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THE MANAGEMENT CONTROL SYSTEM IN PUBLIC SECTOR ORGANIZATIONS: An empirical study based on the perception of INSS managers

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1. INTRODUCTION

In organizations, private or public, the planning process aims to direct the implementation of strategic guidelines, producing an operational plan that has decision-making as a factor that materializes what was planned (BATAGLIA and YU, 2008). The Management Control System (MCS) is one of the main artifacts of organizational management, facilitating planning and decision-making processes (BEUREN, KLEIN and DEL VESCO, 2015).

The MCS provides "subsidy for the planning, decision-making, monitoring and evaluation processes of organizational activities, as well as influencing employee behavior and aligning them with institutional objectives" (SANTOS and LUNKES, 2018, p. 2). In a broad understanding, the MCS is a fundamental instrument for organizational management as it includes all the devices and systems that managers use to ensure that planning and decision-making are in line with institutional objectives and strategies (NISIYAMA and OYADOMARI, 2012).

Most studies on MCS involve the private sector, such as those by Bunce et al. (1995), Langfield-Smith (1997), Ittner and Larcker (1998), Hansen et al. (2003), Collier (2005), Henry (2006a), Henry (2006b), Merchant and Van der Stede (2007), Widener (2007), Oyadomari et al. (2011), Nisiyama and Oyadomari (2012), Beuren, Klein and Dal Vesco (2015), Nisiyama et al. (2016), Giustina, Gasparetto and Lunkes (2020) and Lopes, Beuren and Theiss (2021) or deals with literature reviews, such as the works of Simons (1995), Otley (1999), Simons (2000), Malmi and Brown (2008) and Santos and Lunkes (2018). In the public sector, most studies on the topic cover realities of organizations in developed countries, such as the works of Van Helden and Reichard (2018) and Van der Kolk (2022), which address the topic by focusing on the European continent.

There is a research gap that focuses on the role of the MCS in public sector organizations, especially in developing countries. More studies are needed to explore the MCS in Public Administration, which aims to guarantee basic constitutional rights to society, in an equitable way, based on the planning and execution of public policies efficiently (DENHARDT, 2012; SILVA et al., 2019; QUEIROZ, 2021). The actors involved in the planning and decision-making processes of organizations in the public sector need technical and scientific support to achieve satisfactory results, which can be obtained using tools such as the MCS (KLADIS and FREITAS, 1995; SILVA, 2013; ARAÚJO et al., 2019).

Among public sector organizations at the federal level, the *Instituto Nacional do Seguro Social* – INSS, the federal agency responsible for managing Brazilian Social Security benefits and services, has been developing its capacity to collect, process and use the information at your disposal effectively, implementing auxiliary planning and management applications. The importance of this system model for the organization and the transformations it has been undergoing reveal a relevant field of research that can contribute to reducing the research gap mentioned above. This work seeks to answer the following question: What is the perception of INSS managers regarding the use of MCS in planning and decision-making processes?

To advance with the research question, this work was based on studies by Simons (1995; 2000) and Malmi and Brown (2008) on the theoretical models of Management Control Systems. Through a survey, this study sought to gather evidence that would contribute to validating whether (i) the perception of using the MCS for planning positively affects the perception of using the MCS for decision making; (ii) the perception of using the MCS for decision making

positively affects the perception of using the MCS for organizational management; (iii) the perception of use of the MCS in decision making and organizational management positively affects the perception of use of the MCS in institutional communication; and (iv) the perception of using the MCS for monitoring and evaluation positively affects the perception of using the MCS for planning and decision making. Additionally, information was collected about the implementation and use of Management Control Systems at the INSS through a questionnaire sent to the INSS Citizen Information Service (SIC-INSS).

The analysis unit for this research are the managers of the *Instituto Nacional do Seguro Social*. Considering the national scope of the institution and the complexity of its internal structure, it was decided to limit the analysis to the *Superintendência Regional Sudeste I*, which only covers the state of *São Paulo*. The focus of the research is directed to managers in the institution's middle sector and to managers of *Agências da Previdência Social* (APS).

The structure of this work, in addition to this introduction, includes the development of the theoretical framework in chapter 2 and the research methodology in chapter 3. The analysis of the obtained data is carried out in chapter 4 while the discussion of the results is presented in chapter 5. The chapter 6 brings the final considerations.

2. THEORETICAL FRAMEWORK

Until the middle of the 20th century, management academics considered the concept of control to have the same meaning as financial control (GIGLIONI and BEDEIAN, 1974). Seeking to change this paradigm, Anthony (1965) presented a new concept of control, identifying it as a process that involves people, organizations and the situations in which each participant finds himself, defining the first model of Management Control System (MCS) composed of three main objectives: strategic planning, management control and task control.

The MCS concept has been discussed and improved over the years. Henri (2006a; 2006b) presented the concept of MCS as a collection of procedures and computerized systems implemented to manage organizational activities, encompassing planning, management reporting and monitoring systems. Santos and Lunkes (2018) treated the MCS as a tool to support the planning, decision-making, monitoring and evaluation processes of organizational activities, as well as to influence employee behavior and align it with strategic objectives.

The MCS helps the manager to achieve organizational objectives and, therefore, must be adjusted to the context in which it will be used (CHENHALL, 2003). Ferreira and Otley (2009) argue that studies involving Management Control Systems should consider two dimensions: design and use. The design refers to the theoretical aspects of the MCS (MALMI and BROWN, 2008), while the use addresses the social and organizational aspects of the MCS (SIMONS, 1995).

For this study, we chose to treat the theoretical MCS models defined by Simons (1995) and Malmi and Brown (2008). The adoption of these models for a study involving the public sector reflects results observed in previous work in this area. The work of Van Helden and Reichard (2018) on management and performance control in the public sector was based on the model of Malmi and Brown (2008) to identify that the use of MCS positively influences organizational management. Additionally, the research mapping involving performance measurement in the public sector, carried out by Van der Kolk (2022), showed that much of the research evaluated the adoption of Management Control Systems as a differentiator for optimizing organizational management, supported by Simons' (1995) theory. At the same time, in the private sector, Merchant and Van der Stede (2007) based themselves on the work of Simons (1995) to identify that the use of the MCS facilitates the execution of organizational strategies and the monitoring of results.

2.1. Simons Theoretical Model

Simons' (1995) MCS theoretical model is composed of four control levers, which aims to provide information that will allow the development of the management process (FREZATTI et al., 2009). Levers refer to the belief system, limit (or restriction) system, diagnostic control system and interactive control system.

The belief system refers to organizational communication. It is a well-defined set of organizational guidelines that transmits fundamental values to inspire and motivate employees (SIMONS, 1995; WIDENER, 2007).

Establishing limits to the behavior and actions of individuals is the function of the limits (or restrictions) system, constituting the organizational code of conduct, which can help protect the organization against possible threats and mitigate the risks to which it is exposed (SIMONS, 1995; COLLIER, 2005; WIDENER, 2007).

Measuring process outputs, correcting performance deviations and comparing predefined standards with recent results is the purpose of the diagnostic control system (SIMONS, 1995). Such a system is used to communicate critical performance variables and to monitor the implementation of planned strategies (SIMONS, 2000; WIDENER, 2007).

Finally, the interactive control system addresses strategic uncertainties and necessary adjustments according to changes in the environment in which the organization operates, favoring experimentation and innovation, resulting in disruptive strategies (SIMONS, 1995). The use of this system allows quick adaptation to environmental changes and a renewal of organizational strategies, making them more robust (OTLEY, 2003; WIDENER, 2007; ANTHONY and GOVINDARAJAN, 2011).

In general, the model of control levers developed by Simons (1995) proposes a paradigm shift in relation to the traditional control studied so far, emphasizing the relevance of using the MCS in relation to organizational strategy.

2.2. Malmi and Brown Theoretical Model

Understanding the MCS as a package and not as isolated tools can facilitate the planning and development of a series of controls to support strategic objectives and organizational monitoring activities, in addition to boosting performance and minimizing the risk of poor decisions and management errors (MALMI and BROWN, 2008; SAMPAIO et al., 2018). Thus, the MCS functions as a management professionalization tool by providing conditions for better decisions, as observed in the work of Bunce et al. (1995), Ittner and Larcker (1998) and Hansen et al. (2003). With this, the first hypothesis of this study is established:

H1: The favorable perception of the use of the MCS for Decision-Making favors the positive perception of its use for Organizational Management.

The MCS model proposed by Malmi and Brown (2008) promotes the interrelationship of five control elements in the system design: planning, cybernetic, reward, administrative and cultural.

Planning refers to the definition of organizational objectives, strategic guidelines and the level of effort and commitment expected from employees, and can present both a tactical approach, when it comprises objectives set for periods of up to 12 months, and a strategic one, when it deals with objectives and actions to be completed in the medium and long term (MALMI and BROWN, 2008).

Cybernetic control deals with the continuous process of evaluating performance based on predefined standards, consisting of a computerized decision support system (MALMI and BROWN, 2008). Typically, it is linked to strategic planning, resource allocation, management initiatives focused on efficiency and management by objectives (BUNCE et al., 1995; ITTNER and LARCKER, 1998; HANSEN et al., 2003; MALMI and BROWN, 2008).

Reward control focuses on motivating and increasing individual and group performance and, consequently, improving organizational performance and achieving strategic objectives through a well-defined reward system, normally characterized by monetary incentives (MALMI and BROWN, 2008). It resembles Simons' (1995) belief system when addressing employee alignment with strategic guidelines.

Malmi and Brown's (2008) administrative control is related to the limits system proposed by Simons (1995) and concerns the directing, monitoring and accountability of the individuals' behavior in an organization, as well as coordination of organizational activities, both vertically and horizontally. In this context, it is observed that a well-executed monitoring and evaluation process produces satisfactory effects on planning and decision-making, a relationship supported by the study by Merchant and Van der Stede (2007). Thus, the second hypothesis of this study was defined:

H2: The favorable perception of the use of the MCS for Monitoring and Evaluation favors the positive perception of its use for Planning and Decision Making.

Finally, Malmi and Brown (2008) relate cultural control, which is nothing more than a control system composed of the processes of selection, training, institutional communication and definition and monitoring of behavioral patterns, developed to regulate individual or groups behavior and manage organizational culture. In line with Simons (1995), who treats the MCS as a tool for optimizing management and facilitating institutional communication, and Malmi and Brown (2008), who present the MCS as a mechanism for monitoring and transmitting the organization's guidelines, the third hypothesis of this study is defined, supported by the work of Widener (2007):

H3: The favorable perception of the use of the MCS for Decision Making and Organizational Management favors the positive perception of its use for Institutional Communication.

2.3. Management Control Systems and planning and decision-making processes

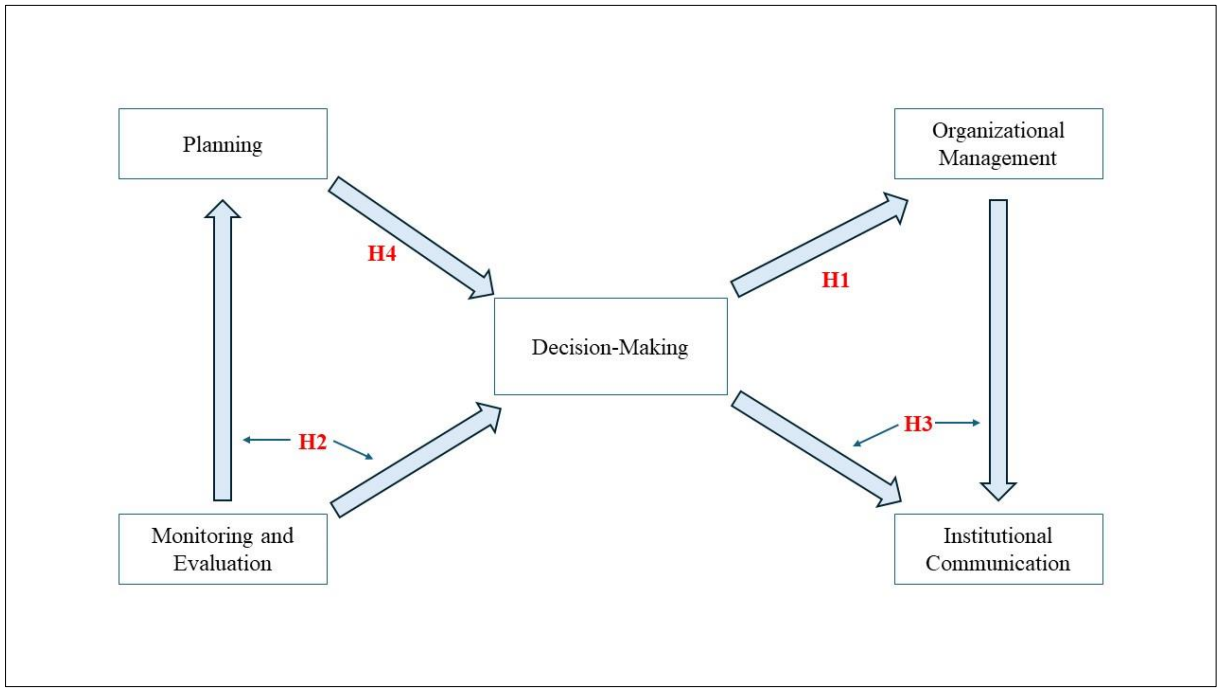
Based on the definitions proposed by Anthony (1965) and later those presented by Chenhall (2003), Henry (2006a) and Santos and Lunkes (2018) and studies such as Nisiyama and Oyadomari (2012), it can be concluded that MCS are management tools whose objective is to provide managers with subsidies to plan institutional actions and decide how and when they will be implemented.

Observing the theoretical models of Simons (1995) and Malmi and Brown (2008), it is possible to identify a common main objective for the implementation and use of MCS: the optimization of organizational management. According to the works of Kladis and Freitas (1995), Costin (2010), Denhardt (2012), Araújo, et al. (2019), Silva, et al. (2019) and Queiroz (2021), organizational management in public administration has two essential processes: planning and decision-making. Such processes are closely linked to the concept of Management Control System in that their adequate design and use order and maintain balance within the organization, thus advancing the provision of reliable information conducive to the development of planning and decision-making processes (KERSCHENBAUER et al., 2015; LOPES, BEUREN and GOMES, 2019). This scenario makes it possible to define the last hypothesis of this study, supported by the works of Collier (2005) and Widener (2007):

H4: The favorable perception of the use of the MCS for Planning favors the positive perception of its use for Decision Making.

By testing these hypotheses, this work investigated the relations between the variables elaborated from the theoretical framework to identify managers' perceptions regarding the use of the MCS as a tool to support planning and decision-making processes. Figure 1 presents the research variables, their relations and the identification of hypotheses.

Figure 1 - Research variables and their relationships



Source: Prepared by the authors.

The concepts involving the design and use of Management Control Systems presented in this work, for the most part, were developed from studies carried out in the private sector. The purpose of this research is to bring the MCS's vision to the public sector and observe whether the proposed relations occur in the same way as in the private sector. It is expected, in principle, that the relations represented by hypotheses **H1**, **H2** and **H4** behave in a similar way to what has already been observed in the private sector through studies by Bunce et al. (1995), Ittner and Larcker (1998), Hansen et al. (2003), Otley (2003), Collier (2005), Merchant and Van der Stede (2007) and Anthony and Govindarajan (2011). As for hypothesis **H3**, it is believed that there will be no behavior like that found in the studies by Simons (2000) and Widener (2007) in the private sector, since the excessive bureaucracy and constant internal communication failures observed in the public sector in studies by Aragão (1997), Costin (2010) and Denhardt (2012) may compromise this relation.

3. METHODOLOGY

This work presents a study of descriptive and deductive nature (OYADOMARI et al., 2011), seeking to empirically test hypotheses supported by the theoretical framework to answer the research question. The research instrument selected to support the study was the survey method (PINSONNEAULT and KRAEMER, 1993; BABBIE, 2003). This study presents a quantitative approach, using analysis and interpretation of data through statistical techniques seeking to refute or build evidence favorable to the hypotheses (RICHARDSON, 2017; LEAVY, 2022).

3.1. Subject of analysis

The *Instituto Nacional do Seguro Social* – INSS, is a federal agency responsible for operationalizing the benefits and services of the Brazilian *Regime Geral de Previdência Social* – RGPS, which covers more than 50 million insured people and more than 30 million beneficiaries (BRASIL, 2022).

Since 2017, the INSS has been implementing improvement actions such as the total digitalization of processes, development of technological management tools and use of disruptive technologies, such as artificial intelligence and neural networks. To meet the need for managers to have effective tools in providing support for planning and decision-making processes (KLADIS and FREITAS, 1995), the INSS implemented computational systems of managerial nature, which aim to optimize institutional management, main characteristic of Management Control Systems, according to the works of Simons (1995) and Malmi and Brown (2008).

Due to the large number of activities carried out by the INSS and the specificities of corporate systems, this work will focus on the institute's final area, which comprises the activities of Rights' Recognition, Benefits' Maintenance and Customer Service. These three activities are composed, respectively, of services that involve the analysis of benefit applications, benefit update procedures and in-person service at the institute's physical units. All the services mentioned are recorded electronically in the form of tasks (task means any type of request made by the population, whether in person or through the agency's remote channels) and stored in the institution's databases (Brasil, 2017).

In this study, the perception of managers in relation to the agency's computer systems which are closely linked to the management of the institute's final area and which present the characteristics of Management Control Systems present in the works of Chenhall (2003), Henry (2006a) and Santos and Lunkes (2018) was captured: computerized systems implemented to manage institutional activities, providing clear and organized information to support planning and decision-making processes, helping the manager to achieve organizational objectives. The Management Control Systems selected were the following:

I. BG INSS (*Base de Gestão* INSS): management system composed of several modules, developed by INSS with WebFOCUS technology, which is a web-based development platform produced by the Information Builders company, focusing on data intelligence and support for decision (IBI, 2023). BG INSS is integrated with the corporate systems GET (*Gerenciador de Tarefas*) and SAG (*Sistema de Atendimento*), from which it extracts the data that feeds the Tasks and Scheduling modules, the main modules of the tool. Due to its characteristics, BG INSS is the institution's most robust management system.

II. GET Gestão (*Gerenciador de Tarefas – Módulo de Gestão*): task management system developed by the *Empresa de Tecnologia e Informações da Previdência Social* – Dataprev. It makes it possible to consult completed and pending tasks, as well as manipulate pending tasks, at a regional level. It is a management system that does not have integration with other corporate systems, as it is a management module of the GET system, which does have integration with the BG INSS.

III. SGP (*Sistema de Gerenciamento da Produtividade*): system that monitors the productivity of employees, in any situation or team in which they are inserted, at a national level. The SGP is a management module of the PAT (*Portal de Atendimento*) system, developed by Dataprev on the QlikView platform, a data intelligence software produced by the QlikTech company, whose objective is to provide reliable information to assist in planning and decision-making processes. (QLIK, 2023). It is a system that does not have integration with other corporate systems, receiving daily data loads through batch operations executed by Dataprev.

IV. *Portal Planejamento e Gestão*: managerial nature system composed of 2 panels, the *Painel de Desempenho*, which stores information about the actions and strategic projects of the INSS Action Plan, and the *Painel Lupa*, which aggregates institutional performance information, for service line. It was developed by INSS itself using AWS (Amazon Web Services) infrastructure resources and MySQL database, with manual

data loads. There are studies underway for systemic integration that allows automatic data loading from the institution's databases.

Information on the agency's Management Control Systems was obtained through a questionnaire sent to the SIC-INSS (INSS Citizen Information Service) through the Fala.Br portal.

3.2. Population and sample

The research population was defined as managers of the *Instituto Nacional do Seguro Social* – INSS within the scope of the *Superintendência Regional Sudeste I*, which comprises the state of *São Paulo*, and who work in the institution's final area: customer service and recognition and maintenance of rights. Professionals who work in the management of the middle sector, made up of the *Superintendência Regional Sudeste I* itself and the *Gerências Executivas*, and in the management of the *Agências da Previdência Social* – APS were selected. Middle sector managers are responsible for tactical planning, developing medium and short-term actions and supervising analysis teams; APS managers are responsible for the operational management of the customer service units and for carrying out the actions developed by the middle sector.

The list of managers and their functional data were obtained from the INSS page on the Gov.br portal. In total, there are 341 managers to whom the research instrument was sent via corporate email addresses.

3.3. Preparation, validation and availability of the research instrument

The managers' perception was measured using a research instrument created based on studies by Bunce et al. (1995), Simons (1995), Ittner and Larcker (1998), Simons (2000), Hansen et al. (2003), Otley (2003), Collier (2005), Merchant and Van der Stede (2007), Widener (2007), Malmi and Brown (2008) and Anthony and Govindarajan (2011), in a questionnaire format, composed of 36 statements on a 7-point Likert scale (COLLIS and HUSSEY, 2005).

Respondents were asked to indicate the agreement level in relation to the statements made for each of the research constructs. The agreement level was established on the following scale: 1 (completely disagree) to 7 (completely agree). There was a concern not to make the research instrument too extensive but respecting the minimum of 4 statements per construct, as recommended by Chin, Marcolin and Newested (2003).

Additionally, 7 questions were prepared to investigate the profile of the respondents and 1 question related to the satisfaction level of the respondents regarding the use of the corporate systems selected for this study. The satisfaction level was also measured using a 7-point Likert scale distributed as follows: 1 (very dissatisfied) to 7 (very satisfied).

After authorizations from the *Comitê de Ética em Pesquisa envolvendo Seres Humanos da Fundação Getúlio Vargas* – CEPH/FGV and the *Núcleo de Pesquisa e Inovação do Instituto Nacional do Seguro Social* – NUPI/INSS, the questionnaire was structured in the Qualtrics tool and tested. Finally, the questionnaire was made available to the target audience electronically, with the link to the survey sent via corporate emails in 2 moments, with an interval of 10 days between them and with a follow-up carried out via messaging application. The survey was available for data collection from March 22, 2024, to April 15, 2024.

3.4. Modeling

To test the hypotheses developed in this study, the multivariate technique of Structural Equation Modeling (SEM) was applied. This technique is appropriate in research that presents several constructs represented by multiple variables (HAIR JR. et al., 2009). The SEM technique is commonly used in research that seeks to analyze the relations between strategy,

structure and control systems in organizational effectiveness (SMITH and LANGFIELD-SMITH, 2004), which fits within the scope of this work.

In addition to the use of SEM, the Partial Least Squares (PLS) method was adopted. The PLS-SEM combination can be used in smaller samples, can treat data in non-normal conditions, deals with high difficulty when evaluating the relation between variables piece by piece and calculates the relation between variables and their constructs (SMITH SMITH and LANGFIELD-SMITH, 2004; BIDO et al., 2010). The SmartPLS 4 software was used to apply the PLS-SEM method (HAIR JR., HULT and RINGLE, 2014; RINGLE, SILVA and BIDO, 2014, BIDO and SILVA, 2019).

4. DATA ANALYSIS

Of the 341 emails sent, 101 responses were collected; of these, 77 were validated for use in the study, which represents a percentage of 76% of valid responses and a sample that corresponds to approximately 23% of the research population. Despite the relatively low number of valid responses, the result is acceptable for continuing the study due to the number of constructs (five) (CHIN, MARCOLIN and NEWESTED, 2003).

To investigate the profile of the respondents, a descriptive analysis of the demographic data collected was carried out. Table 1 presents the professional profile of the sample.

Table 1 – Sample's professional profile

Gender		Age group (years)		Education		Length of Service (years)		Time in Management (years)		Individuals in team	
Fem.	45%	25 - 35	5%	High School	5%	5 - 10	8%	Up to 3	21%	None	3%
Male	55%	35 - 45	45%	Technical Ed.	1%	10 - 15	14%	3 - 5	14%	Up to 5	39%
		45 - 55	22%	Graduation	56%	15 - 20	36%	5 - 10	21%	5 – 10	22%
		> 55	27%	Specialization	35%	> 20	42%	10 - 15	22%	10 – 20	9%
				Master's Degree	3%			15 - 20	10%	20 – 30	12%
								> 20	12%	> 30	16%

Source: Research data.

It is observed that there is practically no difference between the number of female and male managers, which register 45% and 55% each, respectively. Most managers are between 35 and 55 years of age. Regarding education, more than half of the sample has a higher education degree and 35% of respondents have a specialization; only 3% of managers have a master's degree. Regarding length of service at the institution, it appears that most managers have more than 15 years. When looking at the time on management, a more balanced distribution between the scales can be seen, however, most managers have less than 10 years of experience in management positions at the institution. Regarding the number of individuals that make up the team, more than half of the sample reports having up to 10 subordinates, which may indicate that the INSS has relatively small teams. Still on this issue, 3% of managers reported not having teams, which indicates that, in addition to management responsibilities, these professionals are also executors. This situation is an indication that these managers may have the quality of their management processes compromised.

The last question regarding the profile of the respondents explores the managers' familiarity with the concept of MCS in the context of the INSS. It appears that most managers who responded to the questionnaire report having prior knowledge of the concept of MCS according to the definition explored in this work for the INSS scenario. This information may indicate that managers already perceived corporate management systems as components of a MCS even without having received instruction in this regard. It is also clear that the proportion of managers who responded that they did not have any prior knowledge of the MCS concept is minimal.

Table 2 presents a descriptive analysis of the data collected regarding managers' perception of the MCS usage, containing the indicators with the highest and lowest means within the constructs.

Table 2 – Descriptive analysis of the indicators with highest and lowest means

Indicator	Statements with the highest mean within the construct	Mean	Indicator	Statements with the lowest mean within the construct	Mean
plan_1	The use of the MCS favors the planning process.	5.3662	plan_5	The MCS provides information that facilitates the development of short-term objectives.	5.1268
plan_3	The MCS provides input for strategic direction.	5.3239	plan_4	The use of the MCS favors the development of actions involving the team.	5.1972
orgman_1	The MCS provides information for evaluating strategies.	5.3803	orgman_7	The MCS provides subsidies that favor the engagement of individuals.	4.4085
orgman_3	The use of the MCS favors management by objectives.	5.2817	orgman_8	The use of the MCS enables better management of individuals' behavior.	4.7324
moneva_1	The use of the MCS favors the monitoring of results.	5.4930	moneva_8	The use of the MCS favors the accountability.	4.6761
moneva_9	The use of the MCS favors the identification of individuals' needs to change their work profile.	5.1409	moneva_7	The use of the MCS favors accountability for the actions of individuals.	4.8592
moneva_4	The use of the MCS makes it possible to identify critical performance variables.	5.0563	moneva_6	The use of the MCS facilitates the identification of behavioral deviations by individuals.	4.8592
inscom_3	The use of the MCS favors feedback between managers.	5.2113	inscom_5	The use of the MCS favors organizational learning.	4.9859
inscom_2	The use of the MCS favors information sharing.	5.1972	inscom_4	The use of the MCS favors feedback between manager and team.	5.0141
decmak_1	The use of the MCS favors the decision-making process.	5.3099	decmak_7	Decisions made based on input from the MCS are better received by individuals.	4.7747
decmak_6	The decision-making process supported by the MCS has advantages over the previous model.	5.2113	decmak_4	The MCS provides input for resource allocation.	4.9860
	Mean	**5.2702**		**Mean**	**4.8746**

Note: Constructs composition - Planning (plan) 06 statements; Organizational Management (orgman) 08 statements; Monitoring and Evaluation (moneva) 10 statements; Institutional Communication (inscom) 05 statements; Decision-Making (decmak) 07 statements.

Source: Research data.

The data presented in Table 2 demonstrate that there is a reasonable level of agreement among respondents with the statements made for the research constructs. Even in the part of the table that has the lowest averages among the indicators, there are no values that come close to neutrality or disagreement levels with the statements. These results allow us to infer that INSS managers have a positive perception regarding the use of MCS. As for the relations between the constructs, the statistical test will allow us to determine whether, in the respondents' perception, such relations will be validated.

Continuing with the evaluation of the data collected on the managers' perception regarding the use of the MCS, a test was initially carried out to identify possible outliers, data that presents a significant difference from the other observations that make up the sample (HAIR JR. et al., 2009). The test was carried out in the R Studio software, version 2024.04, using the Mahalanobis Distance technique. The result of the test showed that 6 observations were outliers, which were excluded from the sample because the persistence of these divergent observations could influence the research results (HAIR JR. et al., 2021). The remaining 71 observations were allocated to a database built in XLSX format (Microsoft Excel spreadsheet).

Data analysis continued in the SmartPLS 4 software using the PLS-SEM method. Based on the database load, the constructs and their indicators were validated through factor analysis using the Cross Loadings matrix. Table 3 presents the results of the validation of the indicators.

Table 3 – Cross Loadings Matrix

Constructs/ Indicators	**InsCom**	**OrgMan**	**MonEva**	**Plan**	**DecMak**
inscom_1	0.729	0.640	0.566	0.511	0.609
inscom_2	0.888	0.752	0.732	0.736	0.759
inscom_3	0.800	0.739	0.752	0.784	0.736
inscom_4	0.894	0.750	0.712	0.605	0.723
inscom_5	0.825	0.719	0.684	0.596	0.675
orgman_1	0.593	0.779	0.659	0.693	0.658
orgman_2	0.648	0.779	0.559	0.653	0.678
orgman_3	0.771	0.829	0.796	0.791	0.711
orgman_4	0.771	0.823	0.747	0.689	0.775
orgman_5	0.651	0.785	0.637	0.663	0.678
orgman_6	0.645	0.793	0.611	0.563	0.678
orgman_7	0.555	0.671	0.612	0.459	0.557
orgman_8	0.661	0.749	0.698	0.532	0.664
moneva_1	0.648	0.647	0.781	0.635	0.689
moneva_2	0.627	0.624	0.794	0.638	0.649
moneva_3	0.610	0.521	0.723	0.527	0.609
moneva_4	0.580	0.527	0.686	0.596	0.580
moneva_5	0.622	0.679	0.714	0.534	0.599
moneva_6	0.662	0.734	0.805	0.695	0.704
moneva_7	0.680	0.627	0.761	0.592	0.698
moneva_8	0.623	0.681	0.755	0.606	0.695
moneva_9	0.730	0.721	0.855	0.776	0.720
moneva_10	0.575	0.640	0.739	0.592	0.674
plan_1	0.701	0.788	0.717	0.887	0.700
plan_2	0.649	0.796	0.772	0.886	0.752
plan_3	0.665	0.789	0.732	0.890	0.720
plan_4	0.735	0.726	0.752	0.857	0.783
plan_5	0.570	0.516	0.568	0.679	0.577
plan_6	0.703	0.700	0.723	0.918	0.700
decmak_1	0.655	0.746	0.792	0.705	0.837
decmak_2	0.650	0.629	0.636	0.604	0.752
decmak_3	0.621	0.631	0.681	0.682	0.782
decmak_4	0.664	0.679	0.745	0.691	0.819
decmak_5	0.616	0.703	0.622	0.687	0.786
decmak_6	0.589	0.670	0.669	0.524	0.750
decmak_7	0.664	0.511	0.697	0.690	0.775

Note: InsCom – Institutional Communication; OrgMan – Organizational Management; MonEva – Monitoring and Evaluation; Plan – Planning; DecMak – Decision Making.

Source: SmartPLS 4 Software - Factor loadings of the model indicators.

Based on the results in Table 3, all indicators presented satisfactory factor loadings, which means that the research variables are correlated with each other (HAIR JR. et al., 2005).

Next, the measurement model was evaluated using convergent validity and discriminant validity tests, which aim to verify whether the measurement of the constructs occurred adequately (FORNELL and LARCKER, 1981). Verification of the convergent validity of the model is carried out by calculating Cronbach's Alpha, Composite Reliability and Average Variance Extracted (AVE) of the constructs. Table 4 presents the results of descriptive statistics and verification of convergent validity of the measurement model.

Table 4 – Descriptive statistics and convergent validity of the model

Variable	Mean	Median	Mode	Standard Deviation	Cronbach's Alfa	Composite Reliability (rho_a)	Composite Reliability (rho_c)	AVE	R^2
Plan	5.254	5	6	0.997	0.925	0.934	0.942	0.734	0.764
OrgMan	4.968	5	6	1.171	0.906	0.910	0.924	0.604	0.850
MonEva	4.979	5	5	1.130	0.920	0.923	0.933	0.582	-
InsCom	5.096	5	6	1.098	0.885	0.889	0.916	0.688	0.771
DecMak	5.095	5	6	1.024	0.897	0.898	0.919	0.619	0.852

Source: SmartPLS 4 Software – Statistical indicators, reliability and validity of the constructs.

It can be seen from Table 4 that the model's reliability indicators exceed the recommended minimum value of 0.7, with Cronbach's Alpha varying from 0.885 (InsCom) to 0.925 (Plan), the Composite Reliability of the model's internal consistency (rho_c) ranging from 0.916 (InsCom) to 0.942 (Plan) and the Metric Composite Reliability (rho_a) ranging from 0.889 (InsCom) to 0.934 (Plan). As for AVE, all observed results were greater than 0.5, ranging from 0.582 (MonEva) to 0.734 (Plan), demonstrating that the factor loadings are significant. Such results ensure the reliability of the measurement model and meet the model's convergent validity requirements (HAIR JR. et al., 2005).

The discriminant validity of the model is verified by applying the Fornell and Larcker (1981) criterion, which consists of comparing the value of the square root of the AVE of each variable with the variances shared between the other variables in the model. For the model to be validated, the shared variance values must be smaller than the square root value of the AVE. Table 5 presents the matrix of correlations between the model variables, to verify the discriminant validity according to the Fornell-Larcker criterion.

Table 5 – Discriminant validity of the model - Fornell-Larcker criterion

	InsCom	OrgMan	MonEva	Plan	DecMak
InsCom	0.829	-	-	-	-
OrgMan	0.770	0.777	-	-	-
MonEva	0.635	0.607	0.763	-	-
Plan	0.784	0.667	0.574	0.857	-
DecMak	0.647	0.522	0.499	0.687	0.787

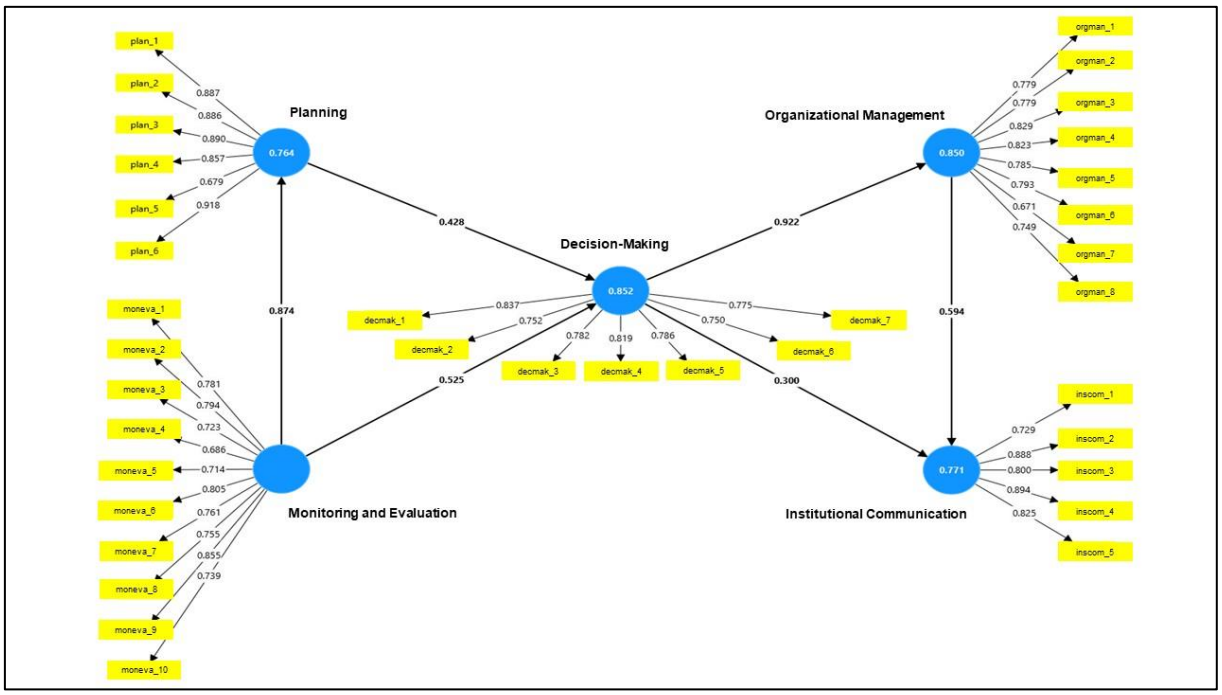
Source: SmartPLS 4 Software - Fornell-Larcker criterion.

The results presented in Table 5 demonstrate that the square root of the AVE of the variables (highlighted cells) is greater than the variance shared between the other variables in the model, satisfying the criterion proposed by Fornell and Larcker (1981). Therefore, it can be

said that both the convergent validity and the discriminant validity of the measurement model presented satisfactory results.

Finally, the validity of the research structural model was verified through the Path Coefficients test, which represent the intensity and direction of the relations between the variables in the research model (HAIR JR. et al., 2005). The relations between the variables represent the hypotheses elaborated during the study and supported by the explored theoretical framework, and the results of the Path Coefficients test are decisive for confirming or not these hypotheses. Figure 2 presents the structural model of the research generated by the SmartPLS 4 software after executing the PLS-SEM method.

Figure 2 – Research's structural model



Source: SmartPLS 4 Software – Graphic result of the PLS-SEM test.

The Path Coefficients are calculated from the R^2 values (values in the center of the graphical representation of the variables in Figure 2), obtained during the validation of the measurement model and contained in Table 4. With this information in hand, a Bootstrapping analysis was carried out to check whether the relations proposed in the structural model are not interfered by external variables (HAIR JR. et al., 2005). Bootstrapping was performed with 5000 substitutions at a significance level of 5% (0.05) and with a maximum number of 3000 iterations. From this analysis, the values for the Path Coefficients and the T and P values for each path were obtained, which, at the 5% significance level, must be, respectively, greater than 1.96 and less than 0.05 to be considered acceptable (HAIR JR. et al., 2005). Table 6 shows the results of the structural model validity test.

Table 6 – Effects between variables

Variables relations	Hypotheses	Path coefficients	T values	P values
Decision Making → Organizational Management	H1	0.922	41.139	0

Monitoring and Evaluation → Planning	H2	0.874	31.814	0
Monitoring and Evaluation → Decision Making		0.525	4.754	0
Decision Making → Institutional Communication	H3	0.300	1.280*	0.200*
Organizational Management → Institutional Communication		0.594	2.674	0.008
Planning → Decision Making	H4	0.428	3.888	0

Source: SmartPLS 4 Software – Result of the validity test of the structural model by Bootstrapping.

The results demonstrate that only one relation presented a T value lower than the minimum acceptable and a P value higher than the maximum acceptable. The other relations in the structural model showed statistical significance.

This fulfills the three steps recommended by Hair Jr. et al. (2005) for the analysis of the research results: first, the validation of the constructs and their indicators through the Cross Loadings Matrix; second, validation of the measurement model through convergent validity and discriminant validity tests; and third, validation of the structural model with the Path Coefficients test.

The last data collected by the research instrument was the respondents' level of satisfaction in relation to the INSS corporate systems selected for this study. Table 7 shows the distribution of the level of satisfaction regarding the 4 systems evaluated.

Table 7 – Satisfaction level with corporate management systems

System	Mean	Very dissatisfied / Dissatisfied	Partially dissatisfied	Not satisfied nor dissatisfied	Partially satisfied	Very satisfied / Satisfied
BG INSS	4.4225	12%	6%	39%	22%	21%
GET Gestão	5.0423	10%	10%	6%	25%	49%
SGP	4.7324	10%	9%	22%	29%	30%
Portal Planejamento e Gestão	5.1408	6%	10%	13%	27%	44%
Mean	4.8345					

Source: Research data.

It is observed that, in general, there is a reasonable level of satisfaction among managers regarding the management tools made available by the INSS, with a greater concentration of responses at the “Partially satisfied” and “Very satisfied/Satisfied” levels. Regarding the BG INSS system, a higher level of neutrality among respondents can be seen, with 39% of responses, a higher value than the other observations of the evaluated systems. As for the level of dissatisfaction, this presents very little change between the evaluated systems, gathering an average of 18% of the responses. There is little difference between the satisfaction levels with the MCS usage in the INSS, with better results presented by the BG INSS and the *Portal Planejamento e Gestão*. It is believed that this result may show that managers perceive the MCS as a useful tool in the exercise of their duties, which is related to hypotheses **H1**, **H2** and **H4**, which deal with the relations between the main management processes: planning, decision making, monitoring and evaluation and organizational management.

5. DISCUSSION OF RESULTS

Using the structural model, **Hypothesis H1**, which assumed that the favorable perception of the use of the MCS for Decision-Making would favor the positive perception of its use for Organizational Management, was confirmed. The studies by Bunce et al. (1995), Ittner and Larcker (1998) and Hansen et al. (2003), carried out in the private sector, demonstrated that the MCS works as a tool for professionalizing management, improving the quality of the decision-making process and, consequently, organizational management. It was expected that this effect would also be found in public sector organizations, which was corroborated by the research results. INSS managers perceive the MCS as a mechanism that facilitates and qualifies the decision-making process, which ends up positively impacting the institution's management. For example, data extracted from systems such as BG INSS and *Painel Lupa*, such as the number of tasks held back, the number of tasks released for analysis and employees that have already reached the monthly target, make decision-making more objective and facilitate the direction of teams.

Hypothesis H2 was also confirmed, which assumed that the favorable perception of the use of the MCS for Monitoring and Evaluation would favor the positive perception of its use for Planning and Decision Making. Merchant and Van der Stede (2007) demonstrated that, in the private sector, the planning and decision-making processes in an organization are satisfactorily affected when the MCS is used as a tool for monitoring and evaluating internal procedures and employees' behaviors. It was expected that a similar result would be found in public sector organizations, a situation that was confirmed by the research results. Therefore, it is safe to say that, in the perception of the sample studied, the use of the MCS as a tool for monitoring and evaluating procedures and people provides relevant support for the planning and decision-making processes. This result finds correspondence, for instance, in the use of the SGP to monitor and evaluate the performance of the individuals that make up the analysis teams and whose data is used to plan improvement actions or changes in the teams and decide how and when this will be implemented.

As for **Hypothesis H3**, which tested whether the favorable perception of the use of the MCS for Decision Making and Organizational Management positively affected the perception of its use for Institutional Communication, there was partial confirmation. The research results show that there is no interference from Decision Making, subsidized by the MCS, in Institutional Communication; on the other hand, it is observed that, while supported by the MCS, Organizational Management positively affects Institutional Communication. In a study carried out in the private sector, Widener (2007) observed that the MCS was used as a mechanism for optimizing decision-making and organizational management processes and that this influenced institutional communication, making it easier and more objective. Such a relationship was not expected in public sector organizations, especially due to excessive bureaucracy and constant internal communication failures observed in studies by Aragão (1997), Costin (2010) and Denhardt (2012), which was not confirmed. In the respondents' perception, there is no relationship between Decision Making and Institutional Communication; however, when Organizational Management is supported by the MCS, there is a positive effect on Institutional Communication. An example of this relationship between Organizational Management and Institutional Communication can be found in the use of the *Painel de Desempenho* to publicize ongoing actions and present institutional results, offering publicity to both internal and external audiences.

The fact that the relationship between the use of the MCS for Decision Making and its influence on Institutional Communication has not been validated may highlight a characteristic of the INSS, referring to its compartmentalization, since the research showed that managers, in their majority, have small teams, according to data in Table 1. This may show that the decisions

made by managers have effect and publicity only among their team, not reaching other sectors of the institution. The technical characteristics of the systems mapped in this study can also contribute to this restrictive effect, since the level of access to information made available by corporate management systems is proportional to the manager's hierarchical level. In this way, an APS manager only has access to information from his unit, a manager from a *Gerência Executiva* has access to information from all teams and units in his region, while a Superintendence manager has access to information from all *Gerências Executivas*. This scenario means that a manager's decisions are known only to the team directly linked to him; the result is widely publicized as it is institutional information, but the process to achieve such a result is normally unknown. This is a characteristic that could be explored in future studies.

In relation to **Hypothesis H4**, the statistical tests supported the existence of a positive relation between the perception of the MCS usage in the Planning and Decision-Making processes. The work of Collier (2005) and Widener (2007) showed that, in the private sector, the use of the MCS organizes and maintains the balance of an organization, providing relevant technical support for the planning process, resulting in better decisions. Similar behavior was assumed in public sector organizations, which was confirmed by the results of this study. In this context, the MCS is perceived by INSS managers as a management optimization tool, offering elements that make the planning process more effective, positively impacting decision-making. This relation is evidenced, for instance, using data provided by the BG INSS and *GET Gestão* systems, such as the tasks' stock per analysis queue and the operational capacity of the analysis teams, for planning actions aimed at achieving goals and improving of institutional indicators, culminating in decisions focused on fulfilling what was planned.

The results of this research also demonstrated that INSS managers are reasonably satisfied with the use of corporate management systems, which corroborates the conclusion that the MCS is a management optimization tool, making it possible to plan with more criteria and make better decisions, but still presents opportunities for improvement. The validation of hypotheses **H1**, **H2** and **H4** supports this conclusion, as it highlights the managers' perception that the MCS increases the effectiveness of planning, decision-making, monitoring and evaluation and organizational management processes.

It is clear from the research results that the use of MCS positively influences the research constructs, however, according to data in Table 7, managers do not show great satisfaction when using the tools, which may indicate a lack of training, little familiarity with technology or even inadequacy of tools. In any case, the availability of MCSs has already presented a great advantage in relation to the work model previously used at the institution, which indicates that improvements implemented in these systems can bring even more interesting results.

6. FINAL CONSIDERATIONS

This study aimed to verify the perception of INSS managers regarding the use of Management Control Systems in planning and decision-making processes. To achieve this, research was carried out through a survey with INSS managers within the scope of the *Superintendência Regional Sudeste I*, which comprises the state of *São Paulo*.

Of the four hypotheses proposed for this study, three were statistically validated. At INSS, managers realize that using the MCS for decision-making has a positive effect on organizational management. Likewise, there is a perception that the use of the MCS for monitoring and evaluation positively affects managers' perception regarding planning and decision-making processes. Regarding the relation between planning and decision making, this research was able to confirm that in the managers' perception the use of the MCS enables a positive association between the processes. However, the hypothesis that the favorable perception of the use of the MCS for decision-making and organizational management would favor the positive perception of its use for institutional communication was not completely

validated. According to the findings, there is no interference in decision-making on institutional communication, however, it was confirmed that managers perceive that the use of the MCS for organizational management has a positive effect on institutional communication.

In the perception of INSS managers, the MCS is a management optimization tool, offering elements that make the planning process more effective, positively impacting decision making, validating the understanding of Nisiyama and Oyadomari (2012) regarding the use of the MCS to align planning and decision-making processes with institutional objectives and strategies. Managers see the MCS as a mechanism that facilitates and qualifies the decision-making process, favoring the management of the institution, in line with what Beuren, Klein and Del Vesco (2015) established. Furthermore, the use of the MCS as a tool for monitoring and evaluating procedures and people provides relevant support for planning and decision-making processes, which is supported by studies by Santos and Lunkes (2018).

The research findings allow us to identify that the implementation and use of the MCS at the INSS had a positive impact on management activities, resulting in better results. Managers realize that the current working model has advantages over the previous model, indicating that improving the MCS and expanding its use would be very favorable options for the institution.

The present work has two major limitations, namely: (i) the data collected through the survey only reflected the perception of managers within the *Superintendência Regional Sudeste I*, excluding the other management units of the INSS from the analysis, which could lead to a result that does not reflect the reality of the institution, and (ii) given the particularity of the case and the peculiarities of the INSS, there will probably be no possibility of generalizing the results.

This work sought to reduce the research gap that focuses on the role of the MCS in public sector organizations. It is expected that the results demonstrated here will contribute to improving management at the INSS and arouse interest in carrying out new research within the institution. It is also intended that this study motivates new research in the field of Public Administration involving the use of Management Control Systems.

It is suggested, for future studies, to verify why the relation between Decision-Making and Institutional Communication has not been validated. It is also suggested to investigate the perception of managers regarding the use of the MCS considering the entire INSS, to verify whether the results found for the *Superintendência Regional Sudeste I* are replicated in the institution's other management units. It is interesting to bring to the research a qualitative analysis, capable of capturing more particular nuances regarding the subject and, perhaps, highlighting other variables that could interfere with the relations analyzed here or even new relations that were not observed in this study.

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