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Evaluation of the Core Dimensions of the Theoretical Framework for the Implementation of Six Sigma Management Accounting

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Abstract

The present study aims to evaluate the core dimensions of the theoretical framework for the implementation of Six Sigma management accounting. In terms of methodology, this study is exploratory and, through qualitative and quantitative phases, seeks to achieve its analytical objectives regarding the identification of the strategic dimensions of Six Sigma management accounting and the fuzzy evaluation of its principal axes within companies operating in the capital market. In terms of data collection, the study should be regarded as a mixed-methods investigation in which data were gathered through the participation of a group of experts in the qualitative phase, and financial managers and chief accountants of capital market companies possessing extensive professional experience and high levels of technical and specialized knowledge in the quantitative phase. Regarding analytical procedures, the qualitative phase employed grounded theory and the Delphi method to identify the strategic aspects of Six Sigma management accounting processes and determine their reliability. In the quantitative phase, the fuzzy TODIM approach was utilized to evaluate the identified core dimensions of the phenomenon under investigation within the context of the public sector. The findings of the qualitative phase, based on 14 expert interviews, indicated the identification of 315 open codes, 3 structural categories, 8 core components, and 42 conceptual themes. Following the determination of these dimensions and in line with the second research question, the fuzzy TODIM process was conducted to prioritize the core components at the level of capital market companies. The results revealed that profit analysis (“B7”) was identified as the most important factor in the strategic implementation of Six Sigma management accounting processes within capital market companies.

Keywords: *Six Sigma, Strategic Management Accounting, Fuzzy TODIM*

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1. Introduction

In today’s competitive and highly dynamic business environment, organizations are increasingly required to adopt integrated managerial approaches capable of simultaneously enhancing operational efficiency, improving financial performance, reducing organizational waste, and strengthening strategic decision-making processes. The expansion of global competition, rapid technological change, and increasing expectations of stakeholders have compelled organizations to redesign traditional accounting and management systems in line with strategic and process-oriented perspectives. In this context, strategic management accounting has emerged as one of the most influential managerial tools for aligning accounting information with organizational strategies and long-term competitive objectives [1]. Strategic management accounting extends beyond traditional financial reporting by emphasizing the provision of forward-looking, competitor-oriented, and strategically relevant information for managerial decision-making [2]. Organizations operating within complex financial and competitive environments increasingly require accounting systems capable of supporting strategic flexibility, operational responsiveness, and sustainable

competitive advantage [3]. Consequently, strategic management accounting has become closely associated with organizational sustainability, strategic orientation, governance quality, and performance enhancement [4, 5].

Simultaneously, Six Sigma has evolved into one of the most widely adopted methodologies for process improvement, quality enhancement, and organizational excellence. Originally developed as a quality management methodology, Six Sigma has gradually expanded into multiple sectors, including manufacturing, healthcare, financial services, logistics, and supply chain management [6]. The principal objective of Six Sigma is to reduce process variability, minimize defects, improve efficiency, and optimize organizational performance through data-driven decision-making and continuous improvement practices [7]. The integration of Lean principles with Six Sigma methodologies has further strengthened organizations' capabilities in reducing waste, increasing productivity, and improving customer satisfaction [8]. Recent studies indicate that Lean Six Sigma has become increasingly relevant in emerging industries such as electric vehicle manufacturing, advanced production systems, and sustainable supply chains [9]. Likewise, the implementation of Lean Six Sigma in industrial production environments has demonstrated substantial improvements in operational capacity, process stability, and organizational efficiency [10, 11].

Despite the substantial growth of Six Sigma applications across various industries, the integration of Six Sigma principles with strategic management accounting processes remains relatively underdeveloped within the existing literature. Most prior studies have focused either on operational process optimization or on the strategic role of accounting systems independently, while limited attention has been devoted to the strategicization of Six Sigma management accounting processes as an integrated framework. This research gap is particularly significant because management accounting systems represent the informational infrastructure of strategic organizational decision-making, while Six Sigma provides the methodological foundation for process improvement and quality optimization. Therefore, the integration of these two domains may provide organizations with enhanced capabilities for strategic control, operational monitoring, and financial sustainability [12].

The increasing complexity of organizational environments has reinforced the importance of integrating strategic management accounting with process-oriented quality systems. Strategic management accounting techniques such as competitor analysis, target costing, value chain analysis, lifecycle costing, and strategic performance measurement are increasingly considered essential tools for achieving organizational competitiveness and long-term value creation [13]. Moreover, organizational strategic orientations significantly influence the effectiveness of management accounting techniques and their contribution to corporate sustainability [4]. Similarly, research has shown that organizational change, strategic configuration, and business strategy substantially shape the implementation effectiveness of strategic management accounting practices [1, 14]. Consequently, the implementation of Six Sigma management accounting requires not only technical accounting procedures but also organizational alignment with strategic, operational, and tactical dimensions.

One of the major challenges confronting organizations is the inability of traditional accounting systems to provide timely and strategically relevant information for supporting process improvement initiatives. Conventional accounting systems are often criticized for focusing excessively on historical financial data while neglecting operational drivers of organizational performance. In contrast, Six Sigma emphasizes real-time data analysis, continuous measurement, process capability assessment, and defect reduction. This conceptual divergence necessitates the redesign of accounting systems to align them with continuous improvement methodologies and strategic organizational objectives [12]. The integration of Six Sigma into management accounting processes may therefore enhance the capacity of organizations to evaluate performance indicators, monitor operational risks, and optimize financial resource allocation more effectively.

The strategicization of Six Sigma management accounting also gains significance in financial and capital market environments, where organizational sustainability and investor confidence heavily depend on the quality of financial information and managerial transparency. Financial managers and accounting executives increasingly require sophisticated analytical systems capable of integrating operational performance metrics with strategic financial indicators. Studies have demonstrated that strategic management accounting practices positively influence accounting information system performance and organizational governance effectiveness [5]. Similarly, organizational culture and information systems significantly affect the implementation success of strategic management accounting practices [15]. Therefore, developing a strategic framework for Six Sigma management accounting can

provide organizations with an integrated mechanism for aligning operational excellence initiatives with financial and strategic objectives.

Another critical dimension associated with Six Sigma management accounting involves organizational competitiveness and sustainable financial performance. Competitive strategies, organizational differentiation, and strategic orientation are recognized as major determinants of long-term organizational success [16, 17]. In this regard, Six Sigma methodologies contribute to organizational competitiveness by improving process quality, reducing inefficiencies, and enhancing customer value creation [18]. Furthermore, Lean Six Sigma applications in financial services have demonstrated significant impacts on organizational performance, customer satisfaction, and operational resilience [19]. These findings suggest that integrating Six Sigma principles into management accounting systems can strengthen organizations' abilities to respond effectively to environmental uncertainty and competitive pressures.

The literature also indicates that strategic orientations such as market orientation, entrepreneurial orientation, and growth orientation substantially influence organizational performance and strategic adaptability [20]. Strategic management accounting systems capable of supporting these orientations require advanced analytical capabilities and integrated performance measurement frameworks. Six Sigma methodologies, particularly through the DMAIC framework, offer structured mechanisms for identifying process inefficiencies, analyzing root causes, and implementing continuous improvements [21]. Accordingly, integrating DMAIC-based analytical processes into management accounting systems can enhance organizational learning, strategic responsiveness, and performance sustainability.

In addition, the successful implementation of Six Sigma initiatives depends heavily on critical organizational success factors, including leadership commitment, employee participation, training systems, and strategic alignment [22]. These factors become even more important in accounting and financial environments, where process changes may directly influence organizational governance, financial transparency, and stakeholder trust. The implementation of Six Sigma within accounting systems therefore requires multidimensional coordination among strategic planning processes, financial control mechanisms, and organizational information systems. Research has also emphasized the role of stakeholder management and project governance in enhancing the effectiveness of Lean Six Sigma implementation [23]. Consequently, organizations seeking to institutionalize Six Sigma management accounting require comprehensive strategic frameworks capable of integrating managerial, operational, and financial dimensions simultaneously.

From a methodological perspective, the identification and evaluation of strategic dimensions associated with Six Sigma management accounting necessitate exploratory and interpretive analytical approaches. Since limited theoretical frameworks currently exist regarding the strategicization of Six Sigma management accounting processes, grounded theory provides an appropriate methodology for discovering underlying conceptual dimensions and generating theoretical structures directly from empirical data. Interpretive interview methodologies, particularly participant-centered approaches, are especially suitable for exploring complex managerial phenomena characterized by multidimensional organizational experiences [24]. Through qualitative exploration, researchers can identify strategic themes, operational mechanisms, and managerial practices associated with Six Sigma accounting systems in organizational contexts.

Moreover, evaluating the relative importance and interrelationships of strategic dimensions requires advanced decision-making methodologies capable of handling uncertainty and linguistic ambiguity. Fuzzy multi-criteria decision-making approaches have therefore become increasingly important in organizational and managerial research. The fuzzy TODIM method, grounded in Prospect Theory, enables researchers to evaluate complex decision-making structures under uncertain environments [25]. Similarly, generalized TODIM approaches integrated with fuzzy systems have demonstrated substantial effectiveness in prioritization and risk evaluation processes [26, 27]. The use of fuzzy TODIM analysis within the present study therefore provides a rigorous analytical mechanism for prioritizing the strategic dimensions of Six Sigma management accounting within capital market companies.

The significance of this study is further reinforced by the growing demand for integrated managerial systems within financial and accounting sectors. Financial organizations and capital market companies increasingly operate under conditions characterized by regulatory complexity, market volatility, technological transformation, and heightened stakeholder expectations. Under such conditions, traditional accounting systems are insufficient for supporting strategic decision-making and organizational adaptability.

Consequently, organizations require integrated frameworks capable of combining strategic management accounting practices with process-oriented quality improvement methodologies. The strategicization of Six Sigma management accounting can therefore contribute to improving organizational efficiency, strengthening financial transparency, enhancing process integration, and supporting sustainable competitive advantage.

Although previous studies have investigated Lean Six Sigma applications in operational and industrial contexts [10, 11, 21], strategic management accounting implementation practices [2, 3], and the relationship between strategic orientations and organizational performance [4, 20], limited research has attempted to integrate these domains into a coherent strategic framework within the accounting and financial context. Furthermore, studies examining organizational performance, strategic alignment, and financial sustainability have highlighted the necessity of developing integrated managerial models capable of addressing both operational and strategic requirements simultaneously [28, 29]. Therefore, there remains a substantial theoretical and empirical gap regarding the strategicization of Six Sigma management accounting processes, particularly within capital market companies operating in complex financial environments.

Accordingly, the present study aims to identify and evaluate the core dimensions of the theoretical framework for implementing Six Sigma management accounting and to prioritize its strategic components within the context of capital market companies through grounded theory and fuzzy TODIM analysis.

2. Methodology

In order to distinguish the operational nature of the research method from the perspectives of outcome, objective, and data type, and to provide a clearer understanding of the implementation focus on the phenomenon under investigation, it should be noted that, from the standpoint of its outcome, the present study is considered developmental. This is because there is no coherent theoretical integration or unified conceptual framework regarding the strategicization of strategic management accounting processes within the context of the study, and the expansion of such a framework can lead to a more comprehensive understanding of the intended phenomenon. On the other hand, in terms of its objective, the study should be regarded as exploratory, since a review of the theoretical foundations and empirical literature demonstrated that no prior research has presented an integrated framework for the strategicization dimensions of Six Sigma management accounting processes. Therefore, this study, through the Glaser (1992) approach within qualitative methodology and grounded theory implementation, seeks to identify the dimensions associated with the phenomenon under investigation within capital market companies. Finally, regarding the nature of data collection, the present study should be classified as mixed-methods research. Furthermore, depending on the analytical processes employed throughout the research trajectory, different methods were utilized for data collection and analysis at each stage. Specifically, the qualitative phase employed grounded theory analysis to identify Six Sigma management accounting processes through interviews and three-stage coding procedures. Subsequently, after conducting Delphi analysis and assessing the reliability of the identified dimensions based on a theoretically acceptable consensus threshold, the quantitative phase positioned the core components derived from the qualitative phase into rows and columns in order to conduct pairwise comparisons for determining the levels of influence (direct, indirect, or no influence). Thereafter, an $m \times m$matrix was constructed to facilitate the identification of the most central strategic component of Six Sigma management accounting within capital market companies through the fuzzy TODIM approach.

Target Population of the Study

Based on the dual qualitative–quantitative structure of the study, the information regarding participants is presented separately below.

Participants in the Qualitative Phase

Considering the interpretive paradigm employed in the qualitative methodological process, participants capable of contributing to the development of a strategic Six Sigma management accounting model were selected based on the nature of the phenomenon under investigation and their experiential knowledge derived from professional backgrounds. These experts were required to satisfy the following competency criteria and were therefore selected purposively.

First, the experts were required to possess an appropriate academic résumé related to conducting research in strategic management accounting. Focusing on this criterion indicated their theoretical understanding of the core phenomenon addressed in the interviews.

Second, in addition to having teaching experience in higher education and university curricula, the experts were required to possess experience in organizing workshops and specialized training courses for companies in areas related to resource management and improvements in corporate financial performance.

Third, the experts were also required to possess consulting experience within capital market companies for the development of strategic financial perspectives.

It should be noted that, in order to prevent deviations during the interview process, a protocol was established whereby explanatory information regarding the topic under investigation was provided to interviewees prior to the interviews in order to enhance consistency. Participant selection was conducted through theoretical sampling and the snowball sampling process. Given the aforementioned characteristics, the focus was placed on experts with sufficient knowledge of management accounting and related theories. Following the initiation of interviews and the introduction of the first three interviewees, additional participants were identified through snowball sampling based on the specified criteria. Ultimately, 14 interviews were conducted because theoretical saturation constituted the basis for terminating interviews in this category of research.

Participants in the Quantitative Phase

In the quantitative phase, following model design, members of the target population—including financial managers and chief accountants of selected capital market companies—were invited through gatekeeper techniques to participate in completing matrix-based checklists. The number of participants in this phase was 25 individuals. Since the applied method is based on complex systems analysis at specific levels and requires participation according to criteria such as experience and specialized knowledge, reciprocal matrix questionnaires are generally completed by 15 to 30 participants. Researchers such as Jian et al. (2020) and Tang et al. (2020) described target population selection as limited due to the multi-stage analytical process involved.

In the qualitative phase, the present study employed the emergent approach for grounded theory implementation in order to develop a theoretical framework. Accordingly, expert interviews served as the basis for data collection and coding according to the Glaser (1992) approach. Due to the emerging nature of the phenomenon under investigation, open/deep interview techniques were initially employed. During coding at the conclusion of each interview, open codes were categorized and assigned to axial codes. Through the identification of conceptual themes and axial components, broader dimensions of the phenomenon under investigation gradually emerged. Once the principal foundations became evident within the coding procedures, semi-structured interviews were subsequently employed to achieve theoretical saturation and ensure balanced development of themes and components. It should be clarified that data collection in this process was required to emerge directly from within the phenomenon under investigation; therefore, no fixed interview questions were necessarily considered for all interviews. In other words, questions were selected according to the experts' level of awareness and based on their real-time responses so that statements expressed during interviews would not remain superficially interpreted without deeper understanding by the interviewees. Accordingly, the research questioning process followed a back-and-forth procedure commonly referred to as the "U" process.

Subsequently, after determining the principal axes and with the aim of generalizing them to the study context, Delphi analysis was employed. The objective of this process was to assess the reliability of the identified axial dimensions for evaluation within the public sector. For this purpose, the classical Delphi process was implemented based on two criteria: mean values and agreement coefficients. In this process, a checklist based on a seven-point Likert scale was developed to examine criteria derived from the principal components from the experts' perspectives. Through the experts' assigned scores, it was determined whether the desirability threshold of the criteria in terms of mean value (5.00) and agreement coefficient (0.50) was confirmed. In fact, the experts' theoretical consensus in this analysis provided the basis for generalizing the principal criteria to the study context for fuzzy evaluation in the quantitative phase.

Finally, after confirming the reliability of the dimensions through Delphi analysis and assigning specific codes to each identified axial component, the first step involved evaluating the core components through fuzzy TODIM matrix analysis. In order to evaluate the emerged components identified and confirmed in terms of generalizability to the study context and their suitability for fuzzy evaluation, the TODIM method was employed. TODIM is a discrete multi-criteria decision-making method based on Prospect Theory and was initially developed by Gomes and Lina (1992). This method can be used to investigate multi-criteria decision-making problems in which criterion values are represented by

precise numerical values. Subsequently, this fuzzy process was expanded by Krohling and Souza (2012) for multi-criteria decision-making problems in which criterion values are represented by fuzzy numbers. An important consideration is that, in reality, precisely determining criterion values in multi-criteria decision-making is difficult or even impossible; therefore, it is more appropriate to evaluate criteria in several stages of weighting processes through matrix-based assessments. This fuzzy process can thus be summarized in the following implementation stages.

According to Table 1, pairwise comparisons were initially performed by assigning scores to each dimension derived from the qualitative phase.

Table 1. Linguistic Scales Based on Pairwise Relationships

Linguistic Variables	Very High Influence	High Influence	Low Influence	Very Low Influence	No Influence
Fuzzy Values	(8,9,9)	(6,7,8)	(4,5,6)	(2,3,4)	(1,1,1)

In this section, for each axial component derived from the qualitative phase, the five-point spectrum presented in the first row of Table 1 was considered so that the weights of each axial component could be determined based on the construction of fuzzy functions. In order to expand the preliminary definitions of fuzzy numbers, mathematical models related to this process are presented below.

Stage 1: Designing Fuzzy Linguistic Criteria

At this stage, the criteria determined in the qualitative phase were utilized for decision-making purposes. To eliminate uncertainty, these criteria were adjusted according to the linguistic criteria presented in Table 1. After collecting the evaluation checklists, each linguistic term was assigned its corresponding fuzzy value.

Stage 2: Presenting Matrix-Based Checklists to Participants

At this stage, in order to construct the initial pairwise comparison matrix, fuzzy functions were evaluated based on upper (u), middle (m), and lower (l) fuzzy levels according to:

$$\tilde{o}_{ij} = (l_{ij}, m_{ij}, u_{ij})$$

This process determined whether each assigned score, through the "mode" index, represented a direct, inverse, or neutral effect of column dimension $i$on row dimension j.

Stage 3: Initial Decision-Making Matrix

At this stage, the initial decision matrix $\tilde{o}$was extracted from the simple average of all participants' evaluations of the checklists and calculated according to Equation (1), where $\tilde{o}_{ij} = (l_{ij}, m_{ij}, u_{ij})$represents triangular fuzzy dimensions.

$$\tilde{o} = \begin{bmatrix} \tilde{o}_{11} & \cdots & \tilde{o}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{o}_{m1} & \cdots & \tilde{o}_{mn} \end{bmatrix}, \tilde{o}_{ij} = \frac{1}{P}\sum_{P=1}^{P} \tilde{\alpha}_{ij}^{P}$$

Equation (1)

Stage 4: Calculating the Normalized Matrix $(\tilde{Z})$

For matrix normalization of the evaluated axial components, the total value of each criterion was divided by the total of all elements located within the corresponding column. Therefore, the normalized matrix was determined according to Equations (2)–(4).

$$\tilde{Z}_h = \frac{1}{K} \times \tilde{O}_h; h = l, m, u$$

Equation (2)

$$K = \max_{1 \le i \le n} \left(\sum_{j=1}^{n} U_{ij} \right)$$

Equation (3)

$$\tilde{Z} = \begin{bmatrix} \tilde{Z}_{11} & \cdots & \tilde{Z}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{Z}_{m1} & \cdots & \tilde{Z}_{mn} \end{bmatrix}$$

Equation (4)

Stage 5: Calculating the Matrix $(\tilde{v})$

Since three-component triangular linguistic criteria were used in this analysis, the entries of each three-component element in the normalized matrix were separated in order to determine the three matrices $\tilde{Z}_l$, $\tilde{Z}_m$, and $\tilde{Z}_u$. Then, for each matrix, fuzzy limits $(l''_{ij}, m''_{ij}, u''_{ij})$were calculated according to Equations (5)–(7).

$$l''_{ij} = \tilde{Z}_l \times (I - \tilde{Z}_l)^{-1}$$

Equation (5)

$$m''_{ij} = \tilde{Z}_m \times (I - \tilde{Z}_m)^{-1}$$

Equation (6)

$$u''_{ij} = \tilde{Z}_u \times (I - \tilde{Z}_u)^{-1}$$

Equation (7)

Thereafter, to calculate matrix $\tilde{v}$, the lower, middle, and upper triangular limits were combined. In other words, the members of the matrices $(l''_{ij}, m''_{ij}, u''_{ij})$respectively formed the first, second, and third entries of matrix $\tilde{v}$, as shown in Equation (8).

$$\tilde{v} = \begin{bmatrix} \tilde{v}_{11} & \cdots & \tilde{v}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{v}_{m1} & \cdots & \tilde{v}_{mn} \end{bmatrix}$$

Equation (8)

Stage 6: Converting Fuzzy Numbers into Crisp Numbers

At this stage, fuzzy numbers were converted into crisp numbers according to Equation (9), where l, m, and $u$respectively represent the first, second, and third entries of each element.

$$V = \frac{l + 4m + u}{6}$$

Equation (9)

Stage 7: Measuring $D_i - R_i$and $D_i + R_i$for Utility Optimization

At this stage, by summing each row and column of the defuzzified matrix, $D$and Rvalues for each factor were obtained. Subsequently, based on the elements $D_i - R_i$and $D_i + R_i$, the intensity of influence and susceptibility for each entry was calculated, thereby providing a basis for decision-making. Finally, the weight of each criterion, according to its level of importance for optimization, entered the TODIM analytical process.

Following the implementation of the described stages, multi-criteria evaluation was conducted through fuzzy inference and binary comparison techniques in order to identify the most probable axial component. As presented in Table 2, the determination of the weights of each axial component constituted the basis for establishing significance within the constructed matrix.

Table 2. Fuzzy TODIM Inference in Determining the Importance of Initial Criteria

	F_1	F_2	⋯	F_n
W_F	W_1	W_2	⋯	W_m
E_1	P_{11}	P_{12}	⋯	P_{1m}
E_2	P_{21}	P_{22}	⋯	P_{2m}
⋮	⋮	⋮	⋮	⋮
E_n	P_{n1}	P_{n2}	⋯	P_{nm}

In this matrix, $m$criteria include $(F_1, \dots, F_m)$, and $n$alternatives include $(E_1, \dots, E_n)$, such that P_{ij}represents the score assigned to the i-th alternative according to the j-th criterion $(F = 1, \dots, m)$. Moreover, $W_F$denotes the importance weight of criterion F. The implementation stages of the fuzzy TODIM inference process can be described in three stages according to Equations (10)–(12).

First, if $P_{ij}$and P_{ji}respectively represent the total scores assigned to research alternatives according to components $(j = 1, \dots, m)$, the relative difference $(P_{ij} - P_{ji})$of the identified criteria must initially be calculated. Therefore, according to Equation (10), $\phi_F(E_i, E_j)$must be computed.

$$\phi_F(E_i, E_j) = \begin{cases} \sqrt{w_F(P_{ij} - P_{ji})}, & (P_{ij} - P_{ji}) > 0 \\ 0, & (P_{ij} - P_{ji}) = 0 \\ -\frac{1}{\theta}\sqrt{\frac{-(P_{ij} - P_{ji})}{w_F}}, & (P_{ij} - P_{ji}) < 0 \end{cases}$$

Equation (10)

Accordingly, θshould be considered the attenuation factor.

Second, the dominance measure of alternative $E_i$over alternative E_j, namely $\delta(E_i, E_j)$, must be calculated according to Equation (11).

$$\delta(E_i, E_j) = \sum_{F=1}^{m} \phi_F(E_i, E_j), \forall(i, j), i \neq j$$

Equation (11)

Finally, the final weights of each identified criterion must be calculated according to Equation (12).

$$w_j = \frac{\delta(E_j)}{\sum_{j=1}^{n} \delta(E_j)}$$

Equation (12)

Accordingly, based on the criteria derived from the grounded theory and Delphi processes, weighting procedures were conducted in this section to answer the second research question of the study. Based on the explanations provided, the fuzzy matrix was first constructed by utilizing the five linguistic expressions presented in Table 1 in order to compare the criteria with one another.

3. Findings and Results

Given the mixed nature of the present study, which aims to obtain research data for presenting the target model and evaluating it within the context of the public sector, the first step involved identifying the strategicization aspects of Six Sigma management accounting processes through grounded theory, as presented in Table 3.

Table 3. Findings from Coding the Criteria Derived from the Strategicization of Six Sigma Management Accounting Processes

Conceptual Themes	Main Components	Categories
Separating major customers from minor customers in subsidiary ledgers	Reengineering the definition of financial account headings	Management strategies
Separating development resources from allocable general/current resources	Reengineering the definition of financial account headings	Management strategies
Separating bank accounts related to resource allocation in recording financial events	Reengineering the definition of financial account headings	Management strategies
Separating the financial scope of accounts based on financial strategies	Reengineering the definition of financial account headings	Management strategies
Separating majority shareholding from minority shareholding in management commentary reports	Reengineering the definition of financial account headings	Management strategies
Determining the procedure for managerial share ownership based on specified measurement criteria	Reconstruction of financial management performance processes	Management strategies
Determining specific managerial rewards based on specified measurement criteria	Reconstruction of financial management performance processes	Management strategies
Determining effective measurement ratios in evaluating financial management performance	Reconstruction of financial management performance processes	Management strategies
Determining time intervals for assigning responsibility to financial departments based on specified measurement criteria	Reconstruction of financial management performance processes	Management strategies
Determining financial policies aligned with core strategies based on specified measurement criteria	Reconstruction of financial management performance processes	Management strategies
Disclosure of transactions with related parties in financial statements	Transaction accounting	Operational strategies
Disclosure of details of partnership contracts in consortium transactions	Transaction accounting	Operational strategies
Disclosure of details of evaluation of investment plans and projects	Transaction accounting	Operational strategies
Disclosure of details related to derivative securities or option transactions	Transaction accounting	Operational strategies
Disclosure of details related to standard parallel salam securities transactions	Transaction accounting	Operational strategies
Presentation of detailed statements of receipts and payments	Receipts and payments accounting	Operational strategies
Presentation of doubtful receivables	Receipts and payments accounting	Operational strategies
Regular presentation of the maturity register of commercial documents	Receipts and payments accounting	Operational strategies
Presentation of documents for all deposits and guarantees received and paid	Receipts and payments accounting	Operational strategies
Presentation of check stubs for issued and cancelled checks as financial evidence and documents	Receipts and payments accounting	Operational strategies
Classification of inventories based on expiration date	Resource procurement accounting	Operational strategies
Classification of goods receipt issuance	Resource procurement accounting	Operational strategies
Classification of documents and records related to the entry and exit of goods from the warehouse	Resource procurement accounting	Operational strategies
Classification of purchase requisition documents	Resource procurement accounting	Operational strategies
Classification of renewable inventory waste in the production line	Resource procurement accounting	Operational strategies
Classification of minimum and maximum reorder points for goods	Resource procurement accounting	Operational strategies
Activity-based costing report	Costing report	Tactical strategies
Target-based costing report	Costing report	Tactical strategies
Product life-cycle-based costing report	Costing report	Tactical strategies
Production-volume-based costing report	Costing report	Tactical strategies
Competitor-performance-based costing report	Costing report	Tactical strategies
Value-chain-based costing report	Costing report	Tactical strategies
Calculating the cost of products relative to the market price desirability ratio	Profit analysis	Tactical strategies

Calculating the production break-even point relative to the market desirability point	Profit analysis	Tactical strategies
Calculating gross profit and comparing it with the market average desirability of the ratio	Profit analysis	Tactical strategies
Calculating return on assets and comparing it with the market average desirability of the ratio	Profit analysis	Tactical strategies
Calculating return on equity and comparing it with the market average desirability of the ratio	Profit analysis	Tactical strategies
Measuring net working capital	Cash flow evaluation	Tactical strategies
Measuring cash flow from financing activities	Cash flow evaluation	Tactical strategies
Measuring cash flow from investing activities	Cash flow evaluation	Tactical strategies
Measuring cash flow in covering debt payments	Cash flow evaluation	Tactical strategies
Measuring cash flow from dividends	Cash flow evaluation	Tactical strategies

The findings obtained from the three stages of open, axial, and selective coding across 14 expert interviews indicate the identification of 315 open codes, 3 structural categories, 8 axial components, and 42 conceptual themes. Given the objective of this study, namely presenting a model for the strategicization of Six Sigma management accounting processes, the validity and reliability of the dimensions had to be assessed through the construct validity index (CVI) and Delphi analysis. To assess validity in the quantitative phase, the construct validity index (CVI) was used. In this method, the axes identified from the qualitative interviews were provided to the experts, as shown in Table 4, and they were asked to evaluate the identified axes based on three indicators: relevance, clarity, and simplicity, in accordance with the research objective.

Table 4. Determining Construct Validity

Identified Axes	Irrelevant	Requires Major Revision	Requires Minor Revision	Completely Relevant	Ambiguous	Requires Major Revision	Requires Minor Revision	Completely Clear	Incomprehensible	Requires Major Revision	Requires Minor Revision	Completely Understandable

The evaluation method for each dimension identified in the qualitative phase was organized such that the percentages of "completely relevant," "completely clear," and "completely understandable" were calculated separately. Accordingly, if each dimension of the identified criteria obtained a score above 70%, its construct validity was confirmed; otherwise, after review and necessary revisions, it was reassessed to obtain an acceptable percentage and be confirmed, or ultimately integrated or modified. Thus, after explaining the objectives and definitions of the identified axes, the experts were asked to evaluate each of them based on the three-part scale of "essential," "useful but not essential," and "not essential." The data calculation method for this validity is also presented in Equation 13:

$$CVI = \frac{n_e - N/2}{N/2}$$

Equation 13

In this equation, $n_e$is the number of experts who selected the "essential" option, and $N$is the total number of experts participating in this validity assessment. According to Equation 13, if fewer than 50% of experts select the essential option for each axis, the CVI value becomes negative; when 50% of experts select the essential option and the other 50% select other options, the CVI value becomes zero. Similarly, when all experts select the essential option, the CVI value equals one. Moreover, if the number of experts selecting the essential option is greater than 50% of the total but does not include all experts, the CVI value is determined between zero and one. Accordingly, Table 5 presents the results related to the evaluation of the construct validity index.

Table 5. Construct Validity Index

Row	Alignment of Identified Components with Selective Categories	CVI Index
1	Definition of account headings	0.76
2	Process recreation	0.73
3	Transaction accounting	0.82
4	Inventory accounting	0.83
5	Receipts/payments accounting	0.80
6	Costing report	0.75
7	Profit analysis	0.81
8	Cash flow evaluation	0.92

On the other hand, in order to assess the reliability of the identified dimensions of Six Sigma management accounting strategies, Delphi analysis had to be used because the measurement instrument for this phenomenon in the quantitative phase was based on matrix-based checklists. Due to its reliance on fuzzy linguistic scales, this process has appropriate validity for generalizing the identified criteria to the study context. Therefore, given the possibility of dispersion in the theoretical perception of the dimensions identified in the qualitative process, fuzzy Delphi analysis was used in this section to determine reliability.

Table 6. Reliability Obtained from Fuzzy Delphi Analysis

Dimension	Component	l	m	u	Definite Value from Defuzzified Mean	Result
Strategicization of Six Sigma management accounting	Definition of account headings	0.71	0.79	0.85	0.76	Confirmed
Strategicization of Six Sigma management accounting	Process recreation	0.75	0.83	0.90	0.80	Confirmed
Strategicization of Six Sigma management accounting	Transaction accounting	0.77	0.85	0.92	0.81	Confirmed
Strategicization of Six Sigma management accounting	Inventory accounting	0.76	0.82	0.88	0.79	Confirmed
Strategicization of Six Sigma management accounting	Receipts/payments accounting	0.79	0.87	0.96	0.85	Confirmed
Strategicization of Six Sigma management accounting	Costing report	0.81	0.89	0.97	0.86	Confirmed
Strategicization of Six Sigma management accounting	Profit analysis	0.69	0.77	0.83	0.73	Confirmed
Strategicization of Six Sigma management accounting	Cash flow evaluation	0.78	0.83	0.89	0.80	Confirmed

Considering that the defuzzified cross-sectional mean of each Six Sigma management accounting strategy was above the threshold of 0.70, it was determined that all 8 criteria identified in the qualitative phase possessed the required reliability. As observed, all conceptual themes derived from the confirmed validity index were also confirmed in terms of reliability, thereby making it possible to present the implementation model of the central phenomenon of the study. Accordingly, the strategicization of Six Sigma management accounting processes was developed according to Figure 1.

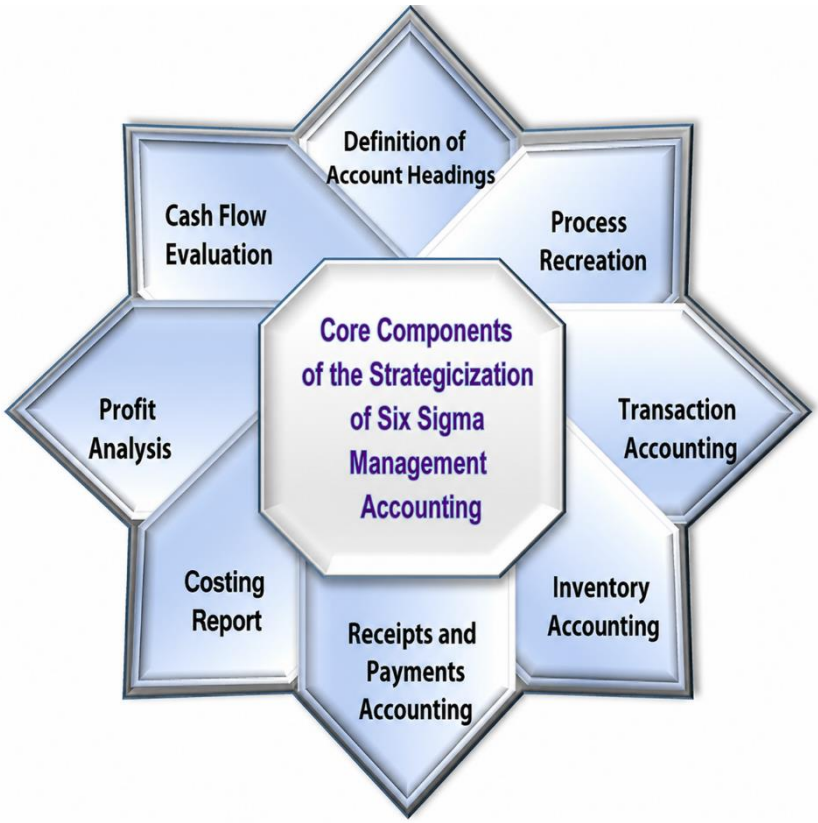

Figure 1. Model for the strategicization of Six Sigma management accounting processes

Accordingly, based on the presented model and the identification of propositional themes derived in line with the axial components, fuzzy TODIM analysis was used to conduct the second phase of the study, namely contextualizing the identified criteria. Therefore, the following 8 axial components were entered into the quantitative analysis process based on their assigned codes.

1: Definition of account headings: B_1
2: Process recreation: B_2
3: Transaction accounting: B_3
4: Inventory accounting: B_4
5: Receipts/payments accounting: B_5
6: Costing report: B_6
7: Profit analysis: B_7
8: Cash flow evaluation: B_8

Subsequently, based on the confirmed reliability of the axial components of the study, and according to the fuzzy process and TODIM logic, the first step involved determining the relative difference between rows and columns in order to optimize the utility of each identified dimension according to the relationships described in this process. In this matrix, as previously explained, $\tilde{x}_{ij} = (l_{ij}, m_{ij}, u_{ij})$represents triangular fuzzy numbers, and $\tilde{x}_{ii} = (i = 1,2,3, \dots, n)$is considered as the fuzzy number $(0, 0, 0)$. To incorporate the opinions of all experts, the arithmetic mean was calculated according to Equation 14.

$$\tilde{z} = \frac{\tilde{x}^1 \oplus \tilde{x}^2 \oplus \tilde{x}^3 \oplus \cdots \oplus \tilde{x}^p}{p}$$

Equation 14

In this formula, $p$represents the number of experts, and $\tilde{x}^1$, $\tilde{x}^2$, and $\tilde{x}^p$respectively represent the pairwise comparison matrix of each research participant. Moreover, $\tilde{z}$is a triangular fuzzy number in the form of $\tilde{z}_{ij} = (l'_{ij}, m'_{ij}, u'_{ij})$. Therefore, the results obtained from this stage are presented in Table 7.

Table 7. Direct Fuzzy Matrix among Dimensions

Axial Components	$i$to j	Definition of Account Headings $B_1 l$	$B_1 m$	$B_1 u$	⋯	Cash Flow Evaluation $B_8 l$	$B_8 m$	$B_8 u$
Definition of account headings	B_1	0.000	0.000	0.000	⋯	0.608	0.719	0.887

…	⋮	…	…	…	⋮	…	…	…	
Cash flow evaluation	B_8	0.613	0.811	0.921	⋯	0.000	0.000	0.000	

After determining the weights obtained from Table 7, Equations 15 and 16 were used to normalize the study matrix.

$$\tilde{H}_{ij} = \frac{\tilde{z}_{ij}}{r} = \left(\frac{l'_{ij}}{r}, \frac{m'_{ij}}{r}, \frac{u'_{ij}}{r}\right) = (l''_{ij}, m''_{ij}, u''_{ij})$$

Equation 15

where $r$is obtained from the following equation:

$$r = \max_{1 \le i \le n} \left(\sum_{j=1}^{n} u_{ij}\right)$$

Equation 16

Table 8. Normalized Relationship Matrix of the Research Criteria

Axial Components	$i$to j	Definition of Account Headings $B_1 l$	$B_1 m$	$B_1 u$	⋯	Cash Flow Evaluation $B_8 l$	$B_8 m$	$B_8 u$
Definition of account headings	B_1	0.000	0.000	0.000	⋯	0.103	0.111	0.112
…	⋮	…	…	…	⋮	…	…	…
Cash flow evaluation	B_8	0.041	0.10	0.11	⋯	0.000	0.000	0.000

Subsequently, matrix $\tilde{T}$was calculated by obtaining the sums of the rows and columns. The row and column sums were calculated according to Equations 17 and 18.

$$\tilde{D} = (\tilde{D}_i)_{n\times 1} = \left[\sum_{j=1}^{n} \tilde{T}_{ij}\right]_{n\times 1}$$

Equation 17

$$\tilde{R} = (\tilde{R}_i)_{1\times n} = \left[\sum_{i=1}^{n} \tilde{T}_{ij}\right]_{1\times n}$$

Equation 18

In these equations, $\tilde{D}$and $\tilde{R}$are respectively $n \times 1$and $1 \times n$matrices. In the next step, the importance of the dimensions $(\tilde{D}_i + \tilde{R}_i)$and the relationship between criteria $(\tilde{D}_i - \tilde{R}_i)$were determined. If $\tilde{D}_i - \tilde{R}_i > 0$, the corresponding criterion is influential; if $\tilde{D}_i - \tilde{R}_i < 0$, the corresponding criterion is influenced. Table 9 presents $\tilde{D}_i + \tilde{R}_i$and $\tilde{D}_i - \tilde{R}_i$.

Table 9. Importance and Influence of the Dimensions

Determined Dimensions	Component	B	$\tilde{D}$	$\tilde{R}$	$\tilde{D}+\tilde{R}$	$\tilde{D}-\tilde{R}$	Result	Ranking
Determined dimensions	Definition of account headings	B1	5.116	4.705	9.821	0.411	Effect	Third
Determined dimensions	Process recreation	B2	6.103	5.564	11.667	0.539	Effect	Second
Determined dimensions	Transaction accounting	B3	4.938	5.342	10.280	-0.404	Cause	Fifth
Determined dimensions	Inventory accounting	B4	3.914	4.078	7.992	-0.164	Cause	Third
Determined dimensions	Receipts/payments accounting	B5	5.098	5.316	10.414	-0.218	Cause	Fourth
Determined dimensions	Costing report	B6	4.101	5.229	9.330	-1.128	Cause	Seventh
Determined dimensions	Profit analysis	B7	7.228	6.351	13.579	0.877	Effect	First
Determined dimensions	Cash flow evaluation	B8	4.444	5.327	9.771	-0.883	Cause	Sixth

The computational outcome of this table evaluates the sum $\tilde{D} + \tilde{R}$as the degree of influence among factors, while the difference $\tilde{D} - \tilde{R}$is interpreted as the degree of susceptibility of factors to one another. Accordingly, if the net influence of a factor is positive, that factor is influential; if it is negative, the factor is influenced. The greater the value of $\tilde{D} + \tilde{R}$for a factor, the more important that factor is considered. The axial component of profit analysis, $B7$, due to the total matrix scores, is the most important factor in the strategicization of Six Sigma management accounting processes within capital market companies, as it can contribute to the sustainability of financial services provided to users of information.

4. Discussion and Conclusion

The present study aimed to identify and evaluate the core dimensions of the theoretical framework for implementing Six Sigma management accounting within the context of capital market companies through grounded theory and fuzzy TODIM analysis. The findings of the qualitative phase

indicated that the strategicization of Six Sigma management accounting consists of three structural categories, including management strategies, operational strategies, and tactical strategies, which collectively encompassed eight axial components and forty-two conceptual themes. Furthermore, the results of the fuzzy TODIM analysis demonstrated that the "profit analysis" component (B_7) was identified as the most influential and important dimension in the strategicization of Six Sigma management accounting processes. In contrast, components such as costing reports and cash flow evaluation demonstrated lower levels of strategic influence compared with profit analysis and process recreation dimensions. Overall, the findings suggest that the strategicization of Six Sigma management accounting is fundamentally dependent upon the integration of financial analysis, process-oriented accounting systems, operational transparency, and strategic performance evaluation mechanisms.

One of the principal findings of the study was the identification of management strategies as foundational dimensions of Six Sigma management accounting. Components such as the reengineering of financial account headings and the reconstruction of financial management processes indicated that strategic accounting systems must extend beyond traditional recording and reporting functions and instead support organizational strategy implementation. This finding is consistent with the configurational perspective proposed by [1], who emphasized that strategic management accounting practices become effective when integrated with organizational change processes and business strategy alignment. Similarly, the findings support the arguments of [2], who demonstrated that strategic management accounting dimensions significantly improve organizational performance through the mediating role of management accounting practices. The present study further expands this perspective by demonstrating that Six Sigma methodologies provide the operational and analytical infrastructure necessary for strengthening the strategic functionality of accounting systems.

The identification of process recreation as one of the major dimensions of Six Sigma management accounting also highlights the significance of continuous improvement and process redesign within financial management systems. The findings suggest that organizations seeking strategic accounting excellence must redesign financial management responsibilities, managerial ownership procedures, and performance evaluation mechanisms according to measurable strategic indicators. These results are aligned with Lean Six Sigma literature emphasizing process standardization, waste reduction, and operational optimization as key determinants of organizational effectiveness [6, 8]. Furthermore, studies investigating Lean Six Sigma implementation within industrial and manufacturing settings have shown that process recreation substantially contributes to productivity enhancement and organizational performance improvement [10, 21]. The present study extends these findings into the accounting and financial domain by demonstrating that strategic financial processes can similarly benefit from Six Sigma-oriented redesign mechanisms.

Another important finding of the study was the central role of transaction accounting, inventory accounting, and receipts/payments accounting within the operational strategy category. The identified conceptual themes emphasized transparency in financial disclosure, classification of accounting information, disclosure of investment-related transactions, and systematic management of financial documents and inventory processes. These findings support prior research suggesting that strategic management accounting systems require transparent and integrated operational accounting infrastructures capable of facilitating strategic monitoring and organizational accountability [15]. Moreover, the findings are consistent with the observations of [3], who argued that external organizational environments significantly influence strategic management accounting practices and require organizations to adopt more adaptive and transparent accounting systems. The integration of Six Sigma principles into these accounting domains may therefore contribute to reducing financial inefficiencies, minimizing procedural errors, and improving operational reliability.

The findings related to inventory accounting and resource procurement accounting are particularly important because they demonstrate the strategic role of accounting systems in supply chain coordination and operational sustainability. The classification of inventory based on expiration dates, reorder points, and warehouse documentation indicates that accounting systems are increasingly expected to support operational decision-making processes beyond purely financial reporting activities. This result aligns with the findings of [9], who emphasized that Lean Six Sigma contributes significantly to sustainable supply chain management and operational integration within manufacturing environments. Furthermore, the strategic significance of inventory-related accounting dimensions is reinforced by studies emphasizing the role of operational

information systems in supporting organizational competitiveness and strategic adaptability [17]. Therefore, integrating Six Sigma methodologies into inventory and procurement accounting systems may enhance both operational efficiency and strategic coordination.

The study also identified costing reports as one of the major tactical dimensions of Six Sigma management accounting. Components such as activity-based costing, lifecycle costing, target costing, and value-chain costing demonstrated the strategic importance of cost information in organizational decision-making processes. These findings are consistent with strategic management accounting literature emphasizing that advanced costing systems support organizational competitiveness, strategic pricing decisions, and performance optimization [12]. Furthermore, the findings align with [4], who argued that strategic orientation dimensions significantly affect the effectiveness of management accounting techniques in enhancing organizational sustainability. The current study contributes to this literature by demonstrating that Six Sigma methodologies can strengthen the analytical and strategic capacities of costing systems through systematic performance measurement and process evaluation mechanisms.

Among all identified dimensions, profit analysis (B_7) emerged as the most influential and strategically important component within the fuzzy TODIM analysis. This finding indicates that organizations primarily evaluate the effectiveness of Six Sigma management accounting systems according to their ability to optimize profitability, improve financial returns, and support market-oriented financial performance evaluation. The emphasis on profit analysis is theoretically consistent with studies demonstrating the relationship between strategic management accounting and organizational performance enhancement [2]. Moreover, the findings correspond with research emphasizing the strategic significance of competitive financial performance indicators, including return on assets, return on equity, and profitability ratios [16]. The prominence of profit analysis within the current study suggests that Six Sigma accounting systems are fundamentally perceived as mechanisms for improving financial sustainability and market competitiveness through data-driven strategic analysis.

The importance of profit analysis can also be interpreted within the broader context of organizational competitiveness and strategic orientation. Studies have demonstrated that organizations characterized by strong strategic orientations tend to achieve superior financial and operational performance outcomes [20]. Similarly, research investigating strategic configurations and accounting systems has emphasized the importance of aligning managerial information systems with organizational strategic objectives [14]. The findings of the present study indicate that profit analysis functions as a strategic integrator connecting operational efficiency, accounting transparency, and financial sustainability. Consequently, organizations adopting Six Sigma management accounting may enhance their competitiveness by improving analytical precision, optimizing financial performance indicators, and strengthening strategic responsiveness.

The findings related to cash flow evaluation also reveal important implications regarding financial sustainability and organizational stability. Measuring working capital, financing cash flows, investment cash flows, and debt coverage capacities reflects the increasing importance of liquidity management and financial resilience within strategic accounting systems. This result is consistent with studies highlighting the role of financial management systems in supporting organizational competitiveness and strategic continuity [28]. Furthermore, the integration of Six Sigma methodologies into cash flow evaluation processes may facilitate more accurate financial forecasting, risk assessment, and strategic financial planning. The emphasis on cash flow management also aligns with the findings of [19], who demonstrated that Lean Six Sigma implementation in financial services significantly improves organizational performance and operational stability.

Methodologically, the use of grounded theory and fuzzy TODIM analysis represents another important contribution of the study. The grounded theory approach enabled the identification of conceptual themes and strategic dimensions directly from expert experiences and organizational realities, thereby strengthening the contextual relevance of the proposed framework. This methodological orientation is consistent with interpretive qualitative approaches emphasizing participant-centered conceptual construction [24]. Moreover, the application of fuzzy TODIM analysis allowed the study to address uncertainty and linguistic ambiguity within strategic decision-making processes. Prior studies have similarly emphasized the effectiveness of fuzzy TODIM methodologies in evaluating complex organizational phenomena and multi-criteria decision-making problems [25-27]. Therefore, the integration of grounded theory and fuzzy decision-making methods provided a rigorous analytical framework for evaluating the strategic dimensions of Six Sigma management accounting.

The findings also support broader theoretical arguments concerning the increasing integration of accounting systems with organizational strategy and operational excellence frameworks. Studies examining the adoption of strategic management accounting techniques have shown that organizational culture, governance systems, and information technologies significantly influence implementation effectiveness [5, 13]. The present study demonstrates that Six Sigma management accounting should similarly be viewed as an integrated organizational system requiring strategic alignment, managerial commitment, and operational coordination. Furthermore, the findings reinforce the argument that accounting systems can no longer function merely as financial reporting mechanisms but must instead serve as strategic infrastructures supporting organizational learning, process optimization, and sustainable competitive advantage.

The results of the study collectively indicate that the strategicization of Six Sigma management accounting provides organizations with an integrated framework capable of linking operational excellence, financial transparency, and strategic performance management. By integrating strategic management accounting techniques with Six Sigma methodologies, organizations may strengthen process quality, enhance financial sustainability, improve managerial decision-making, and increase organizational competitiveness. Consequently, the proposed framework contributes both theoretically and practically to the growing literature on strategic accounting systems and process-oriented management methodologies.

One of the limitations of the present study relates to the contextual scope of the research population, which was restricted to capital market companies and experts with specialized knowledge in management accounting and financial systems. Consequently, the findings may not be fully generalizable to organizations operating in different industrial sectors or institutional environments. Another limitation concerns the qualitative nature of the grounded theory phase, which relied on interpretive perspectives and expert experiences that may involve subjective interpretations. In addition, the use of matrix-based fuzzy evaluations in the quantitative phase may have been influenced by the perceptual and cognitive differences among participants despite efforts to ensure reliability and validity.

Future research may investigate the applicability of the proposed Six Sigma management accounting framework within different organizational contexts such as manufacturing industries, healthcare institutions, banking systems, and public-sector organizations. Researchers may also examine the moderating roles of organizational culture, technological infrastructure, digital transformation, and leadership styles in the successful implementation of Six Sigma management accounting systems. Furthermore, future studies could employ structural equation modeling or longitudinal research designs to examine the causal relationships between Six Sigma management accounting dimensions and organizational performance indicators over time. Comparative studies between organizations with different strategic orientations or governance structures may also provide deeper insights into the contextual effectiveness of Six Sigma management accounting frameworks.

From a practical perspective, organizations should prioritize the integration of strategic management accounting systems with continuous improvement methodologies such as Six Sigma in order to strengthen financial sustainability and organizational competitiveness. Financial managers and accounting executives should redesign accounting structures according to strategic performance indicators and process-oriented analytical systems. Organizations should also invest in training programs, integrated information systems, and process optimization mechanisms that support the implementation of Six Sigma accounting practices. Moreover, managers should emphasize profit analysis, process recreation, and strategic costing systems as central dimensions of organizational decision-making in order to improve operational efficiency, transparency, and long-term strategic adaptability.

Authors' Contributions

Authors equally contributed to this article.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in this study were under the ethical standards.

References

[1] N. M. Alsharari, "The Interplay of Strategic Management Accounting, Business Strategy and Organizational Change: As Influenced by a Configurational Theory," *Journal of Accounting & Organizational Change,* vol. 20, no. 1, pp. 153-176, 2024, doi: 10.1108/JAOC-09-2021-0130.

[2] N. Nuhu, K. Baird, and X. Su, "The Impact of Strategic Management Accounting (SMA) Facets on Organisational Performance: The Mediating Role of the Use of SMA Practices," *Meditari Accountancy Research,* vol. 33, no. 1, pp. 247-271, 2025, doi: 10.1108/MEDAR-05-2024-2481.

[3] M. Rashid, D. Mahboob Hossain, and S. Alam, "The External Organizational Environment and Its Impact on Strategic Management Accounting Practices: An Empirical Investigation," *Asian Review of Accounting,* vol. 32, no. 4, pp. 646-666, 2024, doi: 10.1108/ARA-02-2023-0041.

[4] F. Sabzalipour, A. Sayadi-Somar, S. Shahmohammadi, and Z. Fazlali, "Examining the Role of Strategic Orientation Dimensions in the Effectiveness of Management Accounting Techniques on Corporate Sustainability," *Journal of Management Accounting,* vol. 16, no. 57, pp. 92-109, 2023.

[5] H. Kordani, M. Khalilpour, J. Ramezani, S. J. Ebrahimian, and A. Fallah, "Examining the Effect of Strategic Management Accounting on Accounting Information System Performance with the Moderating Role of Corporate Governance System Requirements," *Journal of Management Accounting,* vol. 17, no. 60, pp. 125-146, 2024.

[6] R. D. Snee, "Lean Six Sigma: Getting Better All the Time," *International Journal of Lean Six Sigma,* vol. 1, no. 1, pp. 9-29, 2010, doi: 10.1108/20401461011033130.

[7] V. Raja Sreedharan and R. Raju, "A Systematic Literature Review of Lean Six Sigma in Different Industries," *International Journal of Lean Six Sigma,* vol. 7, no. 4, pp. 430-466, 2016, doi: 10.1108/IJLSS-12-2015-0050.

[8] A. S. Patel and K. M. Patel, "Study on Lean Six Sigma Methodology from the Indian Context: An Investigation of Literature," *International Journal of Lean Six Sigma,* vol. ahead-of-print, no. ahead-of-print, 2024, doi: 10.1108/IJLSS-11-2021-0199.

[9] A. Aruleswaran, J. Muraliraj, and S. Zailani, "Lean Six Sigma and Sustainable Supply Chain Management: A Case Study in Electric Vehicle Parts Manufacturing," *International Journal of Lean Six Sigma,* vol. 2, no. 4, pp. 1-19, 2025, doi: 10.1108/IJLSS-04-2024-0069.

[10] F. Carneiro, G. Rodrigues, A. M. Carvalho, and B. Moreira, "Improving Cheese Production Capacity in a Dairy Company: A Lean Six Sigma Approach for Enhanced Efficiency and Performance," *International Journal of Lean Six Sigma,* vol. 3, no. 1, pp. 81-110, 2025, doi: 10.1108/IJLSS-11-2023-0194.

[11] A. D. Li, Y. Zhang, M. Zhang, and F. Meng, "Quality Improvement of Magnetron in Company T Based on Six Sigma," *International Journal of Lean Six Sigma,* vol. 16, no. 1, pp. 89-108, 2025, doi: 10.1108/IJLSS-03-2022-0062.

[12] P. M. Madhani, "Lean Six Sigma in Finance and Accounting Services for Enhancing Business Performance," *International Journal of Service Science, Management, Engineering, and Technology,* vol. 12, no. 6, pp. 141-165, 2021, doi: 10.4018/IJSSMET.2021110109.

[13] M. Nazaripour and A. Heydari, "Examining Factors Affecting the Adoption of Strategic Management Accounting Techniques with Emphasis on Contingency and Control Variables," *Accounting and Auditing Review Quarterly,* vol. 31, no. 118, pp. 733-762, 2024.

[14] S. D. Sbarba, "Strategic Configurations and Strategic Management Accounting: A Longitudinal Case Study in the Credit Mediation Industry," *Journal of Accounting & Organizational Change,* vol. 20, no. 6, pp. 277-305, 2024, doi: 10.1108/JAOC-04-2024-0118.

[15] K. Khodabakhshi-Parijan, S. Zarei, and S. Nouri, "The Role of Management Accountants in Strategic Management Accounting Implementation Practices: The Role of Organizational Culture and Information Systems," *Capital Market Analysis,* vol. 2, no. 1, pp. 161-193, 2022.

[16] M. Moradi and S. Sepahvandi, "The Effect of Competitive Strategies on the Sustainability of Financial Performance and Risk," *Financial Accounting Research,* vol. 7, no. 3, pp. 75-90, 2015.

[17] H. C. Lin and P. C. Lin, "The Interplay between CEO-TMT Exchange Level and Differentiation: Implications for Firm Competitive Behaviors and Performance," *Journal of Business Research,* vol. 95, no. 3, pp. 171-181, 2019.

[18] V. M. Sunder and J. Antony, "Six Sigma for Improving Top-Box Customer Satisfaction Score for a Banking Call Centre," *Production Planning and Control,* vol. 26, no. 16, pp. 1291-1305, 2015, doi: 10.1080/09537287.2015.1021879.

[19] A. Vashishth, B. A. Lameijer, A. Chakraborty, J. Antony, and J. Moormann, "Implementing Lean Six Sigma in Financial Services: The Effect of Motivations, Selected Methods and Challenges on LSS Program and Organizational Performance," *International Journal of Quality & Reliability Management,* vol. 41, no. 2, pp. 509-531, 2024, doi: 10.1108/IJQRM-05-2022-0154.

[20] W. Wales, T. Beliaeva, G. Shirokova, T. R. Stettler, and V. K. Gupta, "Orienting toward Sales Growth? Decomposing the Variance Attributed to Three Fundamental Organizational Strategic Orientations," *Journal of Business Research,* vol. 3, no. 2, pp. 1-29, 2018, doi: 10.1016/j.jbusres.2019.09.022.

[21] H. Araman and Y. Saleh, "A Case Study on Implementing Lean Six Sigma: DMAIC Methodology in Aluminum Profiles Extrusion Process," *The TQM Journal,* vol. 35, no. 2, pp. 337-365, 2023, doi: 10.1108/TQM-05-2021-0154.

[22] D. Trwana, "Paving the Way to Six Sigma Success: The Critical Factors That Define Excellence," *Human Resource Management International Digest,* vol. 3, no. 5, pp. 43-46, 2025, doi: 10.1108/HRMID-07-2025-0190.

[23] V. M. Sunder, "Lean Six Sigma Project Management: A Stakeholder Management Perspective," *The TQM Journal,* vol. 28, no. 1, pp. 132-150, 2016, doi: 10.1108/TQM-09-2014-0070.

[24] E. Scheibelhofer, "The Interpretive Interview: An Interview Form Centring on Research Participants' Constructions," *International Journal of Qualitative Methods,* vol. 4, no. 1, pp. 56-79, 2023, doi: 10.1177/16094069231168748.

[25] R. A. Krohling and T. T. de Souza, "Combining Prospect Theory and Fuzzy Numbers to Multi-Criteria Decision Making," *Expert Systems with Applications,* vol. 39, no. 13, pp. 11487-11493, 2012.

[26] J. Tang, X. Liu, and W. Wang, "A Hybrid Risk Prioritization Method Based on Generalized TODIM and BWM for Fine-Kinney under Interval Type-2 Fuzzy Environment," *Human and Ecological Risk Assessment: An International Journal,* vol. 2, no. 2, pp. 1-26, 2020.

[27] S. Xian, W. Wan, and Z. Yang, "Interval-Valued Pythagorean Fuzzy Linguistic TODIM Based on PCA and Its Application

for Emergency Decision," *International Journal of Intelligent Systems,* vol. 35, no. 12, pp. 2049-2086, 2020.
[28] A. Bodnaruk, W. O'Brien, and A. Simonov, "Captive Finance and Firm's Competitiveness," *Journal of Corporate Finance,* vol. 37, no. 3, pp. 210-228, 2016.
[29] H. Ebrahimi, M. Ebrahimpour, and M. Moradi, "Modeling the Evaluation of the Impact of Lean-Agile Activities on Firm Performance Using Bayesian Belief Network-Based Scenario Analysis," *Industrial Technology Development Quarterly,* vol. 18, no. 41, pp. 27-42, 2020.