predefined templates/codes iteratively refined throughout the reading and interpretation of the material, in order to ensure the consistency and traceability of the analytical categories (King, 2004; Tolbert; Zucker, 2010).

As a methodological limitation, it should be noted that the findings result from an purposive sample of entities with operational cost systems at different stages of development, limits generalization to contexts with nonexistent or incipient implementation. Furthermore, because the results are based on interviews, they reflect participants' perceptions, subject to biases − memory/social desirability, and do not contemplate the perspectives of other actors, including end users, line managers, and oversight bodies.

Additionally, data collection was relied exclusively on semi-structured interviews, without triangulation with other sources of evidence, which may have limited the robustness and depth of the findings. Moreover, the use of a single theoretical framework – the model of Tolbert and Zucker (2010) to guide the analysis restricted the interpretation of the phenomenon to that specific theoretical perspective.

4 RESULTS AND DISCUSSION

The data analysis, aligned with academic practices and national and international standards, resulted in eleven strategic recommendations to improve the implementation and use of Cost Information Systems. Each of the following recommendations emerges from the convergence between theoretical foundations (Tolbert; Zucker, 2010; IFAC, 2000; IPSASB, 2015; Brazil, 2021) and empirical evidence (interview excerpts with CIS managers, identified as E1 to E7). To facilitate understanding, the recommendations are organized according to the three stages of institutionalization described by Tolbert and Zucker (2010): habituation (initial arrangements); objectification (consensus and standardization); and sedimentation (consolidated use).

4.1 Stage of habituation (pre-institutionalization)

During the habituation stage, initial structures and experimental routines emerge in response to the new CIS practice (Tolbert; Zucker, 2010). At this stage, establishing the organizational foundations of the system is essential. In several federative entities,

the continuity of the CIS depends on dedicated and technically qualified teams. Interviewee E1 emphasizes that "*the addition of new employees with training in accounting and technology to the CIS team is extremely beneficial. They bring innovative ideas, contributing significantly to the advancement of the system.*" Similarly, E7 noted that the federal government institutionalized the CIS through an internal ordinance, defining the National Treasury as the central body and the ministries as sectoral units, each supported by designated personnel. These findings confirm guidelines from IFAC (2000), IPSASB (2015). and the CFC (Brazil, 2021), all of which emphasize the importance of specialized teams to implement the CIS accurately and in compliance with standards, thereby supporting the recommendation presented in Table 4.

Table 4 – Recommendation 1: Composition of the CIS Team

Establish a minimum number of qualified civil servants and professionals (with expertise in accounting and information systems) to support the CIS from its conception through consolidation. Create and strengthen cross-functional technical committees, encouraging the active participation of civil servants from different areas and preventing team discontinuity. Standardize the competencies and structure of the sectoral cost units according to organizational complexity, ensuring the full development of the central CIS body.

Source: prepared by the authors.

The implementation of CIS also requires adequate and continuous financial resources. Interviewed managers reported that federal management support programs (such as Profisco) finance part of the cost-related projects, usually through umbrella contracts that meet various technological demands. *Study 12* (IFAC, 2000) highlights the need to allocate specific funds for investments in personnel, IT systems, and process modernization during the implementation of a new cost system. Without appropriate funding, there may be delays or incomplete implementation (Mohr; Raudla; Douglas, 2021). This set of empirical and normative evidence directly supported the recommendation presented in Table 5.

Table 5 – Recommendation 2: Financial resources for the CIS

Ensure funding through its own budgetary resources and seek support from institutions interested in promoting transparency and social development. Prioritize the CIS project within the public management agenda (for example, by incorporating it into strategic programs or multi-year plans) to justify it as a priority initiative. Present the CIS as an essential tool to improve the efficiency of administration and optimize the allocation of resources, raising awareness among decisionmakers regarding its relevance.

Source: prepared by the authors.

Technological infrastructure and information systems integration are key factors in CIS maturity. Interviewee E1 stated that it is "essential to highlight the relevance of cost information at a strategic level" and integrate it into the entity's planning process, defining goals under the supervision of the Department of Finance (Sefaz). E5 reinforced that innovative management tools – such as the one adopted in the state of São Paulo, which directly allocates expenses by individual school – are indispensable to improve the CIS. E1 also warned that the absence of integration with inventory, asset management or payroll systems compromises data reliability. The technical literature (Chenhall, 2003; Cavalluzzo; Ittner, 2004; van Dooren, 2005) emphasizes that robust IT infrastructure is crucial for accounting innovations in the public sector. As recommended by IFAC (2000), IPSASB (2015) and the CFC (Brazil, 2021), integrated IT systems should support transparent cost analysis and public sector decision-making. Accordingly, the empirical evidence and theoretical-normative support presented directly justified the following recommendation.

Table 6 – Recommendation 3: CIS Technological Maturity

Develop and implement technological tools that enable the direct recording expenditures to cost objects, preferably applying the direct costing method to avoid rework. Integrate artificial intelligence or automation resources to automatically capture and consolidate information from structuring systems (asset accounting, budget settlement, payroll), ensuring that databases feed the CIS completely and reliably.

Source: prepared by the authors.

To ensure the success of the CIS, it is essential to elevate it to the strategic level of senior management. E3 suggested incorporating the CIS project into the Pluriannual Plan (PPA), as was done in the state of Rio Grande do Sul for other control systems. E4 emphasized that, even with structured accounting, the use of the CIS must be

formalized through normative instruments (decrees, ordinances, and manuals) that define responsibilities and guarantee its continuity.

In fact, Patterson and Lapsley (2003) observe that cost management has assumed a strategic role in all stages of the budget cycle, contributing to more informed decision-making and accountability in public management. In this sense, aligning the CIS with planning and budgeting instruments – PPA, Budget Guidelines Law (LDO), and Annual Budget Law (LOA) – not only reinforces its institutional priority, but also creates conditions for the information produced to be effectively used in the allocation of resources, in the monitoring of results and in accountability. Therefore, the convergence between the empirical evidence presented by the interviewees and theoretical support underpins the recommendation presented in Table 7.

Table 7 – Recommendation 4: Integration with strategic planning

Elevate the CIS to the strategic level of senior management and formally incorporate it into the PPA and the annual budget, ensuring resources, sustainability, and continuity to the project. Designate the Department of Finance (or similar high-level body) as the CIS authority, with other government departments operating as subordinate sectoral units. In this way, the importance of the CIS for public governance and its alignment with institutional goals are reinforced.

Source: prepared by the authors.

Engagement of senior management and political sponsorship are critical factors for CIS viability. E2 reported that multi-year plans and credit operations create windows of opportunity to mobilize senior management in support of the project. E4 emphasized that the issuance of official normative instruments (decrees, ordinances, and manuals) provides legal certainty and clarifies responsibilities, indispensable conditions for the effective system operation. E3 added that, once consolidated within government departments, the CIS becomes easier to disseminate, which allows directing efforts to continuous training and strengthening sectoral teams.

On the other hand, E7 warned that, if sponsorship is restricted only to accounting or Departments of Finance, it will be insufficient. The CIS must be embraced as a cross-government initiative and supported by senior management, because, without appreciation and effective use by managers, cost information tends not to be incorporated into decision-making processes.

This body of evidence is consistent with the literature, which recognizes resistance to change and a conservative organizational culture as relevant barriers to the implementation and use of the CIS (Mohr, 2016; Padrones; Santos; Colares, 2017).

Furthermore, normative and technical references emphasize that the consolidation of cost systems depends on continuous institutional support – in terms of resources, legitimacy, and governance – to promote transparency, accountability, and managerial use of information (IFAC, 2000; IPSASB, 2015; Brazil, 2021). Accordingly, it was possible to formulate the recommendation in Table 8.

Table 8 – Recommendation 5: Political and institutional sponsorship

Engage senior management in the implementation and use of the CIS, through participation in strategic committees and establishment of clear regulations. Publish normative instruments (decrees, ordinances, and manuals) that formally establish the CIS, define roles and responsibilities, and make periodic cost accountability mandatory (e.g., annual reports). Ensure that each new administration recognizes the relevance of the CIS, preventing political changes from interrupting or failing to prioritize the project.

Source: prepared by the authors.

4.2 Stage of Objectification (semi-institutionalization)

During the objectification stage, the initial arrangements created in the previous phase are legitimized and transformed into established routines (Tolbert; Zucker, 2010). Here the CIS is already operational, and its conceptual logic must be consolidated. Most of the entities that implemented CISs adopted accrual accounting, as required by NBC TSP 34 (Brazil, 2021). States such as Pernambuco, Rio Grande do Sul, Santa Catarina, and São Paulo extract information directly from asset accounting records (Expenses decreasing net equity), while others, such as Bahia and the Federal District adjust budget execution data to an accrual basis. In practice, administrations have prioritized direct accrual costing covering agencies and programs, gradually advancing toward cost measurement at frontline units (schools, hospitals, prisons).

Machado, Holanda and Bezerra Filho (2018) state that, given the various costing methods available, it is recommended that entities beginning this process in the public sector should adopt direct costing to simplify the analysis and avoid arbitrary allocations. Furthermore, IPSASB (2015) emphasizes that cost systems must be integrated into planning and strategic management processes, ensuring that the information generated is widely used in public policy formulation. In light of these foundations, Recommendation 6 is presented in Table 9.

Table 9 – Recommendation 6: Conceptual guidelines for the CIS

Design the CIS based on accrual accounting and feed it with data extracted from core systems – equity accounting, budget settlement, payroll, to ensure accurate measurements. Initially prioritize the generation of cost information for frontline units, such as schools and hospitals, and progressively expand to larger objects – agencies, programs, and actions. Integrate the PPA, the LDO, and the LOA into the CIS, to align planning and budgeting with cost calculation, gradually expanding the scope of information.

Source: prepared by the authors.

Despite technical and regulatory progress, cultural resistance to cost measurement persists. E1 and E3 observed that “cost measurement is still not part of the daily culture of the administration” in many organizations, generally for fear of exposing inefficiencies or increasing employees’ workload. At the same time, society’s pressure for transparency is growing: the media and citizens demand indicators such as cost per student, per prisoner or per patient. According to E1, only stronger regulations assigning clear responsibilities for collecting cost data would make managers value the CIS as a mandatory component of the routine.

These concerns are pointed out in the literature (Monteiro, 2018; Reis; Lavarda, 2017). Under such circumstances, it is recommended that accounting standards (NBC TSP/IPSAS) be applied flexibly: instead of seeking strict compliance with each accounting entry, organizations should interpret them in ways that align managers and society with effective asset oversight, avoiding unnecessary bureaucratic rigidity. Accordingly, the recommendation contained in Table 10 was presented.

Table 10 – Recommendation 7: Adaptation of accounting standards

Apply accounting standards (NBC TSP/IPSAS) flexibly, emphasizing their role in transparency and asset oversight, instead of pursuing rigid compliance without practical purpose. The standards should be interpreted so that the accounting requirements faithfully reflect equity reality, focusing efforts on generating useful information for management, without generating excessive administrative costs.

Source: prepared by the authors.

IFAC (2000) and IPSASB (2015) emphasize that clear communication and continuous training are essential strategies to overcome resistance to change. Managers should promote a culture that embraces change, openly communicating the benefits of the CIS and involving civil servants in all stages of the project. In this context, the following recommendation is presented in Table 11.

Table 11 – Recommendation 8: Communication and awareness-raising

Develop a communication plan to demystify cost measurement and raise awareness among managers, civil servants, and society about the importance of the CIS for efficiency, transparency and accountability. Clearly present the contributions of the CIS – improved resource allocation, evaluation of public service performance, among other benefits, and use practical examples of success. Workshops, seminars, and internal training can reinforce the legitimacy of the CIS as a strategic tool.

Source: prepared by the authors.

Finally, the technical training of those involved is decisive. E1 highlighted the urgent need to “raise resources to train professionals” specializing in costs. E7 stated that, in addition to conventional training, it is recommended to prepare a specific work plan for each organization, with clear guidelines and regular technical meetings. E2 recalled that the turnover of qualified civil servants, due to internal transfers and retirements, constitutes an additional challenge. Santos and Voese (2019) and Gupta, Dirsmith and Forgaty (1994) identify that the lack of qualified professionals and competency development are critical factors for the success of the CIS. Therefore, recommendation 9 emerged, as presented in Table 12.

Table 12 – Recommendation 9: Training and capacity building

Develop a specific training plan for employees in sectoral cost units, including workshops, seminars and case studies, to discuss the definition of cost objects and the practical use of the CIS. Carry out an initial diagnosis of existing competencies and offer training tailored to different profiles, such as IT professionals, accountants, and managers. In addition to technical training, establish a clear work plan, with periodic follow-up meetings, to continuously guide the CIS teams.

Source: prepared by the authors.

4.3 Sedimentation stage (institutionalization)

During the sedimentation Stage, CIS practices become an integral part of the organizational routine (Tolbert; Zucker, 2010). The CIS should operate as an integrating information center for the entire public administration. E4 explained that the cost system of Rio Grande do Sul functions as a unified center, aggregating data from accounting, asset management, and payroll systems. Similarly, the IPSASB (2015) emphasizes that integrated public information management requires interaction of accounting, asset management, and human resources systems, among other administrative components, ensuring that cost data are complete and accurate for decision-making. Based on this evidence, the recommendation set out in Table 13 was formulated, aimed at strengthening the systemic integration of the CIS.

Table 13 – Recommendation 10: integration of core systems

Integrate the CIS with the main administrative systems, especially payroll systems, but also accounting, asset management, and procurement, among other corporate solutions, to eliminate manual data collection processes and avoid rework. Include CIS teams in the development or updating of these systems, defining standardized coding structures that enable automatic information flows. Maintaining all databases up to date and aligned, with support from the Courts of Accounts and other oversight bodies, is essential for ensuring the quality of cost information.

Source: prepared by the authors.

The reports generated by the CIS must meet the demands of managers and society. In Santa Catarina, for example, the CIS team developed a model that consolidates all core data and uses business intelligence tools, such as Power BI, to produce dynamic reports configured by end users. However, E6 warned that frequent changes in management and limited resources may hinder the continuous evolution of these reports. Another crucial challenge is to clearly define cost objects. E7 emphasized that,

to calculate the cost of a product or service, it is “essential to identify the processes involved in its creation and delivery.” The literature (Padrones; Santos; Colares, 2017) notes that cultural and organizational barriers may prevent this integrated perspective. In this sense, the IPSASB recommends integrating CIS information with other management systems, allowing a comprehensive view of resource allocation (IPSASB, 2015).

Additionally, NBC TSP 34 (Brazil, 2021) emphasizes that public goods and services, such as in the areas of health, education, and security, constitute final cost objects whose accurate measurement is crucial for efficiency and transparency in spending. Several states already disclose detailed indicators – cost per prisoner, per student, per school meal, among other metrics for the provision of public services, enhancing accountability to society. Considering this normative framework and the evidence of practical application, Recommendation 11 is presented in Table 14, aimed at improving and expanding the final information generated by the CIS.

Table 14 – Recommendation 11: information generated by the CIS

Prioritize, initially, the generation of cost reports related to frontline objects directly enhancing the population − schools, hospitals, and public safety units, and gradually expand to the entire governmental structure. Ensure that these reports are dynamic, customizable, and accessible, using modern platforms, such as artificial intelligence or business intelligence tools, allowing users to configure analyses on demand. The CIS should provide a broad set of indicators and reports on public services, programs, and processes, following the examples of states that already disclose costs by beneficiary category or service type.

Source: prepared by the authors.

Finally, the consolidation of the CIS depends on the continuous support of managers, civil servants and internal, external, and social oversight bodies. The sedimentation of these practices, that is, the regular use and institutionalization of cost information, strengthens transparency, efficiency, and accountability in public management Consistent with the institutional theory of Tolbert and Zucker (2010), it is observed that the effectiveness of the CIS requires going beyond mere formal institutionalization (habituation) and achieving organizational sedimentation, whereby cost information routinely guide administrative decisions.

5 FINAL CONSIDERATIONS

Consistent with the objective of this study, the results allow categorizing critical aspects related to the implementation and use of Cost Information Systems (CIS), based on the perceptions of civil servants responsible for its management in entities where the system has already been implemented. The research also enables the formulation of practical recommendations to support other federative entities in the adoption and maturation of the CIS, complementing existing regulatory instruments, by translating general guidelines into recommendations applicable to administrative practice. Therefore, this contribution is materialized through the systematization of factors that favor or hinder the institutionalization of CISs and through the proposal of operational pathways capable of expanding the use of cost information in public management, with a focus on efficiency and transparency.

In light of institutional theory (Tolbert; Zucker, 2010), the findings suggest that the effectiveness of the CIS depends on its institutionalization beyond formal compliance. In many cases, implementation tends to advance at the level of habituation/objectification − initial structuring, definition of routines, and system design, but encounters difficulties in achieving sedimentation, that is, to consolidate the use of the CIS as a stable practice, incorporated into routines and decision-making processes.

This result is compatible with the notion that regulatory pressures may induce “formal” adoption, while cultural, organizational, and coordination factors condition internalization and effective use. Therefore, theory helps explain why regulatory requirements do not guarantee, by itself, the consistent use of cost information: the consolidation of the CIS requires internal legitimacy, managerial incentives, and routines that sustain its continuous use.

It should be emphasized that the study is based exclusively on interviews with CIS management teams, without triangulation with other sources such as examination of institutional documents, observation of routines, analysis of management reports or databases, which restricts empirical robustness and comparison between discourse

and practice. The findings also derive from an purposive sample of entities in which the CIS was already implemented, and cannot, of course, be generalized to contexts with nonexistent or incipient implementation.

Finally, the analysis was carried out predominantly under the framework of institutional theory, which privileges interpretations related to processes of legitimation and sedimentation, although other approaches may provide complementary explanations, particularly those focused on organizational capabilities, performance, IT governance or change management.

Future research may broaden the understanding of the topic by incorporating and studying of the following subjects: *i)* methodological triangulation, combining interviews with document analysis, evidence of use − reports, dashboards, and cost-informed decisions − and observation of organizational routines; *ii)* comparisons between entities at different stages of implementation, including municipalities, to assess how Cost Information Systems evolve toward sedimentation, especially in view of the integration requirements of the SIAFI; *iii)* testing complementary explanatory models − state capacity, change management, governance, and data maturity − in dialogue with institutional theory; and *iv)* evaluation of the effects of CISs on decision-making and results in public management, exploring indicators of efficiency, resource allocation, and transparency, as well as specific barriers to the managerial use of cost information in service-delivery areas.

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