


Contribution of the COSO model components in the internal control of public administration: a study in the municipalities of the Santa Catarina state

Contribuição dos componentes do modelo COSO no controle interno da administração pública: um estudo nos municípios do estado de Santa Catarina

Contribución de los componentes del modelo COSO en el control interno de la administración pública: un estudio en los municipios del estado de Santa Catarina

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Resumo

Este artigo teve como objetivo analisar a contribuição dos componentes do modelo COSO no controle interno da administração pública nos municípios do estado de Santa Catarina. A pesquisa é classificada como quantitativa, descritiva e de levantamento. O instrumento de coleta de dados utilizado foi um questionário, com 80 questões fechadas. A população deste estudo são os 295 municípios do estado de Santa Catarina, que resultou em uma amostra de 295 respondentes (responsável pelo controle interno de cada município), caracterizando um censo. A técnica de análise de dados foi a análise fatorial exploratória. Como principais resultados, concluiu-se que os cinco componentes do modelo COSO contribuem no controle interno da administração pública nos municípios do estado de Santa Catarina, no sentido de identificar os pontos fortes e fracos de cada componente.

Palavras-Chave: Controle Interno; Componentes; Modelo COSO; Municípios Catarinenses

Abstract

This article aimed to analyze the contribution of the Committee of Sponsoring Organizations (COSO) model components in the internal control of public administration in the municipalities of the state of Santa Catarina. This research is classified as quantitative, descriptive, and survey. The data collection instrument used was a questionnaire with 80 closed questions. The population of this study is the 295 municipalities in the state of Santa Catarina, which resulted in a sample of 295 respondents (responsible for the internal control of each municipality) characterizing a census. The data analysis technique was exploratory factor analysis. As the main result, it was concluded that the five components of the COSO model contribute to the internal control of public administration in the municipalities of the state of Santa Catarina to identify each component's strengths and weaknesses.

Keywords: Internal control; Components; COSO model; Santa Catarina municipalities

Resumen

Este artículo tuvo como objetivo analizar la contribución de los componentes del modelo COSO en el control interno de la administración pública en los municipios del estado de Santa Catarina. La investigación se clasifica en cuantitativa, descriptiva y encuesta. El instrumento de recolección de datos utilizado fue un cuestionario con 80 preguntas cerradas. La población de este estudio son los 295 municipios del estado de Santa Catarina, lo que resultó en una muestra de 295 encuestados (responsables del control interno de cada municipio), caracterizando un censo. La técnica de análisis de datos fue el análisis factorial exploratorio. Como principales resultados, se concluyó que los cinco componentes del modelo COSO contribuyen al control interno de la administración pública en los municipios del estado de Santa Catarina, con el fin de identificar las fortalezas y debilidades de cada componente.

Palabras clave: Control interno; Componentes; Modelo COSO; Municipios de Santa Catarina

1 Introduction

With advances in information technology, alternatives are increasingly being sought to improve the results of administrative actions in institutions that provide relevant elements to support administrators in decision-making (Silva, Costa, Silva, Nascimento, & Rodrigues, 2020). Thus, Carvalho Júnior, Jácome, Almeida Holanda, Menezes, and Santos (2021) emphasize that internal control has become relevant after several accounting scandals in the early 2000s. Such as the historical cases of *WorldCom* and *Eron*, American organizations involved in fraud processes, the causes of which point mainly to weaknesses in its internal control systems.

Rhoden, Bertollo, Eckert, and De Paula (2019) highlight that internal controls consist of policies, procedures, and practices. Since the entity's management establishes them, they are intended to contribute to verifying and managing risks related to the activities developed. Previously, Córdova and Paguay (2017) stated that internal control is oriented towards evaluating activities by verifying the function and determining the level of control risk of the institutions.

In this way, Ayres, Cruz, Santos, and Leone (2018) make it clear that the objectives of internal control are presented as a set of practices to protect the interests of the entity, in addition to safeguarding the assets and the search for adequate information. With the aim of business efficiency. In this sense, Vincent and Barkhi (2021) observe that existing internal control structures are developed to focus on the organization to evaluate governance and management mainly.

One of the most recognized internal control structures in the world is the *Committee of Sponsoring Organizations of the Treadway Commission* (COSO), which stands out for being concerned with simplifying the administrator's task in its management (Rhoden et al., 2019). To carry out these control practices, COSO encourages organizations to effectively and efficiently develop their internal control system to adapt to the company's operating environments to reduce risks to acceptable levels (Ayres et al., 2018).

In this context, the COSO model is a reference that suggests an integrated model monitor, evaluate and improve internal controls (Vasconcelos, Cruz, Santos, & Amorim, 2017). Thus, in the case of public entities, Ferreira and Oliveira (2021) emphasize that it is up to the public manager to maintain a structure to support planning to fulfill the objectives and mission to which it is linked. The authors also maintain that risk management is one of the main functions of internal control systems, which refer to the supervision of the effectiveness and efficiency of public administration.

In the public environment, an internal control system provides reasonable assurance for achieving objectives, whether in terms of efficiency, effectiveness, adherence to rules and regulations, or the generation of internal and external information. Thus, the COSO model makes it possible to analyze in an integrated way the various components of internal control, which must be identified and analyzed as a necessary condition for the continuation of the evaluation of internal controls (Braga, Martins, Maranhão, Cunha, & Santos, 2018).

On the other hand, although the internal control system can be understood as a set of practices adopted by public organizations and is mandatory for all levels of government, it does not mean that it only points out the positive aspects of public management. In this way, it is necessary to make all employees aware of internal control attributions to avoid a lack of autonomy in their activities (Lopes, Valadares, Azevedo, & Brunozi Júnior, 2020).

In the same way, Melo and Leitão (2021) warn that it is essential to overcome the barrier of internal control only as a body focused on only confronting and inspecting through monitoring activities, goals, and objectives. It compares the planned with the executed, the efficiency, efficiency, and effectiveness in the application of resources and the achievement of services intended for society. These internal controls must be capable of evaluating and responding to intrinsic risks, with the implementation of routines and procedures that guarantee the execution of these follow-ups, inspections, and controls in all units of the entity to which it belongs.

This research seeks to answer the following question: What is the contribution of the components of the COSO model to the internal control of public administration in the municipalities of the state of Santa

Catarina? This study aims to analyze the components of the COSO model's contribution to the internal control of the public administration in the municipalities of the state of Santa Catarina.

As a theoretical justification, Araújo, Libonati, Miranda, and Ramos (2016) highlight the importance of examining the internal controls implemented in the municipalities to prevent fraud or irregularities according to the COSO structure. Rae, Sands, and Subramaniam (2017) emphasize that a study on the components of COSO is timely, as it can improve the monitoring function and assist in the quality of the entity's governance.

More recently, Akinleye and Kolawole (2020) warn about a few studies related to internal control involving COSO components, which can contribute to the formulation of policies in public institutions. Finally, Silva et al. (2020) make it clear that research involving internal control in public bodies is current, relevant, and little explored at the national level, allowing the deepening and expanding debates on the subject.

As an empirical justification, this research can contribute to the development of the work of public administrators in the search for management efficiency with the use of internal controls. In addition to this introduction, this article contains a theoretical foundation on the subject, the methodological procedures used to carry out this research, the analysis of the results found, and the final considerations, followed by the references.

2 Theoretical Foundation

In this topic of the study, issues related to internal control, internal control in public administration, and the COSO model are addressed.

2.1 Internal Control

The most significant changes in interpretations of internal controls occurred, above all, from the 1970s onwards, especially with the formation of the *Treadway Commission*, a private sector initiative promoted and jointly financed by five sponsoring entities, namely: the *American Institute of Certified Public Accounts - AICPA*; *American Accounting Association - AAA*; *Financial Executives International - FEI*; *The Institute of Internal Auditors - IIA*; and *Institute of Management Accountants - IMA* (Moeller, 2007). The reorganization of the North American corporate legislation resulted in the first final report, with recommendations to regulate the performance of managers, boards of directors, and accounting professionals, highlighting the need for a consistent and uniform definition of internal control. (Brandão, 2012).

Ayres et al. (2018) comment that efficiently, the internal control system is in the search for improvement in the entity's organization plan in order to make its assets safer to help in decision making. In this way, it is evident that for the internal control system to function correctly, it does not depend only on the company's planning and the efficiency of established procedures and practices but also on the interaction and involvement of the entire group of people involved in the organization.

In the same perspective, Araújo et al. (2016) highlighted that internal controls seek to promote and assist organizational procedures that manage and minimize risks in achieving the organizations' objectives when carrying out their activities. Nevertheless, Mosquera (2021) points out that periodic assessments establish the institution's internal control system's strengths and weaknesses.

It should be noted that the internal control in operation in the company can help it develop its activities, helping the administration reach its goals and objectives. This control must be proportional to the organization's size, the speed and amount of operations carried out by the organization being decisive so that the cost does not exceed the benefits (Ayres et al., 2018).

Internal control seeks to improve, monitor, and verify the entity's financial and asset transactions (Custódio, Fukuro, Pavão, & Ferreira, 2019). Therefore, Table 1 displays the aspects that integrate the concept of internal control defined by the *American Institute of Certified Public Accountants (AICPA)*. According to Santos and Tres (2012), comprise all the planned means in an organization to direct, administer, restrict and check its various activities to enforce its objectives.

Internal controls establish the protection of assets, verify the trust and reliability of accounting data, encourage adherence to established policies, seek to achieve objectives, and promote operational efficiency (Attie, 2011). However, even if the plans, policies, systems, and organization are correctly planned, administrative efficiency will be compromised if the company does not have a staff dimensioned to the internal needs, acting in a capable, efficient and motivating way (Santos, & Tres, 2012).

2.2 Internal Control in the Brazilian Public Administration

Control actions in public administration can be carried out by complying with legal rules or as a tool adopted to improve the levels of control of its bodies or entities. On the other hand, when the administration does not implement a control that covers all areas of management and all its activities, entities become vulnerable to the occurrence of fraud (Araújo et al., 2016).

Table 1

Integrating Aspects of the Concept of Internal Control

Aspect	Description
Safeguarding the company's assets	It is related to the protection of the assets distributed by the departments and sectors that are individually responsible, for possible errors or irregularities, through the means: segregation of functions; authorization and approval system; determination of roles and responsibilities; employee rotation; issuance of a letter of guarantee; maintenance of control accounts; insurance enrollment; observation of legislation; reduction of errors and waste; performing independent physical counts.
Precision, accuracy and reliability of accounting data and reports	It comprises the generation of adequate and timely information, managerial necessary to manage and better understand the events carried out in the company, the main means being: accounting documentation; conciliation; analysis; chart of accounts; observation of chronology; mechanical equipment.
Development of operational efficiency	Its objective is to have the necessary means to carry out the tasks, in order to obtain an understanding, application, and timely and uniform action. The company must have procedures and rules for each sector, and adequate communication is necessary, in a clear and objective way, so that everyone assimilates and knows their tasks, in order to lead the company to its objective.
Adherence to existing policies	It aims to ensure that the procedures adopted by the administration are properly followed by the personnel. The means that provide the basis for adherence to existing policies are aimed at strengthening Internal Control, comprising: supervision, review and approval system and internal audit.

Source: Adapted from Attie (2011).

Ferreira, Santos, and Vasconcelos (2021) reveal that understanding how internal control mechanisms are structured and evaluated within organizations, especially public ones, responsible for managing and applying public resources, can be decisive for management efficiency. In this sense, it becomes relevant to investigate how the context in which the entity is inserted, reflects, and influences its structures, in order to help managers to achieve better results and respond to the dynamics of change.

It is worth noting that public entities need a system that favors the achievement of the goals pursued by the institution (Silva et al., 2020). Mosquera (2021) adds that internal control within public institutions must be applied in advance and continuously in their activities.

Thus, Galante, Beuren and Oliveira (2009) emphasize that the internal control system has the purpose of ensuring, in the various phases of the decision-making process, that the flow of information and implementation of decisions develops within the necessary legality, legitimacy and reliability, with a view to achieving efficiency, effectiveness and economy (Table 2). In this context, the exercise of internal control plays a fundamental role in achieving objectives at the lowest cost and in the best way to ensure that the numbers recorded and disclosed in the financial statements are reliable (Santos, & Tres, 2012).

Table 2

Concept of efficiency, effectiveness, and economy applicable to public administration

Focus	Feature
Efficiency	It relates to the cost or the way in which the media are managed. It is about the optimization of the available resources, through methods, techniques, and norms, aiming at the least effort and the lowest cost in the execution of the tasks. Efficiency is therefore a performance criterion. It is a measure of the ability to improve the use of resources.
Effectiveness	It concerns the achievement of the objectives and goals set. The guideline is the result. In this way, the organization must clearly define its objectives and how to achieve them, translating into an effective organization. Effectiveness refers to the ability to achieve objectives.
Cost-effectiveness	It refers to the terms and conditions under which physical, human and financial resources are obtained. An economical operation presupposes resources in quality, quantity, lower cost and in a timely manner.

Source: Adapted from Silva et al. (2014).

In this way, with a planning structure also composed of the control activity, this can be a relevant resource for achieving efficiency, effectiveness, and economy (Ferreira, & Oliveira, 2021). In addition, once public managers prioritize internal controls with a focus on instruments for monitoring, preventing, and correcting failures, more effective results can be achieved, generating resource savings (Ferreira et al., 2021). For a better understanding, Table 3 shows studies that also addressed the issue of internal control in the Brazilian public administration.

The studies point to a diversity of interests on the subject of internal control in public administration, being a broad field of knowledge regarding the results found in the research. The objectives range from the analysis of compliance by the bodies or internal control reports, to the proposition of models that seek more transparency in public management. Finally, it is clear that research has evolved over the years and that the theme has followed this evolution, making its relevance to the area evident.

Table 3

Related Studies on Internal Control in Brazilian Public Administration

Authors	Objectives	Main Results
Peleias, Caetano, Parisi e Pereira (2013)	To identify and analyze the bibliometric characteristics of articles on internal control presented at the USP Congress and EnANPAD, between 2001 and 2011.	The growth in the volume of papers presented at EnANPAD over the period analyzed was more than double that of the USP Congress. On the topic of internal control, the average growth rate showed balance in the two events.
Beuren e Zonatto (2014)	Identify the profile of articles on internal control in the public sector, published in national and international journals indexed in the Scopus database.	A total of 133 articles published between 1983 and 2011 were identified and it was observed that there is an increase in scientific production on the analyzed theme.
Monteiro (2015)	Conduct an analysis of the purposes and importance of internal control in public administration in Brazil and the barriers to its implementation.	The main barriers detected were the lack of a risk management culture, the shortage of personnel in adequate numbers, and the required technical quality.
Araújo et al. (2016)	To verify which findings in reports issued by the internal control units of Brazilian municipalities are related to the perspectives of COSO II.	It was observed that the control carried out by the municipalities was associated with the requirements of norms or was carried out with the objective of achieving budgetary and financial goals, without being in accordance with the perspectives of COSO II.
Moreira, Dias e Souza (2017)	Identify the subsidies that ensure internal control as an important instrument for public management.	Internal control is an important instrument for public management since it is an important instrument that must be increasingly improved by public bodies.
Braga et al. (2018)	Present an audit experience in contract management of a public organization following the COSO model.	The use of such a model balanced the focus of the audit, going beyond compliance, structuring analysis also on effectiveness and disclosure, which favors the improvement of Accountability.
Sancovski, Silva, Ribeiro e Agostinho (2019)	To describe changes in the structure and functioning of the internal control system of a publicly-traded company controlled by the Brazilian federal government.	The company's managers made significant changes to the structure and processes of internal control in the period 2008-to 2016, and these changes centralized decisions regarding internal controls and risk management.
Gattringer e Marinho (2020)	Evaluate the internal controls that are in operation in the municipalities of Santa Catarina to verify if the components and principles of internal controls of the COSO model are related to operational efficiency: control environment, risk assessment, control activities, information, and communication, and monitoring, are substantially gifts.	The municipalities of Santa Catarina, as a whole, satisfactorily use the 5 components of the COSO model, contributing to the effectiveness of the internal control system. The research also revealed the need to improve the components of the control and information and communication environment.
Silva et al. (2020)	To analyze the perception of managers of a public agency in RN regarding the knowledge and procedures of the Internal Control Unit (ICU).	The need for this public body to direct management strategies to solve the problems presented in its management is highlighted, considering that the problems highlighted can serve as a guide to promote improvements in other ICUs.
Ferreira e Oliveira (2021)	Address the issue of strategic planning in the public sector, relating it to the performance of internal controls as a way of improving management.	It was observed that control composes a strategic activity, which guarantees the approximation between what was planned and what was carried out, being therefore essential for the public sector to achieve the optimization of results that are expected of them.

Source: Elaborated by the authors (2021).

2.3 The COSO Model

The COSO model, commissioned by the five most important professional financial organizations in the United States, was defined in 1992, after five years of study and discussion, so that a new conceptual framework of internal control emerged with the fundamental objective of integrating the different definitions and concepts in force at that time (Morán, Álava, Macías, Haro, & Salazar, 2018). One of COSO's initiatives was to evaluate the organizations' reports based on the understanding of the factors that lead to the preparation of fraudulent reports and, based on this, to establish recommendations for internal control (Araújo et al., 2016).

Edited in 1992, with the objective of improving the control structure, under the name of *COSO Internal Control – Integrated Framework*, *COSO Report or COSO I*, it was reformulated in 2004, with a view to the management of corporate risks and fraud, called *COSO ERM - Enterprise Risk Management* -

Integrated Framework. Finally, it was remodeled in 2013, renamed COSO 2013 Internal Control – Integrated Framework, with the purpose of providing thought leadership in the development of comprehensive frameworks and guidelines on internal controls (COSO, 2013).

Custodio et al. (2019) point out that the COSO model provides an evaluation criterion for the control components in order to obtain a high degree of transparency of the financial statements. Its main feature is to provide a vision of integration of internal accounting controls. The authors also note that the internal control structure model proposed by the COSO methodology is formed by five components: Control Environment, Risk Assessment, Control Activity, Information and Communication and Monitoring Activity

In this context, Sancovski et al. (2019) adds that the structure of the COSO internal control model is made up of five components. The first of these is the Control Environment – the standards, processes and structures that support the application of internal control throughout the organization. The second is Risk Assessment – a dynamic, iterative process to identify and analyze risks to the achievement of the organization's objectives. The third is Control Activities – actions determined by policies and processes that have the potential to contribute to mitigating risks to the achievement of objectives. The fourth deals with Information and Communication – the processing and communication of relevant information so that work is performed properly and the organization's objectives are achieved. Finally, the fifth talks about the Monitoring Activity – continuous and independent evaluations of all components of the internal control system.

It is worth noting that the COSO model links seventeen principles to its five components, divided into seventy-seven points of focus, in order to give consistency to the factors considered essential to the internal control put into operation by the entity (COSO, 2013). In this context, Figure 1 shows the internal control structure proposed by COSO/2013.



Figure 1 – Internal Control Structure proposed by COSO/2013

Source: Braga et al. (2018).

In the model, the five components and their principles operate in an integrated manner, considering the institution's objectives. The control of compliance, the control of results, are added by the control of information, representing the multiple dimensions of *Accountability* (Braga et al., 2018). Thus, the structure of the COSO model articulates requirements for effective control, demanding that the control system put into operation integrate the five components supported by principles and focal points (COSO, 2013).

Rae et al. (2017) make it clear that the COSO model, as a general internal control system, can be managed. The authors further note that notably, the quality of information and communication within the organization influences the effectiveness of all components of COSO. In addition, monitoring operates as a feedback mechanism that may require improvements in the quality of control activities. That is, the monitoring function evaluates and reports the effectiveness of control activities and subsequently suggests corrections to control activities.

3 Methodological Procedures

This research is classified as quantitative in terms of approach, descriptive in terms of the objective, and survey, in terms of procedures. The data collection instrument used was a questionnaire, with items on the application of the COSO/2013 model, with adaptations to the models applied by Maia et al. (2005) and Silva et al. (2014), together with those responsible for the internal control of each municipality in Santa Catarina.

The questionnaire with 80 closed questions, of the 5-point Likert type, with options from totally disagree [1] to totally agree [5], deals with the components of internal control: 1) Control Environment (Q1 to Q23), indicating the knowledge, within the institution, about the complexity of the organizational structure, the alignment of roles and responsibilities, integrity and ethical values; 2) Risk Assessment (Q24 to Q39), to

identify and analyze the risk assessment and tolerance process; the impact of internal and external threats on the institution's objectives, as well as the risk of fraud and significant changes; 3) Control Activity (Q40 to Q62), with a view to verifying compliance with the guidelines, rules, procedures, and practices established so that the institution's objectives are efficiently achieved. Covers general, automated, and information technology controls; 4) Information and Communication (Q63 and Q73), concerns the quality of information, sources, confidentiality and effective communication with servers and external parties; and 5) Monitoring (Q74 to Q80), to monitor the quality of internal controls and adequate institutional design, including with service providers.

The population of this study is the 295 municipalities in the state of Santa Catarina, which resulted in 295 respondents (responsible for the internal control of each municipality). Prodanov and Freitas (2013) clarify that when data collection is carried out on the total population (100%), it is called "census".

Data were collected using the LimeSurvey software, whose invitation was sent via email to respondents who represented each of the 295 municipalities in Santa Catarina, in the period between October 26 and December 7, 2015. The data analysis technique was the exploratory factor analysis, for each of the 5 components, performed using the principal components method, using the Statistical Package for the Social Science – SPSS software.

The internal reliability of the scales that measured each of the 5 variables related to operational efficiency was extracted according to Cronbach's Alpha, which must reach a minimum value of 0.7 (Hair Júnior, Babin, Money, & Samouel, 2007). The values can be seen in Table 4.

Table 4
Cronbach's Alpha

Component	Cronbach's Alpha	
	Total items	Standardized items
Control Environment	0,919	0,920
Risk assessment	0,917	0,919
Control Activity	0,928	0,928
Information and Communication	0,886	0,888
Monitoring	0,831	0,837
Total	0,8962	0,8984

Source: Research data (2021).

Bartlett's tests (variance) were performed, which indicated a significant result for all COSO components, with $p < 0.05$. The calculations of the Kaiser/Meyer/Olkin Sample Adequacy Measures were consolidated at a value above 0.700. Also, the analysis of commonalities of the components was carried out, which represents the proportion of the variance of a variable that is shared with the factors (Carvalho, 2012), excluding indicators that presented values below 0.500, an index considered ideal by Hair Júnior et al. al. (2007).

For the purpose of Exploratory Factor Analysis, COSO components (dimensions) are presented and evaluated in principles (subdimensions). The questions were grouped according to their similarities and differences in the corresponding sub-dimensions, which indicates that they were measured in the same way, that is, it was considered that the questions allocated in the same sub-dimension have similar attributes. There were cases where the question was grouped into more than one sub-dimension, which was also demonstrated.

In the analysis of the indicators, records with duplicated or high loads were excluded, that is, questions that composed more than one sub-dimension were disregarded, provided that their indices were considered non-significant in any sub-dimension. When generating the question load in more than one sub-dimension, it was solved through the Varimax rotation, which aimed to highlight the differences between the evaluated components due to the similarities of the indicators of each component (Carvalho, 2012). The general average of the set of questions that make up each component was also extracted (component consolidation measure), which determined its degree of absorption in order to achieve operational efficiency. Thus, the higher the overall average obtained in the component, the better its consolidation within the scope of Santa Catarina's municipalities is evident (Silva et al., 2014).

4 Analysis of Results

Next, we present the Exploratory Factor Analysis by internal control components, put into operation in the municipalities of Santa Catarina, in relation to the COSO/2013 model, calculated due to the presence of the characteristics of the principles and points of focus linked to the respective component.

4.1 Exploratory Factor Analysis for the Control Environment

The Control Environment component (Table 5) based on 5 principles (COSO, 2013), allowed the generation of four sub-dimensions (communalities): 1 – ethical conduct and authority limits; 2 – structure and performance of the central Internal Control body; 3 – organization of personnel and determination of responsibilities; and 4 – training programs and incentives applied to personnel. Questions Q1, Q11, and Q23 were excluded, as they did not present significant load, and question Q18 was removed because it presented a high load in two sub-dimensions. The communalities formed were within the desirable level, that is, with values above 0.500, with only question 23 having an index of 0.485 (question excluded). Thus, there was a good margin of attendance of the focus points 1 to 20 that integrate the 5 principles of this component (COSO, 2013), which explains the obtained variance of 62.668%.

Table 5

Control Environment Component - rotating component matrix for similar issues

NUMBER/QUESTION		Subdimensions			
		1	2	3	4
Q2	The City Hall reinforces the existence of the code of conduct and ethics, as well as the program of compliance with the rules.	0,782			
Q3	The City Hall formally establishes the rules of conduct and ethics in the City Hall.	0,670			
Q4	The City Hall regularly assesses adherence to the rules of conduct and ethics established.	0,780			
Q5	The City takes action on misconduct in a timely manner.	0,586			
Q6	The City Hall sets limits of Authority (in the Municipality)	0,604			
Q7	The City Hall formally establishes the responsibility of the defined body to exercise the supervision of Internal Controls and administrative acts in the City Hall.		0,761		
Q8	The body defined by the Municipality to exercise the supervision of Internal Controls and administrative acts applies specialized knowledge.		0,729		
Q9	The body defined by the City to exercise the supervision of Internal Controls and administrative acts operates independently.		0,767		
Q10	The body defined by the City to exercise the supervision of Internal Controls and administrative acts performs an evaluation of COSO components.		0,716		
Q12	At City Hall, the attributions of each position are clearly defined.			0,770	
Q13	The lines of subordination are clearly established in the City Hall			0,827	
Q14	City Hall clearly establishes delegation and limits of authority			0,709	
Q15	The City Hall captures and retains competent people aligned with its objectives			0,609	
Q21	The City Hall enforces the established lines of authority and responsibility			0,621	
Q16	The City Hall formally establishes the plan of positions, careers, and salaries				0,718
Q17	The City Hall regularly evaluates employees on their conduct in the role (performance and attendance)				0,694
Q19	The City Hall maintains a qualification, training, and awareness program				0,575
Q20	The City Hall establishes lines of replacement for bosses and managers, as well as plans to prepare for succession				0,699
Q22	City Hall establishes bonuses and incentives based on performance, discipline and conduct				0,579
TOTAL AVERAGE VARIANCE BY SUBDIMENSION		0,684	0,743	0,707	0,653

Generated variance for the four sub-dimensions 62,668%.

Caption: Sub-dimension 1: ethical conduct and limits of authority. Sub-dimension 2: structure and performance of the central internal control body. Sub-dimension 3: organization of staff and assignment of responsibilities. Sub-dimension 4: training programs and incentives applied to staff.

Source: Research Data (2021).

For the Control Environment component – principles 1 to 5, focus points 1 to 20 (COSO, 2013), 4 sub-dimensions were generated (Table 5).

Sub-dimension 1 - ethical conduct and limits of authority - linked to principle 1, focus points 1 to 5 (COSO, 2013), demonstrated whether municipalities are concerned with integrity and ethical values, reinforcing the need for a code of conduct. Formalized conduct with regular evaluations. The result generated an average index of 0.684. It became clear that the investigation of transgressions on misconduct on time (Q5) needs to be improved, as the rate of 0.586 was obtained – below the average rate.

Sub-dimension 2 - structure and performance of the central internal control body, principle 2, focus points 5 to 8 (COSO, 2013), sought to highlight the definition of responsibility in this sector, where specialized knowledge must be applied, independently, with routine assessments of the entity's operating internal controls. The average index generated was 0.743, considered satisfactory.

Sub-dimension 3 - organization of personnel and establishment of responsibilities, based on principle 3, points of focus 9 to 11 (COSO, 2013), aimed to indicate the formal delegations to positions that are part of the organizational structure, with the definition of the attributions of responsibilities and limits of authorities, also defining the lines of subordination. It was found that there is a concern in this sense, whose average index in the question reached 0.707.

Sub-dimension 4 - training programs and incentives applied to personnel, principles 4 and 5, points of focus 12 to 20 (COSO, 2013). Related to the attraction and retention of personnel involved in the organization, the maintenance of training programs, and preparation for replacing heads and managers with defined lines of authority obtained an average index of 0.653. It is observed that the index referring to the preparation of personnel with qualification and training (Q19) of 0.575 is a little above the acceptable, demanding attention in the implementation of training programs. In evaluating the team's performance and assiduity with the establishment of bonuses and rewards, the requirement was met, with an average index of 0.579, which could be improved if the operational career plan is improved because of the bonus and incentive program. Overall, the four sub-dimensions linked to the COSO (2013) control environment component reached an average index of 0.62668, and it can be considered that the municipalities comply with this item.

These results align with the research by Gattringer and Marinho (2020), which despite meeting the Control Environment component, needs improvement since attention must be paid to people management. Especially in the preservation and functional training and the preparation of managers, due to the lack of rewards and adequate remuneration for employees who perform essential functions. Ferreira and Oliveira (2021) add that because of this, the component, as mentioned above, describes a set of standards, processes, and structures that provide the basis for carrying out the internal control activity of the entire organization.

4.2 Exploratory Factor Analysis for Risk Assessment

In the Risk Assessment component (Table 6), three sub-dimensions were generated: 5 - setting and monitoring of objectives; 6 - consistency and reliability of records; and 7 - the assessment of risk and significant changes. Questions Q24, Q32, Q33, and Q34 were excluded as they did not present load significance. The commonalities were above 0.500, explaining the obtained variance of 73.196% for the three generated sub-dimensions.

Table 6

Risk Assessment Component - rotating component matrix for similar issues

NUMBER/QUESTION		Subdimensions		
		5	6	7
Q25	Quantification of objectives and goals in the Pluriannual Plan (PAP)	0,840		
Q26	Quantification of fiscal targets in the Budget Framework Law (BFL)	0,825		
Q27	Systematic monitoring of the objectives and goals quantified in the PAP and BFL with the preparation of a management report	0,793		
Q28	Systematic monitoring of the tax risks provided for in the BFL	0,751		
Q29	Accounting records adequately reflect financial and equity transactions in accordance with applicable standards		0,787	
Q30	Accounting records properly reflect budgeting and clearing operations in accordance with applicable regulations		0,804	
Q31	The Reports and Financial Statements reflect the assets and the application of public policies elected for the Municipality		0,761	
Q35	Risk management in the processes of launching, registering, and collecting public revenue to avoid errors and fraud			0,610
Q36	Risk management in the processes of hiring personnel, payroll and charges			0,710
Q37	Risk management in procurement processes, agreements, and contracts			0,652
Q38	Risk management through Internal Audit activity			0,751
Q39	Assessment of established Internal Controls (routines and personnel) with a view to achieving the institution's objectives			0,773
TOTAL AVERAGE VARIANCE BY SUBDIMENSION		0,802	0,784	0,699

Generated variance for the four sub-dimensions 73.196%.

Caption: Sub-dimension 5: setting and monitoring objectives. Sub-dimension 6: consistency and reliability of records. Sub-dimension 7: risk assessment and significant changes.

Source: Survey Data (2021).

The organization must specify its objectives to identify and assess risks in the Risk Assessment component (according to principles 6 to 9 and focus points 21 to 37, COSO, 2013). Also, the possibility of occurrence, the determination of fraud, how these risks will be managed, and identifying and evaluating significant changes that may affect the internal control system.

As for sub-dimension 5 - setting and monitoring objectives, questions Q25 to Q28, the service had an average rate of 0.802. In sub-dimension 6 - consistency and reliability of consolidated accounting records and reports, questions Q29 to Q31, the average index of 0.784 was obtained. In sub-dimension 7 - risk assessment and significant changes in the internal control system questions Q35 to Q39, the average index was 0.699.

In this way, it was found that the municipalities of Santa Catarina meet, as a whole, the points of focus linked to principles 6 to 9 of the Risk Assessment component of the COSO model (2013), justified by reaching the average total percentage of 73.196%. However, the measurement of the risks of non-compliance with laws and regulations, the management of risks on budget, financial, and equity execution objectives, and the analysis of the risk of non-compliance with government policies were affected due to low loads. This situation calls attention to the fragility of the municipalities in following the goals set.

Thus, fiscal management is associated with planning, control, transparency, and responsibility. Public entities' fiscal responsibility assessment initiatives have emphasized parameters related to achieving goals. However, there is no relationship between this compliance with the planned action and the inadequacies of the established goals to the fiscal reality of the municipalities (Cruz & Afonso, 2018).

4.3 Exploratory Factor Analysis for the Control Activity

In the Control Activity component (Table 7), three sub-dimensions were generated: 8 - accounting records and asset protection; 9 - computerized systems and IT management; and 10 - management control and evaluation, which bring together issues of similar nature, in order to meet principles 10 to 12, focus points 38 to 53 (COSO, 2013).

Table 7

Control Activity Component - rotating component matrix for similar issues

NUMBER/QUESTION		Subdimensions		
		8	9	10
Q42	Operations take place through reliable documentation	0,630		
Q43	Asset security (prevention and detection) through physical safeguard control	0,624		
Q44	Adopts procedures for checking and reconciling financial accounts (debtors and creditors) and inventories	0,742		
Q45	Adopts checklist procedures - at the time of receipt of goods, services, and works	0,752		
Q46	Uses restricted access control of people in the asset safekeeping sectors (financial and property)	0,720		
Q47	Adopts segregation of duties (prevention) policy to reduce human risks and errors	0,586		
Q48	Computer systems controls are performed (access, integrity, availability, and infrastructure, internet and database protocols, security considerations)		0,523	
Q49	Computer equipment is frequently renewed avoiding obsolescence		0,654	
Q50	Computerized systems are regularly updated		0,863	
Q51	The data stored in computerized systems allow the verification of records by nature of the event		0,721	
Q52	Systems maintained in Information Technology limit or block illegal or irregular operations		0,518	
Q53	Computerized systems with the acquisition of relevant technology and development of maintenance process control activities are constantly evaluated		0,512	
Q55	Management guidelines (policies and procedures) are based on rules and regulations			0,652
Q56	Mapping of Internal Controls through organizational charts that determine lines of responsibilities			0,779
Q57	Establishment of responsibility and accountability for the implementation of policies and procedures to achieve the objectives			0,657
Q58	Objectives measured through performance indicators			0,807
Q59	Performance indicators regularly reviewed			0,837
Q60	Adoption of assessment and reassessment measures to correct course and achieve goals in due time (when necessary)			0,688
Q61	Execution of operations takes place in a timely manner			0,528
Q62	Tasks performed through the action of competent personnel			0, 518
TOTAL AVERAGE VARIANCE BY SUBDIMENSION		0,675	0,631	0,618

Generated variance for the four sub-dimensions was 59,013%. Caption: Sub-dimension 8: accounting records and asset protection. Sub-dimension 9: computerized systems and IT management. Sub-dimension 10: management control and evaluation.

Source: Research Data (2021).

Questions Q40, Q41, and Q54 were excluded as they did not the present significance of load. The commonalities were within the desirable level. That is, their values were above 0.500. Focus points 38 to 53 linked to this component were reasonably met, which explains the total variance obtained of 59.013%.

In Table 7, sub-dimension 8 - accounting records and asset protection, aggregates accounting records and asset protection actions, the requirement for reliable documentation for operations, physical safeguarding of assets, conferences and reconciliations of debtors and creditors, checks on the receipt of goods and services, restriction of people's access to asset and inventory storage locations, and respect for the principle of segregation of duties, the average index was 0.675. However, attention must be paid to compliance with the principle of segregation of duties, which reached an index of 0.586. It is important to emphasize that most municipalities in Santa Catarina are small and operated with reduced personnel, mainly in the administrative and control sectors. Characteristics of small structures, which may justify the relaxation of the principle of segregation of functions, are essential for preventing errors and frauds.

Sub-dimension 9 - Computerized systems and Information Technology (IT) management, controls over computerized systems and relevant technologies, acquisition, updating, and maintenance of computer equipment and software, and credibility and consistency of software programs acquired, obtained an index of 0.631. The positive point was that municipalities had sought access to computerized technologies (Q50, index of 0.863). However, attention should be paid to the maintenance of systems that do not control or block irregular operations (Q52, index of 0.518); constant evaluation of computerized systems on relevant technologies (Q53, index of 0.512); and control over access to computerized systems (Q 48, index of 0.523).

Sub-dimension 10 - management control and evaluation happen through establishing and monitoring guidelines and policies, formal organization structuring, creation, maintenance, monitoring performance indicators, and adopting measures and time control to correct the direction of the direction program. The average index reached 0.618, emphasizing the creation (Q58, index of 0.807) and review (Q59, index of 0.837) of performance indicators to measure the fulfillment of the objectives outlined in the organization. However, they lack care, the time for the execution of operations (Q61, index of 0.528), and the competence of the staff to perform the delegated tasks (Q62, index of 0.518).

Thus, Cavalcante, Peter, and Machado (2011) observe that the objective of internal control is to act, at the same time, as an aid mechanism for the public administrator and as an instrument for the protection and defense of the collective interest. In addition, the authors also point out that internal control aims to safeguard public resources against waste, abuse, errors, fraud, and irregularities, ensuring sound treasury management.

About technology, Macêdo, Machado, and Scarpin (2014) emphasize that it can guide the organizational structure of the organization. Cruz, Silva, and Spinelli (2016) add that the area of technology in public administration shows continuous evolution but still needs to improve the systems that support the service of citizens.

4.4 Exploratory Factor Analysis for Information and Communication

The Information and Communication component comprises two sub-dimensions that bring together those of similar nature: 11 - internal communication; and 12 - external communication (Table 8), meeting principles 13 to 15 and focal points 54 to 67 of the COSO model (2013). In the lines of internal communication, there is the disclosure with quality of its structure and form of internal controls. On the other hand, the external one enables channels of interaction, mainly with society, the target of actions by the municipalities.

With this, the organization must strive for quality information, promoting interaction with internal and external parties (COSO, 2013). Thus, this component was reasonably met, which explains the obtained variance of 64.690%. Question Q73 was excluded as it did not present a load significance. The extracted commonalities were higher than the 0.500 indexes.

Table 8 shows a reasonable service margin for internal communication, sub-dimension 11 – internal communication, questions Q63 to Q69, with an average index of 0.730; and sub-dimension 12 - external communication, questions Q70 to Q72, had an average index of 0.850. External communication is highlighted, where the creation of service channels for citizens is observed, both in evaluating their services, implementing the ombudsman sector, and receiving suggestions, criticisms, complaints, and denouncements. However, it is recalled that the question about the publication of official acts (Q73) was refuted. In the state of Santa Catarina, a constitutional mandate is allowed to take place in front of public murals for small towns.

It is important to note that the item with the lowest score refers to the quality of internal information and its reach to all involved within an acceptable cost/benefit ratio (Q63, index of 0.680). This score denotes the need to continue improving internal communication, a base component for the transfer and knowledge of how the administration operates and manages its activities to achieve its objectives.

Table 8

Information and Communication Component - rotating component matrix for similar issues

NUMBER/QUESTION	Subdimensions	
	11	12
Q63 Internal communication has quality, reaches all involved and meets the cost/benefit principle	0,680	
Q64 The importance of internal controls is communicated properly and efficiently	0,784	
Q65 Internal control routines and procedures are set out in manuals	0,616	
Q66 The organizational structure is formalized and duly communicated to all members	0,781	
Q67 Availability of a communication channel with senior management	0,738	
Q68 Top Management clearly sets out plans	0,785	
Q69 The information is made available to all involved	0,730	
Q70 Establishment of channels for open communication (including mechanisms that allow anonymous information)		0,780
Q71 Active Ombudsman		0,884
Q72 Availability of channels for submitting suggestions and criticisms		0,886
TOTAL AVERAGE VARIANCE BY SUBDIMENSION	0,730	0,850

Generated variance for the four sub-dimensions 64.690%.

Caption: Sub-dimension 11: internal communication. Sub-dimension 12: external communication.

Source: Research Agenda) (2021).

These findings align with Gattringer and Marinho (2020) and Silva et al. (2020) when they observe that the Information and Communication component processes the identification, capture, and exchange of information with the aim of continuous improvement of internal control. Furthermore, it seeks to monitor processes so that the efficiency of internal control systems can be qualified.

4.5 Exploratory Factor Analysis for Monitoring

In the Monitoring component (Table 9), questions Q75 and Q80 were excluded as they did not present load significance. The communalities presented values greater than 0.500. Only one sub-dimension was generated - 13, to meet principles 16 and 17 and focus on points 68 to 77 that underpin the component (COSO, 2013). There was proper compliance with the component, which explains the obtained variance of 60.721%.

Table 9

Monitoring Component - rotating component matrix for similar issues

NUMBER/QUESTION	Subdimension
	13
Q74 Internal Control System constantly monitored to assess its validity and quality over time	0,747
Q76 Internal Control System considered adequate and effective by the evaluations suffered	0,781
Q77 Management activity of the Internal Control System contributes to performance improvement	0,825
Q78 Use of failures and deficiencies found to adjust control routines	0,830
Q79 Communication of failures and deficiencies to senior management	0,706
TOTAL AVERAGE VARIANCE BY SUBDIMENSION	0,778

Generated variance for the four sub-dimensions was 60.721%.

Caption: Sub-dimension 13: monitoring.

Source: Research Data (2021).

The Monitoring component (Table 9), integrated by principles 16 and 17, focus points 68 to 77 (COSO, 2013), obtained an average index of 0.778. It is pointed out as strengths, the use of management activities of the internal control system to improve the organization's performance, as well as the use of faults and deficiencies detected to adjust the control routines. On the other hand, weak points involve fragility in the storage and access of documentation and the performance of internal audit activities.

It is worth noting that Gattringer and Marinho (2020) had already detected weaknesses in the monitoring component, the lack of consistency in the monitoring and evaluation of the internal control system, in addition to the lack of effectiveness and adequacy of the internal control system in operation. In this context, Pinheiro and Oliva (2020) emphasize that monitoring in public companies is vital to reduce information asymmetry by internal governance mechanisms.

4.6 Synthesis of Exploratory Factor Analysis for COSO Components

The sub-dimensions formed in the face of the components of the COSO model (2013), resulted in 67 valid questions with a total average variance index of 0.720, and a total average percentage of 64.058%, summarized in Table 10:

Table 10

COSO Components - Rotating matrix for questions of the same nature, by subdimension

Component	Subdimension	Questions	Mean-Variance	
			Subdimension	Total (%)
Control Environment	1 Ethical conduct and limits of authority	Q2 a Q6	0,684	62,668 %
	2 Structure and performance of the central internal control body	Q7 a Q10	0,743	
	3 Organization of staff and assignment of responsibilities	Q12 a Q15 e Q21	0,707	
	4 Training programs and incentives applied to staff	Q16, Q17, Q19, Q20 e Q22	0,653	
Risk assessment	5 Setting and monitoring of objectives	Q25 a Q28	0,802	73,196 %
	6 Consistency and reliability of records	Q29 a Q31	0,784	
	7 Risk assessment and significant changes	Q35 a Q39	0,699	
Control Activity	8 Accounting records and asset protection	Q42 a Q47	0,675	59,013 %
	9 Computerized systems and IT management	Q48 a Q53	0,631	
	10 Management control and evaluation	Q55 a Q62	0,618	
Information and Communication	1 Internal communication	Q63 a Q69	0,730	64,690 %
	2 External communication	Q70 a Q72	0,850	
Monitoring	1 Monitoring	Q74 a Q79	0,778	60,721 %
	3			
TOTAL		67	0,720	64,058 %

Generated variance for the thirteen sub-dimensions was 64.058%.

Source: Research Data (2021).

Table 10 summarizes the formation of 13 sub-dimensions or commonalities (Carvalho, 2012), reaching the 17 COSO model (2013) principles with reasonable compliance – 64.058%. The sub-dimensions referring to External Communication and Goal Setting were the most significant. At the same time, those with less significance relate to Management Control and Assessment, Computerized Systems and IT Management, Training Programs and incentives applied to personnel, Ethical Conduct and Authority Limits, and Risk Assessment and Significant Changes.

According to the index obtained in the set 0.720 or 64.058%, it appears that, in general, the five components of COSO (2013) are present, and it can be observed that they contribute to the public administration of all municipalities in the state of Santa Catarina. These findings corroborate the study by Araújo et al. (2016) when they found that the reports issued by the internal control units of Brazilian municipalities aligned with COSO's perspectives. These results are also in line with the research by Braga et al. (2018) concerning the application of the COSO model in each administrative unit, reinforcing the paths to improve the process.

Likewise, Sancovschi et al. (2019) state that the COSO model needs to map the most relevant risks associated with the strategic objectives of any entity. Finally, the data obtained in this article are in line with the work by Silva et al. (2020), when they highlighted the link between internal control and public administration with the COSO management model.

5 Final Considerations

This study aimed to analyze the contribution of the components of the COSO model to the internal control of public administration in the municipalities of the state of Santa Catarina. We sought to study the contribution of the five components of the internal controls of the COSO model (and its subdivisions) in the public administration of all municipalities in the state of Santa Catarina.

It is worth noting that the sub-dimensions that showed tremendous significance were: 12 - external communication and 5 - setting and monitoring of objectives related to COSO components: Information and Communication and Risk Assessment, respectively. Managers should value the citizen's service channels for the citizens of each municipality, both for the evaluation of the services provided and for receiving information from the ombudsman. Furthermore, administrators' setting and monitoring objectives are also relevant for public management since failure to comply with budget, financial, or equity execution rules can result in sanctions for the public representative.

On the other hand, the sub-dimensions with less significance were: 10 - management control and evaluation, 9 - computerized systems and IT management, 4 - training programs and incentives applied to personnel, 1 - ethical conduct and limits of authority, and 7 - risk assessment significant changes linked to the Control Activity, Control Environment and Risk Assessment components, respectively. In this context, improvements and enhancements must be pursued, mainly in the implantation and maintenance of control systems in information technology (IT) and the professionalization of the staff.

With this, it was concluded that the five components of the COSO model contribute to the internal control of public administration in the municipalities of the state of Santa Catarina to identify each component's strengths and weaknesses. This way, it was verified that the research question was answered, the objective achieved, and the methodology used adequately for the study.

The contribution of this research corroborates the development of the work of public administrators in the search for management efficiency with the use of internal controls. In addition, this article can also contribute to the search for the operational efficiency of internal control, whether in municipalities or even in other bodies of the Brazilian public system.

As a limitation of the study, the research was performed with a closed data collection protocol, which methodologically may have inconsistencies in the answers. In addition, there can be a lack of understanding of the content and objective by the respondents. Regarding future research, we suggest replicating this study in municipalities in other states in order to compare the results obtained in this article. We recommended investigating the internal control components from the point of view of other participants, such as mayors, for example. Finally, qualitative research is proposed to understand how each component of the COSO model influences public management as a whole.

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