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RESEARCH ARTICLE

Systematic Review of the Factors Influencing Cognitive Management Control Systems: A Meta-Synthesis Approach

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Abstract

During the Industrial Revolution and the era of scientific management, the primary role of management accounting focused on cost calculation and reduction. Therefore, Management Control Systems (MCS) were designed and implemented mechanically. However, with the shift to strategic management accounting, MCS has significantly evolved. In order to manage high levels of uncertainty and complex cognitive processes, cognitively-oriented MCS are required. This study aims to conduct a systematic review of prior research to identify key factors influencing cognitive MCS, employing a meta-synthesis approach. A total of 102 articles published in international journals between 2000 and 2024 were analyzed through content analysis. The findings identify six major categories influencing cognitive MCS: (1) dynamic cognitive capabilities, (2) cognitive awareness control, (3) individual-organization fit control, (4) cognitive futures research, (5) behavioral and cultural control, and (6) cognitive competencies. As a result, a comprehensive cognitive analysis is required prior to the implementation of MCS in order to understand the causal relationships between the different components of the system. Aligning the CEO's incentives with stakeholders' goals is also essential. As a result, MCS provides critical information to managers, helping them execute their responsibilities and helping organizations maintain long-term behavioral patterns. After reviewing all of the pertinent literature on MCS in strategic management accounting, the results of the meta-synthesis provide a thorough comprehension of the topic. A comprehensive framework to address the multi-dimensional view prevalent in modern management accounting systems is presented in this meta-synthesis, which can be applied to the implementation of strategic management accounting systems in dynamically changing economic conditions.



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1. Introduction

Changing markets, changing customers, and changing behaviors make businesses dynamic. Management control, as a support function of management, is also subject to continuous change. While the basic management accounting and control concepts and instruments will not lose their relevance in the future, new problems will require new solutions ([Charifzadeh and Taschner, 2017](#)).

The difficulty for organizations is to effectively explore new market prospects while also efficiently utilizing existing tactics. Concepts like strategic control, interactive control systems, and strategic foresight have drawn a lot of attention to this dichotomy in the literature on management control. Traditionally, however, research on management control systems (MCS) has primarily focused on supporting the exploitation of established strategies ([Dávila et al., 2024](#)). Management accounting systems (MASs) give managers data that they can use for planning and control, and management control is just one of many terms for the same thing: collecting, preparing, processing, analyzing, and reporting both financial and non-financial information to managers ([Chenhall, 2003](#)). Information should be relevant and designed to support decision-making within the firm (Kaplan, 1998). Based on Chenhall (2003), MASs are systems of using MA practices (e.g., budgeting and product costing) to reach a goal, and MCS include MASs together with other types of control, such as personal control. Management control takes the perspective of managers and is concerned with driving firms towards the achievement of organizational objectives. It relates to two main issues: design of the information and responsibility system of the operating activities (information issues) and the behavioral concerns of motivating managers and employees to achieve organizational goals (cognitive issues) ([Zanin et al., 2017](#)). This study aims to systematically analyze the literature on MCSs and cognitive issues to identify studies that link both fields and to provide a state of the art and a framework for the analysis and identification of future research opportunities.

In management control systems, control processes and mechanisms are employed to ensure that the organization achieves its predetermined goals and objectives ([Jukka, 2023](#)). There is substantial literature proposing various frameworks for MCSs ([Bedford et al., 2016](#); [Ferreira and Otley, 2009](#); [Malmi and Brown, 2008](#)). These frameworks are aimed at the study of the individual parts and characteristics of a single MCS ([Jukka, 2023](#)). [Chenhall and Moers \(2015\)](#), [Ghodrat Abadi et al. \(2022\)](#), [Matsuo et al. \(2021\)](#), and [Lewandowski \(2023\)](#) all examine management control systems in relation to the development of management accounting and the interactive and dynamic use of control mechanisms to shape individual performance. A more dynamic and open management accounting system has evolved from its traditional, cybernetic roots of controlling mechanisms within closed systems. In this way, modern systems provide a foundation for enabling innovation, while recognizing organizational complexity and promoting responsiveness.

There has been a renaissance in management control and accounting as of late, with several different theoretical frameworks being presented for MCS. Despite the substantial contributions to the literature from various published frameworks like the performance management and control framework ([Ferreira and Otley, 2009](#)) or more generalized ideas of management control systems (MCS), none of these current conceptualizations adequately address the present demands of management control by taking into account the viewpoints of the many different actors and stakeholders involved ([Malmi and Brown, 2008](#)).

Few studies have looked at what factors affect management control systems, despite the large body of literature on management accounting in the nation. However, companies need a strong management control system that can help them implement strategic management accounting programs. This system should be able to bridge the gap between strategy creation and planning. This study aims to explore and identify the key factors that influence cognitive management control systems.

It is important to note that a management control system cannot be transferred from one environment to another without careful consideration of the strategic management accounting issues involved. Each control and accounting system is designed to meet the specific strategic and operational needs of a particular company. Planning the installation of a management control system necessitates, therefore, familiarity with the selected strategic management accounting framework. Individuals in organizations, according to Simons's theory, are complex social systems that must balance their own interests with those of the organization while also contending with the influence of group norms and power dynamics. Control must balance internal contradictions like freedom versus constraints, employee autonomy versus responsibility, Learning versus control, Advice/support versus prohibitions, Motivation versus coercion, and innovation/experimentation versus efficiency (Lewandowski, 2023).

Lewandowski (2023) interprets these tensions as tensions between short- and long-term policies, as well as between top-down and bottom-up strategies (emergent strategies). An MCS is a framework used by organizations to define, monitor, and evaluate employee performance to foster a culture of optimal productivity aligned with the company's goals. According to Merchant and Van der Stede (2024), MCS places a high value on collaborative teamwork, and it ensures that all employees work cooperatively towards shared goals. These systems can be categorized based on the nature of the information they provide, namely as financial or non-financial control systems. Financial control systems, on the one hand, provide invaluable information for analyzing costs, managing cash flow, and improving a company's efficiency. In contrast, non-financial control systems are useful for identifying emerging market segments, forecasting sales, and engaging in competitor accounting.

Managers may evaluate competitive positioning differently even under comparable situations. MCS can influence their risk preferences by modifying their cognitive frameworks (Bhimani, 2012). In terms of how it thinks, acts, and designs its control systems, every company has its own logic. However, most of the previous research has ignored organizational learning, procedures, and practices in the context of cross-organizational information flows and coordination in favor of studying formal organizational structures. Adaptable methods of action are necessary for accounting, reporting, and control systems to integrate and balance various institutional logics in the face of conflicting social and instrumental demands (Agarwal et al., 2024). Management accounting is undergoing a period of transition as a result of the following factors: the ever-changing nature of information; the evolution of the concept of an organization from a "system" to an "organism" and finally to a "human being"; and the ever-changing environments in which these entities operate.

Emergent causality is replacing linear causality in strategic management accounting tools. This means that the focus is no longer solely on simple, predetermined relationships, but rather on complex, feedback-driven, and unpredictable reciprocal influences over time. Meaning-making within management control systems is based on an understanding of human behavior and thought in this new approach. This implies that control systems are no longer limited to financial numbers and data; instead, they emphasize how individuals and groups perceive, interpret, and react to organizational information and goals. This shift in perspective highlights the need for a deeper understanding of the human and cognitive dimensions in the control and management processes of today's complex organizations.

One of the key challenges impacting both financial and non-financial domains involves cognitive issues.

Management accounting techniques can be more effectively used, and value generation can be enhanced by attending to these often-intangible cognitive elements that impact MCS. The aims of the company, the management, and the employees themselves are in a constant state of dialectical

conflict, but this helps bring them into harmony. This method takes into account the fact that people's perceptions, interpretations, and processing of data have a significant bearing on the efficiency of control systems and, by extension, the accomplishment of organizational goals. Management control systems (MCS) and management accounting have both been the subject of substantial research, but most of that research has concentrated on the behavioral components of MCS. Nevertheless, there has been little research into MCS that takes a cognitive viewpoint. This work intends to fill that void by offering fresh perspectives to the field through a thorough analysis of the differences between conventional MCS and cognitively-based MCS.

In an era when management control is expected to replace direct instructions in guiding the actions of an increasing proportion of the workforce at ever lower hierarchical levels, and more remotely from top management, managers and coworkers will be expected to interact more frequently. Insufficient focus on management control systems is the main cause of this issue. These systems are crucial for making the goals of management and strategic accounting a reality. MCS are therefore operational procedures that link management accounting strategy creation and program implementation. Conducting a meta-synthesis-based systematic review of the literature on cognitively informed management control systems is the principal objective of the current work. The design and evaluation of MCS remain largely unexplored, despite the fact that previous studies have shed light on management systems and strategy. Rather than focusing on strategy formulation, many organizations struggle with strategy implementation due to the lack of adequate consideration of environmental context while implementing models in strategic management accounting. Cognitive management control systems emerge as a solution, bridging the gap between management control, strategic planning, and operational control.

Despite substantial studies in management accounting and management control systems (MCS), existing studies have predominantly concentrated on the behavioral dimensions of MCS, resulting in a lack of thorough cognitive analysis. As a result of this study, a new understanding of the differences between classic MCS and cognitively-based MCS is provided. Moreover, as MCS are progressively anticipated to direct workforce operations across diverse hierarchical tiers, supplanting direct directions, the significance of reciprocal interaction between managers and colleagues intensifies. This problem happens a lot because people do not pay enough attention to MCS, which are very important for turning management and strategic accounting goals into real actions. Therefore, MCS serve as operational tools for planning and implementing management accounting strategies. The primary aim of this study is to conduct a systematic review of the literature on cognitively informed management control systems using a meta-synthesis method.

This study is structured as follows: In the first part of the paper, we present an overview of MCS and the gap in research that exists. The second section provides the theoretical foundations of MCS and its connection to cognitive issues. Next, the research methodology is discussed, including the research question and the qualitative meta-synthesis approach employed in this study. Finally, the analysis and findings are presented in detail across six dimensions.

2. Literature review

There are many management control systems in organizations, including strategic planning, budgeting, resource allocation, performance measurement, incentive systems, and responsibility centers. Merchant and Van der Stede (2024) say that managers use MCS to make sure that their employees' actions and choices are in line with the company's goals and strategies. Specifically, MCS provides information that is useful to managers in carrying out their tasks and helps organizations develop and maintain consistent behavioral patterns (Otley, 1999).

Most of the time, MCS are described as "formal, information-based routines and procedures that

managers use to keep or change patterns in the way the organization works." A large amount of previous work in the field of management control has concentrated on determining what variables impact the implementation and development of MCS. Internal considerations can include things like the nature of the company, its focus on strategy, and its financial framework. Conversely, changes in contextual or external conditions, which are often exogenously imposed, also have significant implications for the configuration of control systems. According to Antonini and Gómez-Conde (2024), these outside forces might take many forms, such as changes in the economy, new regulations, or shifting expectations from stakeholders.

Formal processes like rules, regulations, policies, and established procedures are not sufficient to attain effective control in organizations. In many cases, actual control over employee performance and behavior is exercised through informal mechanisms such as organizational culture, shared values, behavioral norms, and human interactions. Traditional management control models and routines for protecting the company often make it hard for managers to deal with strategic issues in a good way. Instead of giving us useful information, these models often lead to long-winded SWOT studies and plans that we never follow through on. It is possible to make strategic judgments but never put them into action, showing that there is a gap between the two. Cognitivism has changed the way we look at organizations by moving us away from mechanistic approaches and toward systemic thinking. This means that we look at how different parts of a system interact and depend on each other to get a better picture of how organizations behave and develop. With the new way of thinking about systems, the whole thing was seen as a system, and its parts were seen as subsystems inside it. A system was regarded as a component of a broader supra-system, its environment. Components were no longer only added together; they worked together, which led to the realization that the whole was greater than the sum of its parts. From studying individual parts or entities, the focus shifted to studying how subsystems interact with each other, and how systems interact with each other. A fundamental aspect of this thinking is the assignment of different levels of existence to phenomena. A subsystem is seen as a subsystem of a system, a system as a subsystem of a system, and a system as a subsystem of a supra-system. The phenomenon is unique at each level and necessitates a separate form of comprehension (Stacey, 2007).

Behavioral control is the first step in establishing control inside MCS. The term "control" is used to describe a system that managers put in place to make sure employees operate in the right way. There are three main kinds of controls: behavioral, cultural, and results. The result control system focuses on rewards and sanctions, motivating employees to meet expected outcomes. Behavioral control is used to ensure consistency between employee actions and organizational expectations. Behavioral control is the fundamental building block of MCS control. By definition, a control is "a system encompassing all actions taken to ensure proper behaviors" in management. There are usually three kinds of controls: behavioral, cultural, and results. Rewards and penalties are the backbone of outcome control, which in turn motivates workers to aim for predetermined outcomes by drawing their attention to the effects of their actions. Accordingly, the central role of cognition is to support and enhance the capacity to control actions, thereby enabling the creation of integrated knowledge and consistent perceptions within cognitive systems of action and interpretation.

The first step to establishing a robust MCS is to comprehend and conceptualize its mechanisms. The first step is determining whether organizational members understand the suggestions and intentions of management accountants in the context of control systems. The second step involves assessing whether this understanding has evolved into a shared conceptualization. This shared understanding must be translated into action in the third step.



Figure 1. A pragmatist approach (Adapted from Engel et al, 2016).

Organizational programs' perceived success or failure is often attributed to employees' views of organizational difficulties. A recent study by Tessier and Otley (2012) emphasizes the need to differentiate between managerial intent and employees' perceptions of control. The goals of implementing MCS are known as managerial intent, but how such systems are perceived and experienced by employees is what makes them unique.

It is inevitable that MCS will limit individual autonomy by adopting predefined routines and processes, since one of the primary goals of MCS is to guide employee behavior (Langfield-Smith, 2006). This means that MCS could be seen by some workers as a danger to their job security. Instead of seeing MCS as a tool for support and empowerment, this perception develops when people (or groups) see them as a means for punishment, control, and restriction (Tessier & Otley, 2012).

When designed correctly, MCSs change how people act in ways that are good for the company, which makes it more likely that the company will reach its goals. So, the main job of management control is to change people's behavior in ways that are good for them. Management control makes it more likely that the organization's goals will be met (Merchant and Van der Stede, 2024).

Positively, management accounting and control are viewed as the only professions free of subjective, unjustified considerations, letting the numbers speak for themselves. A perfect "business brain" would be an accountant or controller who helps their supervisors avoid making poor or incorrect decisions.

Needless to say, both views are wrong. As much as management accounting is about numbers, it is also about human behavior. Company goals, budgets, variance analyses, or performance targets might all be expressed in numbers. However, they elicit responses from humans, such as resistance, inspiration, competition, assurance, etc. Thus, human behavior is as important as the quality and "perfection" of a plan itself in determining the success or failure of an endeavor (Charifzadeh and Taschner, 2017).

Human behavior is influenced by human perception. When managers, in collaboration with management accountants, formulate and execute a strategic plan, the success of this initiative depends on the alignment of perceptions between employees and managers.

For an organization's strategies to be put into action, management control mechanisms must be in place. Collaboration amongst employees in various roles and levels of authority is what makes up an organization. The company as a whole can have a stated objective, such as increasing profits, but employees have various priorities, such as increasing their own wealth or having more leisure time.

Management control must match firm goals with managers' and employees' personal ambitions ([Charifzadeh and Taschner, 2017](#)). Perceptual differences and misalignment between the goals of employees and managers lead to a decline in organizational performance.

Cognitive dissonance is a well-researched psychological phenomenon characterized by the conflict between two cognitive elements, such as beliefs, attitudes, or behaviors. For instance, managers frequently experience cognitive dissonance in the post-implementation stages of MCS, particularly when actual performance fails to meet their expectations, often resulting in feelings of regret. Similarly, dissonance may arise when organizational performance data conflict with a manager's "internal perceptions" ([Xue and Sun, 2024](#)). Cognitive dissonance theory has been applied to explore how employees' perceptions of MCS as a threat can lead to deviant workplace behavior and intentional ignorance. Cognitive dissonance theory is one of the most important ideas in social psychology, and it is also used a lot in economics ([Dierick et al., 2019](#)).

Contemporary cognitive science seeks to understand perception within real-world contexts. The objective of cognitive science is to explain the processes and mechanisms through which individuals recognize environmental constraints and align their perceptions with goals and situational factors ([Frankish and Ramsey, 2012](#)).

This study aims to bridge the gap between cognitive science and management control systems. Using the meta-synthesis approach, it aims to systematically review the literature on cognitively informed MCS. The research aims to enhance our understanding of how cognitive factors impact the effectiveness, perception, and implementation of control systems in organizational contexts by incorporating findings from both domains.

2.1 Domestic literature review

[Hejazi and Ramesheh \(2013\)](#) examined the relationships between product differentiation strategy, MCS, and innovation. They considered two dimensions of MCS: organic organizational culture and formal controls. The findings indicated a direct relationship between product differentiation and innovation, as well as both dimensions of the management control system.

[Rashidi et al. \(2016\)](#) investigated the relationships between business strategies, management control systems, and performance in industrial towns of Qazvin province. The findings revealed that business strategies (cost leadership and product differentiation) influence MCS, and MCS, in turn, affects organizational performance.

[Abili et al. \(2020\)](#) conducted a study on the application of cognitive sciences in management. Cognitive science has three main areas of application that they've identified. Firstly, it plays a role in basic managerial functions like decision-making, planning, and cognitive control. Secondly, it is used in different types of management, such as neuro-leadership, wise leadership, rational-brain leadership, and self-leadership/management. Lastly, it is used in specific domains, like cognitive knowledge management and cognitive business management.

[Azizi et al. \(2021\)](#), in a study on how the use of different management accounting techniques affects the efficiency of MCS, found that there are significant differences in the adoption of these techniques across companies. Moreover, not all management accounting techniques have the same impact on MCS effectiveness. Based on these findings, strategic management accounting tools should be applied dynamically, incorporating cognition and environmental factors.

[Ghodrat Abadi et al. \(2022\)](#) presented a two-dimensional outcome-based typology of control strategies to sustain organizational dynamism. Based on Lorange's outcome-oriented strategic control model and Simons' levers of control framework, key performance, profitability, transformation, and communication strategies were identified.

For their 2021 study, Ahmadi-Lengari and Garkaz investigated how MCS influences immoral

actions. They found that when people are praised for their fair involvement in the goal-setting process, their perceptions of procedural justice improve. But this sense of equity does not necessarily translate into pay raises for managers. Likewise, views of procedural and distributive justice are not enhanced when uncontrolled elements are ignored during performance review.

Sajjadi et al. (2023) examined the influence of innovation-oriented culture on the use of strategic management accounting techniques. The study found a positive and significant relationship between an innovation-oriented culture and the increased application of such techniques. Culture plays a role in strategic management accounting innovations, as well as in the effectiveness and efficiency of these innovations in different cultural and environmental settings. This environmental dynamism underscores the need for an MCS informed by cognitive sciences to successfully implement strategic management accounting tools.

Zeraatgari et al. (2024) studied the effect of perceived organizational justice in MCS on unethical behaviors in budgeting, emphasizing the psychological dimensions involved. The results were mixed, although there was a favorable and statistically significant correlation between financial slackiness and factors like using various performance criteria, having a hand in creating goals, and receiving high-quality feedback. In contrast, the principle of controllability did not have a significant effect on such tendencies.

Daneshmand Pour et al. (2025) conducted a study titled "The role of management accounting in individual and social behavior (grounded theory approach)." The first category of contextual conditions is related to project management and risk management. Risk management, within the realm of behavioral management accounting, lays the groundwork for its various levels. Informational and motivational impacts were part of the second group. Intervening conditions were primarily divided into two groups: basic behavioral management accounting principles and social and behavioral skills.

2.2 International literature review

Using an interview and document-based case study, Ruth (2020) investigated how MCS can facilitate or impede the uptake of integrated thinking. The study found that informal social controls, supported by senior leadership, fostered trust and collaboration, promoting outcome-oriented decision-making. Accounting profit-driven old performance measuring systems, on the other hand, served to stifle integrated thinking by serving to further isolate Business Units.

With process automation serving as a moderator, Papiorek and Hiebl (2024) investigated how the quality of management accounting information systems affected the effectiveness of management control systems (MCS). Their findings confirmed the assumed positive effect of information system quality on MCS effectiveness. Furthermore, this relationship is significantly stronger in organizations with a higher degree of process automation. Value creation issues grounded in contingency theory impact MCS efficacy beyond automation.

Ammar and Hassan (2024) conducted a quantitative study that looked at how different configurations of entrepreneurial cognition styles (ECSs) in SMEs relate to one another. They utilized a cross-sectional poll to determine that people have one of three cognitive styles: knowing (which is concerned with accuracy), planning (which is concerned with structure), and creativity (which is associated with new ideas). The findings suggest that these cognitive styles significantly influence how MCS are designed and utilized in entrepreneurial contexts.

SMEs employed five configurations of MCS simultaneously: customer focus, performance monitoring, administrative focus, strategic focus, and development focus. Three notable "constellations" or clusters of relationships between ECS and MCS were found in the study's combined analysis. These clusters were distinguished by a "cohesive integration approach" in

Cluster 1, a "revealing strategic approach" in Cluster 2, and a "multifaceted exploration" in Cluster 3.

Digital literacy, agile mindset, design thinking skills, and management control competencies were explored by [Imjai et al. \(2024\)](#). Design thinking abilities and control management abilities can be significantly developed with digital literacy and an agile mindset. An accountant's ability to put their digital knowledge and agile mentality to use is directly correlated to their level of digital understanding.

A separate study by [Papiorek and Hiebl \(2024\)](#) also confirmed the positive effects of high-quality management accounting information systems on the effectiveness of MCS.

The study by [Huber et al. \(2025\)](#) examined internal tensions within the components of MCS and how they affected the interaction between system elements. Their findings suggest that identifying the driving forces of individual elements is essential and that the tensions between elements should be viewed as dynamic and interactive. Strategic management accounting consists of two dimensions: academic theory development and practical trend analysis. Although prior research has explored various aspects of management accounting and strategic management accounting, limited attention has been given to the gap between planning and implementation. Addressing this research gap, the present study focuses on identifying factors that influence cognitive management control systems.

3 Methodology

3.1 Research question

Based on the systematic review of previous studies, the central research question is as follows:
Which factors influence cognitive management control systems?

3.2 Research methodology

Using a qualitative meta-synthesis approach, this study adopts a rigorous and interpretive methodology that is especially useful in research areas with uncertainty and a lack of consensus. Unlike traditional literature reviews that primarily summarize individual studies, meta-synthesis goes a step further. The results of different qualitative research can be systematically analyzed, compared, and translated using this method. Each of these individual studies might have utilized different conceptual tools, theoretical lenses, or methodological approaches. By bringing them together, meta-synthesis integrates these diverse insights into a more unified and coherent body of knowledge.

The core strength of this method lies in its ability to generate a comprehensive understanding. The comprehensive examination of all pertinent qualitative publications addressing management control systems in the framework of strategic management accounting led to this comprehension, which is not merely a summary. Our goal in going through this process is to come up with fresh and original interpretations that go beyond what individual research can cover. This allows for the identification of deeper patterns, nuanced relationships, and emergent theories that might not be apparent when examining studies in isolation. [Bergdahl \(2019\)](#) highlights the importance of qualitative meta-synthesis in identifying commonalities and promoting theoretical progress in the field by bringing together investigations of a certain topic.

3.3 Scope of the study

There are clear boundaries between time, space, and thematic areas in this study in order to ensure a focused and pertinent synthesis.

- **Temporal Scope:** The years 2000–2024 are comprehensively covered in this study. By focusing on the previous twenty years, we can monitor the development of ideas in these multidisciplinary domains and make sure that the synthesis is grounded in up-to-date research.
- **Spatial Scope:** Our search is specifically limited to peer-reviewed articles published in reputable academic journals. The selection of journals will primarily focus on the fields of management accounting and finance, ensuring that the included studies adhere to high scholarly standards and are directly relevant to our research domain. This exclusion of non-peer-reviewed sources, grey literature, or dissertations helps maintain the quality and academic rigor of the synthesized evidence.
- **Thematic Scope:** The core thematic areas guiding our meta-synthesis include strategic management accounting, management control systems, and cognitive science. This interdisciplinary focus is crucial for exploring how human cognitive processes influence the design, implementation, and effectiveness of control systems in strategic contexts. The focus of our analysis will be to unpack the interplay between these three critical elements, shedding light on the human element that is often neglected in more traditional analyses of management control. The research protocol for this meta-synthesis follows the seven-step guideline developed by [Sandelowski et al. \(2006\)](#), as illustrated in Figure 2.

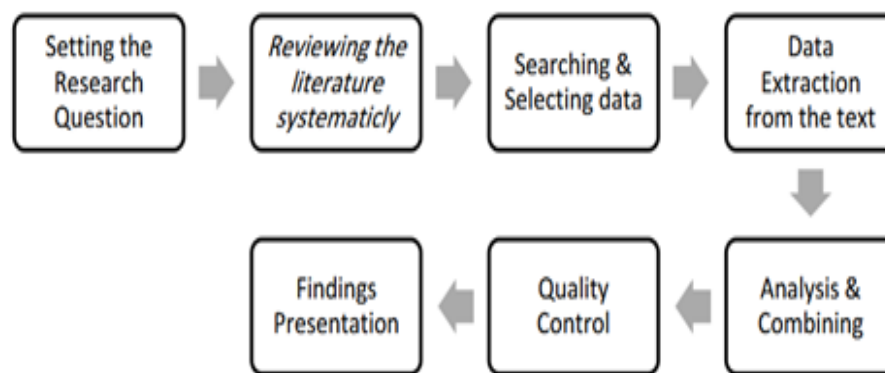


Figure 2. Research process

Step one: Formulating the research question

According to the objective, the research indicators—namely, *which population*, *what*, *when*, and *how* must be addressed. Based on this, the research questions have been organized in Table 1.

Table 1. Parameters related to formulating the research question

Key Questions	Identifying the central topic of the study is the starting point in the meta-synthesis approach. In this research, the process begins with the main research question:
What	What are the cognitive science components in management control systems?
Who	In this study, reputable international academic databases and various search engines have been examined.
When	The timeframe during which documents and records were searched and reviewed spans from 2000 to 2024. In view of the limited amount of research conducted domestically on this topic, only credible international journals have been considered.
How	The method refers to the approach used to collect studies. In this research, the secondary data analysis method has been applied. The researcher, based on specific criteria, identifies and selects appropriate articles that either enter or are excluded from the meta-synthesis process.

Step Two: systematic literature review

For this study, researchers used keywords from article titles, abstracts, and keyword sections to search Scopus and Google Scholar for English-language journal papers published between 2000 and 2024. As a result of its extensive coverage of sources, high citation metrics, access to interdisciplinary materials, and intelligent tools for systematic searching, the Scopus database was selected as the primary literature retrieval source. Additional searches were conducted using Google Scholar (Table 2).

Table 2. Keywords used in the search

English keywords
Management Control
Management Control System
Management Accounting
Strategic Management Accounting
Cognitive and Behavioral Factors in Management Accounting

Step Three: Searching and selecting relevant literature

The collected documents were reviewed in terms of the relevance of their titles, abstracts, and full texts to the research objective. Ultimately, articles were selected that either directly explained or indirectly defined the concept by examining its dimensions, components, and complexities. The screening process was conducted based on the inclusion and exclusion criteria outlined in Table 3.

Table 3. Inclusion and exclusion criteria for meta-synthesis

Factors	Inclusion Criteria	Exclusion Criteria
Geographic Scope	All studies	Conference papers
Language of Research	English	Non-English
Timeframe	2000–2024	Prior to 2000
Method Used in Document	Qualitative and quantitative methods	Non-systematic approaches
Subject Area	Related to Strategic Management, Accounting, and Management Control Systems	Unrelated topics
Type of Study	Peer-reviewed journal articles	Personal opinions, personal websites, reports, and conference proceedings

Step Four: Data extraction from selected articles

At this stage of the meta-synthesis process, the researcher continuously reviews the articles selected in Step Three to identify distinct content-related elements within which the primary studies have been conducted. These elements are regarded as initial open codes. Table 4 records the remaining references, based on the authors' names and publication dates, of this study, including the open codes that were identified and extracted.

Step Five: Analysis and integration of qualitative findings

The researcher carefully reviewed and re-examined the extracted codes in this step. Taking into account the meaning of each code, the researcher aimed to identify shared concepts and categories. Once identified, these codes were grouped into broader concepts and then categorized under thematic headings that best described the underlying ideas.

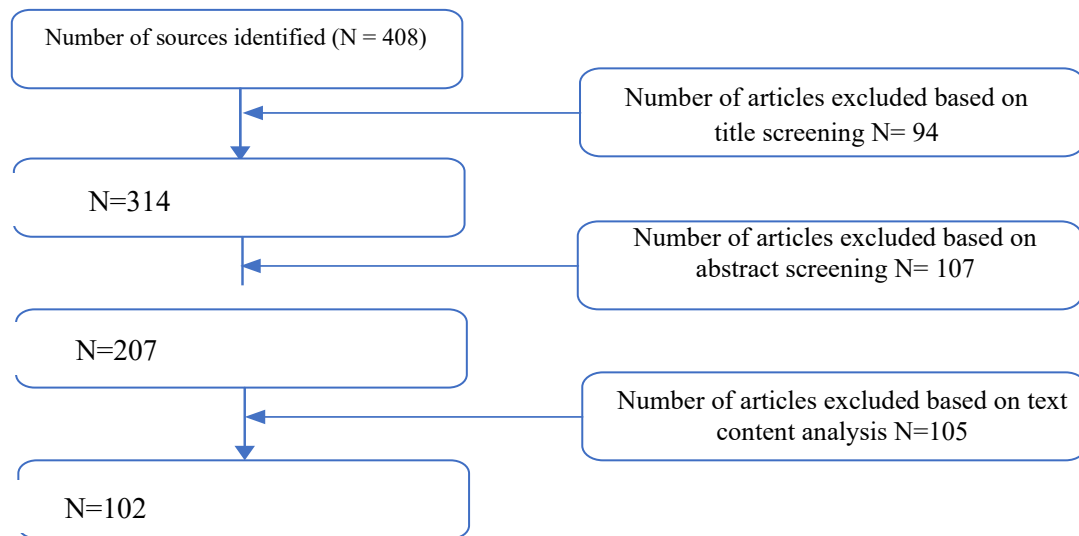


Figure 3. Search and selection of relevant articles

In this approach, based on the researcher's understanding and intuition regarding the subject matter, codes were classified into concepts, and concepts were further grouped into categories. The discovered aspects of cognitive management control systems were subsequently grouped according to certain characteristics after an analysis of the commonalities between these groups. Here is a simple, step-by-step example to help you understand the process:

- Initial Open Code (from raw text): "Managers struggle to deal with strategic issues."
- Concept (grouping similar open codes): "Challenges in strategic engagement" (This concept might also group codes like "visions not connected to reality" or "long-term plans are simply filed")
- Category (broader thematic grouping of concepts): "Cognitive Limitation" (This category could encompass concepts such as "Challenges in strategic engagement" and "Inconsistency with rational predictions").

Finally, the classification of the findings is presented in Table 4.

Table 4. The classification.

Category	Code	Concept	Author (s)/Year
Dynamic cognitive capabilities of management control	Understanding the causal relationships of the components of the management control system	Combined use of automated controls, an integrated approach in the management control system, and the role of human factors	Shields et al. (2000)
	Aligning the agent's motivations	Causal relationships of the process, interaction with the environment	Maasalo and Teittinen (2023)
	Measurement diversity	Multiple and diverse measurement criteria, feedback and updating performance measurement criteria, a range of performance criteria from detailed to holistic	Bedford et al. (2016); Langfield-Smith (2006)

	Effective management system factors	Management objectives for process, procedural goals, logic, and feedback in the control system	Chenhall (2003)
	Interdependence between management control system practices	Creating a shared understanding of the meaning and complex concepts of information, considering contingency theory	Bedford et al. (2016)
	Decision-making rules	Collected, integrated, and timely for operational decision-making	Bedford et al. (2016)
	Financial controls	Planning and forecasting, administrative controls such as structures and management processes	Akroyd (2019)
	Planning controls	Planning, effort, and the direct behavior of organizational members through setting functional area objectives and providing expected standards regarding control objectives, as well as coordinating among functional areas via goal alignment.	Malmi and Brown (2008)
	Cybernetic control	Feedback loop, performance measurement system, informational feedback on undesired variances in the system, and correction of system components.	Malmi and Brown (2008); Chenhall (2003); Ferreira and Otley (2009)
	Cultural controls	To inspire and motivate employees and guide search and discovery by transferring the company's core values.	Merchant and Van der Stede (2024); Anthony and Govindarajan (2007); Malmi and Brown (2008)
	Organizational commitment	Team members feel emotional attachment to their team. Team members feel a strong sense of belonging to their team.	Appuhami et al. (2011)
	Economic transaction cost	Encouraging goal alignment and thereby minimizing relational and performance risks.	Appuhami et al. (2011)
	System dynamics	Establishing and implementing management control systems, identifying and analyzing final results, and providing feedback to decision-makers.	Dirks and Wouters (2025)
Cognitive Awareness Control	Cognitive limitation	Human agents are constrained by knowledge limitations and cognitive biases; the complexity of processes and their limited cognitive abilities.	Bedford et al. (2016); Chenhall (2003)
	Bounded rationality	Inconsistency with predictions based on assumptions of rational economic decision-making.	Appuhami et al. (2011); Chenhall (2003)
	Individuals' mental representation	Rules of accuracy, correction, representation, and ethicality; information exchange and search; involvement of ethical standards in control.	Roberson and Stewart (2006)
	Knowledge processing problem	Uncertainty as "lack of sufficient information"; complexity as "lack of a conceptual framework to interpret information."	Lopez-Valeiras et al. (2024)

	Individual cognitive style	The tendency of individuals to use different types of information, such as opportunity costs, and the ability of managers and employees to build trust.	Chenhall (2003)
	Fair design	Fairly designing management control systems, aligning organizational goals with individual capabilities.	Janke et al. (2014)
	Procedural understanding	Allowing users to deviate from procedures, tailoring procedures to the needs of each sub-unit.	Ter Bogt and Scapens (2019)
	Cognitive frames	Maintaining a management mindset and aligning goal actions to avoid risky situations.	Chenhall and Moers (2015)
	Cognitive control	Subordinates' participation in decision-making: challenging and debating data, assumptions, and action plans.	Maasalo and Teittinen (2023)
	Cognitive flexibility	Enhancing information flow; reducing hierarchical and functional barriers; key performance indicators and other information.	Langfield-Smith (2006)
	Cognitive biases	Inertia pressures, maintaining competencies and successful past routines, bias toward past key success measures.	Bedford et al. (2016)
	Social capital	Better understanding of tribal control performance, explaining how tribal control works and its positive performance impacts, and bureaucratic controls.	Ströbele and Wentges (2018)
Cultural and Behavioral Control Systems	Behavioral understanding	Understanding behavior driven by biases toward procedures; evaluating alignment of goal level and accountability.	Kim et al. (2018)
	Behavioral risk	Opportunism, bounded rationality, uncertainty, and asset specificity.	Appuhami et al. (2011)
	Results control	Controls of performance risk, performance measurement standards that are clearly defined, and minimizing performance risk.	Appuhami et al. (2011); Chenhall (2003)
	Organizational culture	Cultures of clan, bureaucracy, market; values, beliefs, assumptions; broad "fit" between personal and organizational values; informal social controls; employee socialization; alignment and self-regulation.	Merchant and Van der Stede (2024); Anthony and Govindarajan (2007)
	Meaningful work	Key drivers of individual performance: purposeful and valued goals; work engagement and individual performance.	Burghardt and Möller (2023)
	Work outcome	Managing employees' experienced meaningfulness.	Burghardt and Möller (2023)
	Learning agility	The ability to respond quickly and effectively to changes, proactively gaining insights from transformative experiences to increase customer value.	Jutidharabongse et al. (2024); Zanin et al. (2017)
	Reform management	Systematic approach to improving organizational performance, reforming processes, structures, or culture, and absorptive capacity for knowledge and adaptation to experiences.	Jutidharabongse et al. (2024)

	Behavioral focus	Controlling others' behavior and managing their performance.	Merchant and Van der Stede (2024); Pfister et al. (2023)
	Attention shift	Focusing on value-added activities, customer relationships, and customer-focused KPIs.	Janke et al. (2014) Dávila et al. (2024)
	Output control	Determining performance standards for the project, such as technical performance, quality, profitability, and market share.	Bonner (2005); Zanin et al. (2017)
Cognitive Competencies	Motivation for discussion	Facilitating organizational dialogue.	Bracci and Tallaki (2021)
	Leadership style	Transformational, dialogue-driven, flexible.	Maasalo and Teittinen (2023)
	Creative competency	Ability to generate new and novel ideas and solve problems innovatively; creative thinking and original solutions to new challenges.	Jutidharabongse et al. (2024)
	Organizational resilience	Maintaining control and performance stability; diagnostic use of controls; organizational adaptability.	Baird et al. (2023)
	Strategic decision-making	Resource allocation, risk reduction, performance evaluation for strengthening dynamic capabilities and sustainable performance; strategic mindset.	Zanin et al. (2017)
	Management control competency	Resource capacity to guide and monitor organizational activities; organizational adaptability and capacity to manage multifaceted challenges.	Jutidharabongse et al. (2024)
	Impact management	Understanding cause-and-effect relationships between employee actions and project performance, interactive use, and obtaining updated information from various stakeholders.	Burghardt and Möller (2023); Dirks and Wouters (2025)
	Control perceptions	Employees' proper perception of controls.	Tessier and Otley (2012)
	Continuous learning	Adaptability and learning from experience through more informed and data-driven decision-making.	Appuhami et al. (2011)
	Trust-based strategy	Non-opportunistic behavior, minimizing performance risk, stable social relationships, collaborative behavior, reducing transaction costs, and interdependence among stakeholders.	Appuhami et al. (2011); Zanin et al. (2017)
	Realism	Objective and factual data; decision-making based on real data.	Merchant and Van der Stede (2024)
Cognitive Foresight	Seeing the big picture	Non-financial information is provided through reports that include data such as sales forecasts, a mix of past and future data, and forward-looking approaches for future actions.	Davila et al. (2009); Zanin et al. (2017)
	Future-oriented mindset	A combination of historical information, adopting forward-looking approaches, alignment with a forward-looking mindset, and full evaluation of negative aspects.	Lopez-Valeiras et al. (2024)

	Mental models	Understanding employees and organizational processes, ensuring sustainability through informal controls.	Janke et al. (2014); López-Valeiras et al. (2024)
	Attitude change	Changing attitudes toward behavior, drivers, and variables.	Tessier and Otley (2012)
	Resilience capacity management	Cautious planning, monitoring, control processes, flexible budgeting, performance management, and how to implement them.	Bracci and Tallaki (2021)
	Coping capacities	The ability to cope with disruptions through coping actions.	Bracci and Tallaki (2021)
	Buffer capacities	Ability to absorb shocks without changing structure or performance, such as delaying investments or postponing expenses.	Bracci and Tallaki (2021)
	Cognitive capacity of open systems	Close relationship between the organization and its environment; attention to the impact of the human relations school, focusing on human behavior.	Pfister et al. (2023); Zanin et al. (2017)
	Transformational leadership	Personal attention and intellectual stimulation to inspire employees, using non-financial and forward-looking information.	Maasalo and Teittinen (2023)
	Managerial flexibility	Discretionary power for decision-making; need to deviate from rules in emergencies; convincing and supporting senior management.	Tessier and Otley (2012)
	Dynamic tension	Simultaneous and intensive use of interactive and diagnostic controls.	Bedford et al. (2016); Zanin et al. (2017)
	Critical thinking	Critical analysis, explanatory knowledge, questioning assumptions.	Rautiainen et al. (2024)
	Causality	Considering structural relationships between variables, the nature of causality between variables, and levels of analysis, descriptive knowledge is obtained.	Bracci and Tallaki (2021)
	Managerial discretion	A project manager's freedom to decide which actions are permitted and how they should be executed; autonomy and accountability.	Sakka et al. (2013); Zanin et al. (2017)
	Social controls	Controls over “emotional, irrational, and emotional elements of employees”; core values, beliefs, norms.	Einhorn et al. (2024)
	Technical controls	How tasks are performed, how people and groups are organized based on rules, procedures, and standards.	Tessier and Otley (2012); Malmi and Brown (2008)
	Delegation	Adaptability: achieving the agent and delegating decision-making authority to choose actions; selecting actions with environmental analysis.	Bedford et al. (2016); Zanin et al. (2017)
person-organization fit	Contingency theory	Task uncertainty and environmental uncertainty; instability of the management control system; and consideration of organizational structure.	Chenhall (2003)
	Competence trust	Perception of benevolence, competence, and integrity; mutual information sharing and problem-solving.	Appuhami et al. (2011)

	Fairness in the management control system	Fair design of management control system; reducing unethical behavior; fair performance indicators.	Merchant and Van der Stede (2024); Otley (1999)
	Non-conflict	Pursuing social responsibility goals, economic management based on conventional procedures.	Vuorenmaa (2024)
	Soft controls	Team control and bureaucratic formal controls.	Ströbele and Wentges (2018); Zanin et al. (2017)
	Duality of role	The dual role of controls as "positive" and "negative" or "decision-facilitating" and "decision-influencing"; limiting and facilitating elements.	Bracci and Tallaki (2021)
	Interpersonal characteristics	Belief systems, boundary controls, and interpersonal characteristics.	Abernethy et al. (2010)
	Informal controls	Individual, professional, and cultural controls; less reliance on standard operational procedures, programs, and plans.	Ferreira and Otley (2009); Burghardt and Möller (2023)
	Role ambiguity	Conflict between formal and informal management control systems.	Sakka et al. (2013)
	Executive controls	Organizing people and groups, monitoring behavior, and holding employees accountable for their behavior; the process of specifying task execution.	Malmi and Brown (2008)
	Reward and compensation control	Aligning organizational members' goals with the organization through aligning financial interests.	Malmi and Brown (2008)
	Behavioral outcomes	Job satisfaction and human resource management.	Chenhall (2003); Pfister et al. (2023)
	Knowledge sharing	Knowledge sharing within teams, team-based organizational design, tribal control, and intra-team monitoring.	Radtke et al. (2023)
	Psychological empowerment	Sense of control over work, competence, meaning, and participation in goals.	Mahmoud et al. (2022)
	Bias in employees' and managers' perceptions	There is a mismatch between managerial intentions and employees' perceptions of empowerment and limitations.	Tessier and Otley (2012)

Step 6: Quality control

To ensure reliability and quality, the documents were randomly assigned to experts. The experts, without knowledge of how the indices and concepts were integrated by the researcher, categorized the documents. After comparing the categories of the researcher with the expert, the relationships were calculated as shown in Table 5. If the codes from the two coders are close, it indicates a high level of agreement between the two coders, which reflects the reliability of the study. Cohen's Kappa index was used to evaluate the level of agreement between the two raters. The Kappa index fluctuates between zero and one. In general, the closer this measure is to one, the greater the agreement between the raters, but when it approaches zero, there is less agreement. Given that the Kappa coefficient of 0.656 indicates the validity of this measure.

4. Results

Management Accounting Systems (MASs) provide information to assist managers in planning and control. Management Accounting (MA) activities primarily involve collecting, preparing, processing, analyzing, and reporting financial and non-financial information to managers. The

information should be relevant and designed to support decision-making within the organization (Zanin et al., 2017).

Table 5. Calculation of the kappa index

Consensus observatus = 0.666		researcher's opinion		
		Yes	No	Total
Opinionem alterius periti	Yes	11	3	14
	No	3	1	4
	Total	14	4	18
Consensus observatus casu		0.0298	Kappa coefficient: 0.656	

A total of 102 codes were extracted, grouped into six categories related to the use of cognitive sciences in management control systems. These categories include cognitive awareness control, cognitive foresight, control over individual-organization fit, control over behavioral and cultural aspects, and review of previous studies.

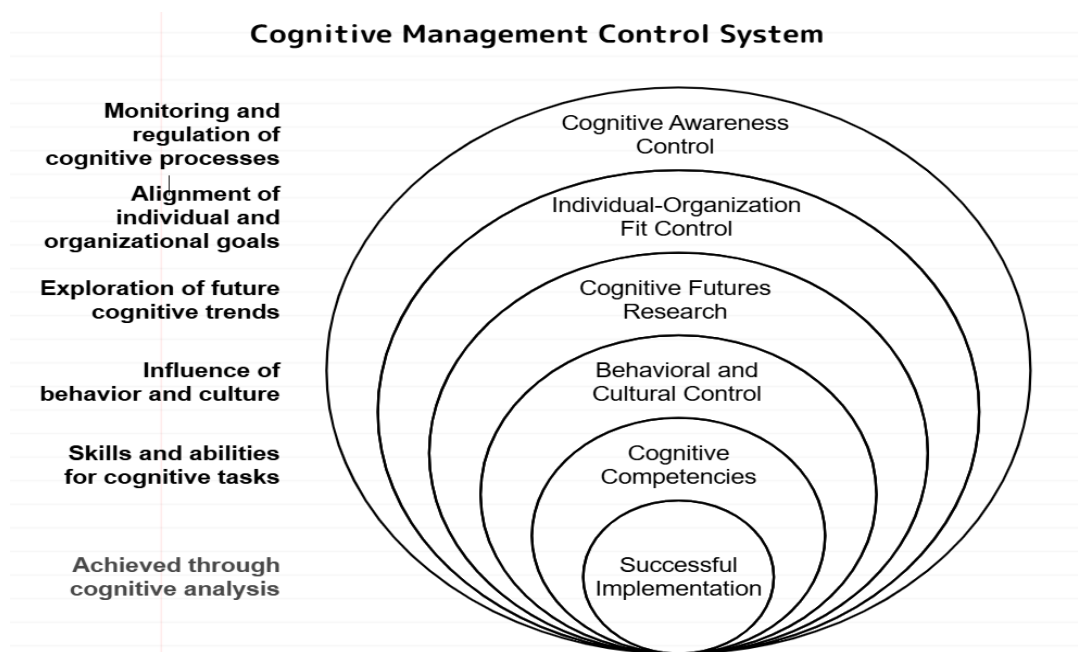


Figure 4. cognitive sciences in management control systems

4.1 Dynamic cognitive capabilities

Strategic management accounting tools are based on contingency theory, making attention to dynamic resource capabilities crucial for management control systems. An organization's capacity to coordinate its resources to carry out tasks or activities is known as its dynamic organizational capability.

According to resource-based theory, dynamic organizational capabilities generate value and drive organizational outcomes. While distinguishing between static and dynamic capabilities is often challenging, the former is often considered to be resources or competencies that enable an organization to cope with production process issues. On the other hand, dynamic organizational capabilities are viewed as strategic actions that enable organizations to adapt to environmental threats and opportunities (Nuhu et al., 2019). For the successful implementation of management control systems, organizations need causal and root-cause analyses of the dynamics of the management control system in the first stage to develop a rich understanding of the causal

relationships among its components. In the second stage, the approach of empowering the implementation of management control systems should overcome organizational complexity. In the third stage, aligning agents' motivations with management's objectives by integrating knowledge available to organizational goals and control objectives is crucial. This study's results align with those of Burghardt and Möller (2023) and Dirks and Wouters (2025), who also highlight the importance of dynamic cognitive capacities in helping firms spot opportunities and hazards during MCS implementation.

4.2 Cognitive awareness control

Cognitive awareness encompasses awareness of stimuli and environmental events, as well as cognitive phenomena such as sensation, thought, and representation.

Within the context of (MCS) and strategic management accounting, this concept is crucial for aligning individual and organizational perceptions. Awareness encompasses perceptual, non-perceptual, and self-awareness, which are associated with three types of memory: episodic, semantic, and procedural. Procedural memory, which concerns how tasks are performed, relates to the practical application of MCS. This dimension within MCS includes psychological empowerment, structural empowerment, cognitive frameworks, and cognitive flexibility, which are vital for effective implementation. For successful MCS implementation, individuals within the organization need a shared understanding of its goals and strategies. Therefore, cognitive awareness control is crucial for aligning the shared understanding among those involved in the management control system. The findings are consistent with the research of Bedford et al. (2016); Chenhall (2003); Ghodrat Abadi et al. (2022); Lopez-Valeiras et al. (2024).

4.3 Cultural and behavioral control systems

Management systems (environmental) and organizational culture are distinct constructs but interdependent. Organizational culture is embodied within the organization and, thus, determines the actual behavior of employees (Schein, 2010). The culture of every organization is either explicit, as managed by mechanisms (such as cultural controls), or implicit, as accepted by management without any attempt at change (Schein, 2010). Thus, organizational culture, as a contextual factor of management controls, has an indirect impact on individual or group behavior, while managerial controls are mechanisms that directly influence behavior to achieve organizational objectives. Cultural controls are managerial mechanisms used to interact with employees and actively manage their behavior. They can reinforce organizational culture within the company (Sageder and Feldbauer-Durstmüller, 2019). According to the research of Sajjadi et al. (2023), organizational culture is dynamic and requires deep attention for innovation in management accounting. The findings are consistent with the research of Appuhami et al. (2011); Chenhall (2003); Merchant and Van der Stede (2024); Anthony and Govindarajan (2007).

4.4 Cognitive competencies

Based on Piaget's (1997) theories of cognitive competence, individuals are able to manipulate their experiences and organize and adapt their thoughts to guide their actions. Cognitive competence involves three interrelated and dependent components: cognitive structures, cognitive processes, and overt behaviors. Among them, "cognitive processes" such as metacognition, self-regulatory cognitive styles, and cognitive skills of thinking, reasoning, problem analysis, and information processing can influence an individual's "behaviors" such as task performance, problem-solving, and decision-making, as well as "cognitive structures" like self-schemas and goal orientations. Furthermore, individuals can alter their cognitive abilities by manipulating mental

processes and cognitive styles through the use of thinking skills, thus contributing to cognitive growth and capability. Cognitive competence fosters strategic orientation of information, internalization abilities, self-regulation, and the transfer of these cognitive skills to create knowledge and perceive a dynamic environment (Lee et al., 2012).

In cognitive competence, management control system designers require a set of skills necessary for performing tasks within a specific domain (Väisänen et al., 2021). Transparency, accountability, motivation for dialogue and discussion within organizations, resilience capabilities, and impact management are examples of cognitive competencies in management control systems. In cognitive competence, the perception of individuals regarding the goals and strategies plays a determining role in the effectiveness of the management control system.

To gain a meaningful understanding and effective feedback from the management control system, management accountants have to align their perceptions with realities and gather information from alternative and multiple sources. The findings are consistent with the research of Väisänen et al. (2021).

4.5 Cognitive foresight

In cognitive foresight, to enhance self-development, it is necessary to see a combination of the big picture and a future-oriented mindset. Hence, management control systems can be designed to manage resilience, coping, buffering, adaptability, and flexibility. Management accountants, based on the mental models of managers and the forces affecting the management control system, take the big picture into account and assess the capacity for transformation and action within the management control system. The challenge is, for instance, to question traditional assumptions because cognitive foresight explores multiple alternative futures according to contingency theory. According to Lopez-Valeiras et al. (2024) and Janke et al. (2014), the findings are consistent.

4.6 Person-organization fit control

Although human behavior can be explained by environmental or organizational factors, it can be enhanced by focusing on individuals because they bring a unique interpretation to the situation. Person-environment fit examines the extent to which individuals' demands for financial, physical, and psychological resources, as well as task-related opportunities, align with the features provided by the organization. The degree to which a person's skills match the needs of the organization for their involvement is another way of looking at fit. Trust competence, interpersonal traits, role conflict, self-control, role duality, compensation, and reward controls are all aspects of a well-fitting person with an organization. The findings are consistent with the research of Merchant and Van der Stede (2024), Otley (1999), and Malmi and Brown (2008).

5. Conclusion

During the era of the Industrial Revolution and scientific management, the role of management accounting was primarily focused on cost calculation and cost reduction. Consequently, management control systems were implemented linearly and mechanically. The degree to which a person's skills match the needs of the organization for their involvement is another way of looking at fit. Trust competence, interpersonal traits, role conflict, self-control, role duality, compensation, and reward controls are all aspects of a well-fitting person with an organization. In response to these evolving managerial needs, strategic management accounting emerged.

Strategic management accounting, by focusing on both internal and external organizational factors, aims to achieve sustainable value creation within organizations. One of the key components of strategic management accounting systems for implementing organizational strategies is the

control system. Formal control systems, due to their alignment with mechanistic organizations, can hinder employee creativity and motivation. Additionally, not all control actions can be predetermined; therefore, effective decision-making requires cognitive and behavioral considerations. The objective of the present study is to conduct a systematic review of research related to cognitive-based management control systems using a meta-synthesis method.

Cognitive competences, cognitive awareness, cognitive foresight, behavioral and cultural control, and cognitive dynamic capacities are some of the components that emerged from the meta-synthesis on cognitive management control systems. Based on contingency theory, resource dependence theory, and the person-environment fit theory, implementing a management control system necessitates an understanding of cognitive and behavioral processes. The findings suggest that in dynamic and culturally vibrant organizational environments, (MCS) must move beyond traditional mechanistic models. A cognitively-informed approach is essential to provide the necessary flexibility for implementing strategic management accounting techniques. Furthermore, achieving organizational goals through MCS requires attention to perceived fairness and justice, highlighting the importance of stakeholders' perceptions and cognitive engagement in the sensemaking processes during strategic execution.

Management control systems facilitate adaptability to environmental changes, provide performance feedback, help assess the profitability of products and customers, and enable managerial decision-making. It is recommended that to understand cognitive processes within control systems, one must also consider behavior, organizational culture, and leadership style. This understanding enables the development of outcome-based, meaningful work-oriented, and culturally aligned control systems. Additionally, it is advised that organizations first identify and design their strategic management accounting systems, recognizing the influencing factors and determining appropriate strategies. Only then should the management control system be developed. Neglecting cognitive and behavioral elements may result in divergent individual perceptions of shared objectives, thereby undermining the effectiveness of the control system.

In light of contingency and resource dependence theories, each organization's management control system must be tailored to its dynamic mechanisms. Thus, it is recommended that person-environment fit within dynamic organizational contexts be carefully considered in system implementation.

When deciding where to put the management control system in their company, executives should think about the objective, the resources available to them, and the competitive landscape. Adapting control systems to support effective decision-making under uncertain conditions requires conceptual and fundamental changes.

Future research could explore how specific characteristics of different organizational cultures influence cognitive management control systems and assess the effects of various managerial strategies on the effectiveness of these systems, potentially contributing to further advancements in this field. It could also investigate how managers' perceptions of strategic management accounting practices influence cognitive management control systems.

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