

Digitalization and the Changing Role of Management Control: Business Literacy Perspective and Theoretical Review

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Abstrac. The development of digital technology has brought fundamental changes in organizational management practices, especially in the management control (MC) system. This article aims to systematically examine the impact of digitalization on the functions, roles, and structures of MC through a multidisciplinary approach. Literature review. The study results show that digitalization drives significant transformation in MC, ranging from process automation and data-driven decision making to the shift in the role of management accountants as strategic partners. This article also identifies challenges in implementing digitalization, such as the need for technology investment, employee resistance, and data security risks. In addition, Simons's framework, Levers of Control, explains control dynamics in the context of digital organizations. This study emphasizes the importance of technology integration, human resource competency readiness, and adaptive control system design so organizations remain competitive in digital disruption. These findings are expected to be a conceptual reference in developing relevant MC policies and strategies in the future.

Keywords: *Control Management, Digitalization, Decision Making, Organizational Transformation, Levers Of Control.*

INTRODUCTION

The development of digital technology has brought about a significant transformation in various aspects of life, including in the business world and managerial practices. The phenomenon of digital disruption requires organizations to make adjustments to the way they manage processes, resources, and decision-making. One crucial aspect significantly affected is Management Control (MC), a formal system designed to direct, monitor, and evaluate organizational activities to align with its strategic objectives.

Digitalization offers efficiency and speed through process automation and drives fundamental changes in the decision-making structure and work patterns of organizations. Digital technologies such as Enterprise Resource Planning (ERP), big data analytics, and artificial intelligence have expanded the role of MC from an administrative function to a strategic partner in decision-making (Fähndrich 2023). The integration of big data into ERP systems, for example, not only improves operational efficiency but also drives data-driven innovation and strategic planning (Kimberling 2024), as

well as expanding the function and role of control management in organizations (Syarifudin Eko and Suwandi 2025).

However, digitalization also presents complex challenges. In addition to the need for high technology investment, organizations face resistance from employees who are not yet ready for digital competency. This transformation is not just about adopting software, but requires a paradigm shift in all aspects of organizational culture (Whatfix, 2024). Without effective change management, implementing digital systems can cause psychological stress and dysfunction of the control system, which hinders efficiency. In human resources, digitalization requires management accountants and control professionals to have new competencies, such as analytical skills, understanding of digital technology, and a role as a strategic business partner (Gunawan et al. 2025). Until now, technology has continued to develop and will continue to become more practical and modern (Jasmin, Puspitasari, and Noviarty 2024). This change requires restructuring the internal control system and a training curriculum that is adaptive to technological developments.

Implementing digitalization in internal control systems can offer a comprehensive solution to improve organizational compliance. By utilizing technology, organizations can automate processes, improve data accuracy, and ensure regulatory compliance more transparently and efficiently. Work automation reduces the need to monitor employee behavior because it aims to replace human intervention, reducing the risk of dysfunctionality. Digitalization also contributes to cost savings in data creation, reduces the time required for data analysis and verification, and improves reporting and decision-making capabilities.

In addition, digitalization increases the efficiency and effectiveness of management control systems by monitoring employee and manager performance. For organizations, adapting the concept of management control to the digital era is essential for better operational efficiency and effectiveness. It emphasizes the need for responsive and adaptive management in dealing with market changes and technological advances to ensure business sustainability in competition. Therefore, the company's ability to manage human resources in line with developments is necessary for visionary companies in the digital era (Perdana, Aruiawan K., 2019) in Wahyudi & dkk, (2023).

This study aims to identify and explore the impact of digitalization on control management systems and practices. In addition, this study also examines how digital technology changes instruments, methods, and processes in control management. This study describes organizations' various challenges and opportunities in implementing digital-based management control. Conceptually, this study is expected to contribute to developing a more adaptive and responsive control management model for future technological disruptions.

Concept of Control Management

Management control (MC) is a systematic process by managers to ensure that organizational resources are used effectively and efficiently to achieve strategic goals. According to (Anthony and Govindarajan 2005), the management control system is a tool to motivate members to act consistently in achieving organizational goals. The management control system helps ensure that individual and work unit actions are aligned with the organisation's overall strategic direction. Otley et al., (1995) emphasized that management control (MC) links the strategic planning process to operational control. This system connects the organization's long-term vision with the implementation of daily activities, creating continuity between strategy and operations.

According to Widener (2007) and Merchant and Otley (2003), one of the main objectives of MC is to provide relevant information to support decision making, planning, and evaluation. The information generated from this system allows management to monitor performance, assess the effectiveness of strategies, and make necessary adjustments. Thus, control management is not only administrative, but also strategic in maintaining alignment between organizational goals and the behavior of its members.

Simons (1995), in his theory about Levers of Control, explains that management control includes four central systems: Belief Systems, Boundary Systems, Diagnostic Control Systems, and Interactive Control Systems. These four systems are designed to balance achieving organizational goals and controlling risks and organizational behavior.

The advantage of this model lies in its integrative nature: the four levers in the system cannot stand alone, but rather complement and strengthen each other. It reflects the reality of modern organizations that require flexibility in innovation and

discipline in implementing strategy (Marsheila et al. 2022).

Digitalization in an Organizational Context

Digitalization refers to transforming business activities by adopting digital technologies to transform manual or conventional processes into technology-based ones (Fähndrich, 2023). More than just automation, digitalization implies structural and cultural changes in an organization, including how it communicates, interacts, and how data is used to support decision-making.

According to Schallmo and Williams (2018), digitalization in the organizational context includes three levels: (1) digitization or conversion of analog data to digital; (2) digitalization namely the integration of digital technology in business processes; and (3) digital transformation, namely fundamental changes in business models driven by technology. These three levels provide a conceptual basis for how digitalization affects organizational control practices.

The Impact of Digitalization on Control Management

Literature shows that digitalization has a broad impact on management control

systems. Fähndrich, (2023) identified five main aspects of MC change in the digital era: (1) expansion of MC functions, (2) adaptation of existing control instruments, (3) creation of new technology-based tools, (4) changes in MC organizational structures and models, and (5) behavioral impacts on MC practitioners.

This transformation accelerates the reporting and evaluation process and increases transparency, accuracy, and predictive capabilities in management. Digital tools such as big data analytics, cloud computing, and artificial intelligence enable faster, data-driven decision-making. However, challenges arise in new competency requirements, resistance to change, and potential implementation failure if the organization is not structurally and culturally ready.

RESEARCH METHODS

This article uses a literature review approach to analyze how the development of digitalization impacts the Management Control (MC) system in various organizational contexts, by mapping the results of relevant and current previous studies. This research method will include the following steps:



Figure 1. Steps of the research method

This type of research is exploratory and analytically descriptive, and it seeks to understand the phenomenon of digital disruption in control management practices based on the synthesis of theories and previous study results. This method does not aim to test hypotheses, but to explore the literature to identify trends, gaps, and future research directions. This study uses a systematic mapping study with qualitative data collected through searching scientific articles in accredited national and international journals that focus on the topic of Management Control(MC), digital transformation, management accounting, internal control systems, technology, and organisation. The literature has been published in the last 5–10 years to ensure relevance to current technological developments.

In the literature source selection stage, this study applies inclusion and exclusion criteria to ensure that only relevant and quality references are analyzed. The inclusion criteria include scientific articles that have gone through a peer-review process, both empirical and theoretical, and specifically discuss the topic of management control (MC) in the context of digitalization. The articles used

can be written in Indonesian or English, as long as the substance of the discussion is directly related to the objectives of this study.

Meanwhile, articles categorized into exclusion criteria include non-scientific publications such as opinions, popular articles, general news, and information sources from blogs and social media. In addition, the analysis does not include articles that are not available in full text or do not include verifiable study methodologies and results. The application of these criteria is carried out to maintain the validity and accuracy of the research focus, and to ensure that the literature reviewed has a significant scientific contribution to the development of understanding of the impact of digitalization on control management systems.

The analysis results are then compiled and synthesized to provide a comprehensive understanding of the influence of digital control management(MC). This explanation includes a review of the studies that form the basis of the effect. The full findings of this article are presented in Table 1 below:

Table 1. Relevant Previous Research

No	Researchers & Years	Research Title	Research methods	Research Focus	Key Findings
1	(Gunawan et al. 2025)	Human Resource Management in the Digital Era	Qualitative Study	The impact of digitalization on HR management	Digitalization accelerates strategic decision-making
2	(Jasmin, Puspitasari, and Noviarty 2024)	The Impact of Implementing Digitalization Systems: Effectiveness	Quantitative Analysis	Effectiveness digital internal control.	The presence of technology creates opportunities in the economic sector that can influence company value
3	(Kusnanto, Permana, and Hadi 2024)	Innovation of Management Control Systems in Facing Challenges in the Digital Era	Qualitative Study	Innovation in digital management control	Control systems require a new approach to digital risks
4	(Wahyudi	The Impact of	Preferred	The impact of digital	The transformation

	and dkk 2023)	Digital Era Transformation on Human Resource Management	Reporting Items for Systematic Review and meta-analysist.	transformation on HR, with a focus on paradigm shifts, digital skills development, and the use of technology in decision making	of HR competencies from traditional to digital becomes essential changes in the digital era
5	(Ningsih et al. 2019)	Document Control Management Application at PT. Siantar Top, Tbk Bekasi Using the Waterfall Method	Case study	Digitalization of document control management and archiving	Inefficient document management and control with traditional processes. Digital databases make document control easier
6	(Wujarso et al. 2023)	The Role of Digital Leadership in the Digital Era	Qualitative descriptive analysis	Leadership in digitalization: Management Control	There is a need for synergy between leadership and digital capabilities
7	(Day, Widyastuti, and Sihite 2023)	The Influence of Internal Control, Organizational Behavior, and Digitalization on Company Performance	Mixed Method	Investigating the influence of internal control, Organizational Behaviour, and Digitalization on company performance in the palm oil industry	Digitalization increases the effectiveness of control and performance
8	(Nurul Fauziyyah 2022)	The Effect of Digitalization on Management Accounting	Literature Review	The impact of digitalization on management accounting	Significant changes in accounting functions and tasks
9	(Nasrah 2023)	Management accounting in the digital age	Literature Study	Digital transformation in accounting systems	Digitalization is becoming a dominant factor in decision-making
10	(Fähndrich 2023)	A Literature Review on the Impact of Digitalisation on Management Control	Literature review	Change Management Control due to digitalization	Digitalization changes tasks, tools, and structures of management control

RESULTS AND DISCUSSION

Changes in Function and Role Management Control (MC)

Digitalization has driven significant changes in the functions and roles of Management Control(MC) in modern organizations. Strategic use of

digital technology improves operational efficiency and enables faster, more accurate, and data-driven decision-making. Control systems that previously relied on manual documentation are now transforming into automated, real-time, and integrated systems. It makes MC an administrative oversight tool and a strategic driver in achieving organizational goals.

One of the significant changes seen is MC's ability to automatically integrate processes such as financial reporting, risk management, and internal audit. This automation speeds up work processes and significantly reduces the possibility of human error that often occurs in manual systems. In addition, digital technology allows for real-time data recording and monitoring, which strengthens the accuracy of information and speeds up reactions to deviations in operations.

Digital transformation also expands the MC function in creating transparency and accountability at all levels of the organization. With open and digitally documented data access, management can monitor, audit, and evaluate performance more easily. It encourages compliance with applicable standards and regulations and supports the organization's reputation and sustainability.

Digitalization enriches the role of MC through several essential aspects. First, organizations can quickly identify deviations through an integrated monitoring system and take timely corrective actions. Second, neatly organized digital documentation simplifies the audit process and proof of compliance. Third, the use of digital training platforms such as e-learning supports strengthening employee awareness of internal policies and expanding the reach of training without geographical barriers. Overall, this shift in the role of MC emphasizes the importance of integration between technology and management control in building an adaptive, transparent, and data-driven organizational system (Fähndrich,

2023; Jasmin et al., 2024; Gunawan et al., 2025; Day et al., 2023; Nurul Fauziyyah, 2022).

The Impact of Digitalization on Tasks Management Control (MC)

Digital transformation has brought about significant changes in the way organizations work, including in the structure and tasks carried out by systems. Management Control(MC). Along with the rapid advancement of technology, the role of MC is no longer limited to administrative supervision and reporting alone. Still, it has shifted to become a strategic part in supporting data-based decision making. This literature review shows that digitalization opens up great opportunities for developing management accounting, while creating new challenges in transforming organisations.

Digitalization introduces a new dimension to MC practices, both operationally and strategically. According to Nasrah (2023), digitalization increases process efficiency through automation and system integration and disrupts traditional business models by creating new approaches to organizational processes. This transformation includes using technology not just as a technical tool but as a foundation in forming more adaptive work processes that are responsive to market needs. As a result, MC must adjust the control methods and devices used to remain relevant in the digital business environment.

The literature also identifies the emergence of new tasks in the increasingly complex and multidimensional MC function. They provide data-based decision-making templates, support organizational strategies, conduct scenario analysis, and utilize technology to create transparency and efficiency. In this context, Fähndrich (2023) groups the future roles of MC into three main categories: (1) Governance roles that emphasize professionalism and compliance; (2) Data scientist roles that rely on digital intelligence and analytics;

and (3) Business partner roles that make MC a strategic advisor to top management. This transformation reflects the functional expansion of MC from a control role to a strategic collaboration role.

In addition, digital change also touches on aspects of human resource behavior and competence involved in management control. Digitalization not only affects work systems and tools, but also reshapes expectations of management accountant capabilities. Employees who are not ready to face the demands of digitalization are at risk of experiencing emotional stress, resistance to change, or even losing relevance in the organizational structure. Therefore, organizations must develop digital competency development programs that align with changes in MC tasks, such as technology-based training, strengthening understanding of information systems, and improving analytical skills.

Furthermore, the quality of decision-making in a digital environment depends on the availability of relevant, accurate, and reliable data. However, the literature shows that not all organizations have a sound data governance system. A study by WHU in Nurul Fauziyyah (2022) found that only half of chief data officers in large German companies reported directly to the CFO, indicating a coordination gap between data owners and strategic decision makers. It shows the importance of strengthening the responsibility structure in data management to optimally support the role of MC.

Finally, the success of strengthening the role of MC in the digital era is highly dependent on educational and training institutions' readiness to equip future management accountants with appropriate competencies. Higher education curricula must adapt to digitalization, emphasizing technological mastery, analytical thinking, and cross-functional understanding of the industry. It is a challenge and an opportunity for the

world of education to help shape the profile of management accountants ready to play an active role in digitalized organizations.

Challenges of Implementing Digitization in Management Control (MC)

Although digitalization provides various strategic advantages for management control (MC) systems, such as increased efficiency, transparency, and data-driven decision-making, the implementation process is not free from several crucial challenges. Various studies show that digital transformation in management control often faces technical, structural, and cultural obstacles. These three aspects need to be taken seriously so that the benefits of digitalization can be achieved optimally and sustainably.

One of the main challenges is the high technology investment. Implementing ERP systems, analytics platforms, and supporting hardware and software requires a large budget, especially in the early stages of transformation. This cost includes the purchase of equipment, infrastructure development, employee training, and complex system integration. Several studies suggest using cloud computing-based technology as a more efficient and flexible alternative to reduce the cost burden, especially for medium and small-scale organizations.

The second challenge that is no less important is employee resistance. The transition from a manual to a digital system often triggers discomfort and even rejection from employees, especially those less familiar with technology. Lack of mental and technical readiness to face this change can slow down the process of adopting digitalization. Therefore, organizations must design an effective change communication strategy and implement ongoing training programs, emphasizing the practical benefits of using digital systems. This training also builds an adaptive and collaborative digital work culture.

The third challenge that is increasingly emerging in the digital era is the issue of data security and information privacy. With increasing dependence on digital technology in the control process, organizations become more vulnerable to the risk of data leaks, cyber attacks, and misuse of information. Kusnanto et al., (2024) state that information security must be essential in designing a digital-based MC system. Therefore, it is necessary to implement protection measures such as data encryption, user authorization systems, firewalls, and other layered security protocols to ensure the integrity and confidentiality of organizational data.

These three challenges illustrate that digitalization in MC is not just about technology, but also includes human resource readiness, strategic planning, and mature risk management. Failure to anticipate these challenges can hinder the achievement of digitalization goals and even cause long-term losses. Therefore, every organization must adopt a holistic approach that considers technical, cultural, and security aspects when designing a digitalized MC system.

Management Control System Limitations and Framework Levers of Control

In modern organizations, management control systems (Management Control/MC) have a central role in bridging long-term strategy formulation and short-term operational control. The literature review shows that MC is positioned between two other managerial activities: strategic planning and operational control. All three have elements of planning and control, but differ in the level of structure, time horizon, and type of data used. Strategy formulation tends to be unstructured and focused on the long-term future, task control is highly structured and oriented towards short-term actions, while management control combines the two

with intermediate structure and time horizon (Asiva Noor Rachmayani 2015).

This fundamental difference indicates that MC does not merely perform technical administrative functions, but also plays a role as a liaison between the company's strategic vision and operational implementation. It is where the need for an approach that can balance control and value creation arises. In this case, the framework, Levers of Control, developed by Robert Simons from Harvard Business School, is an essential reference in designing effective control systems in dynamic organisational environments (Simons 1995). Simons proposed four main levers in a management control system, namely:

- a. **Belief System (Belief Systems):** Used to convey and affirm the company's core values, such as vision statements, mission statements, and shared beliefs. This system serves as a guideline for behavior and long-term strategic direction.
- b. **Limit System (Boundary Systems):** Defines the boundaries of behavior and risks an organization must avoid. These boundaries are enforced through formal policies such as codes of ethics, investment guidelines, asset acquisition regulations, and standard operating procedures.
- c. **System Control Interactive (Interactive Control Systems):** Managing strategic uncertainty by encouraging active dialogue between management and operational units. This system is realized through interactive use of data, face-to-face meetings, and participatory decision-making processes.
- d. **Diagnostic Control System (Diagnostic Control Systems):** To monitor and evaluate performance achievements based on key indicators, such as production targets, budgets, efficiency standards, compensation systems, and incentives.

These four systems form an adaptive MC framework, enabling organizations to remain "on course" or track despite high external dynamics. In practice, MC measures performance, shapes values, sets boundaries, drives innovation, and maintains accountability.

The literature also highlights that the application of these four levers can help organizations achieve a balance between tight control and strategic flexibility. Thus, modern MC systems are no longer just monitoring tools, but strategic platforms that support achieving organizational goals through values, structure, involvement, and evaluation.

CONCLUSION

Digitalization has fundamentally impacted how organizations design and implement control management systems (Management Control/MC). Based on the results of the literature review, it was found that digitalization drives a shift in the role of MC from merely an administrative function to an integral part of strategic decision-making. The MC function is now broader, with the ability to integrate information systems, encourage transparency, and facilitate efficiency and accuracy in performance monitoring.

This transformation also gives rise to new tasks for MC practitioners, including the ability to process data in real-time, conduct scenario analysis, and become a strategic partner for management. However, despite bringing significant benefits, digitalization also faces challenges such as high technology investment, employee resistance to change, and data security risks.

The implementation of digital control systems also requires organizations to adjust work structures and cultures, as well as update HR competencies. In this case, education and training are critical in preparing management accountants who can perform MC functions in the digital era.

The Framework Levers of Control developed by Simons remains relevant in explaining how organizations can balance control and flexibility. Belief systems, boundaries, interactive controls, and diagnostic controls are essential for responsive and sustainable MC design.

Thus, this article confirms that developing a digital-based control management system is not just an option, but a strategic necessity for organizations that want to survive and compete in the era of technological disruption. This study also opens space for further exploration of new MC models, digital competency readiness, and technology integration in future organizational internal control systems.

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