European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.17, No.1, 2025

Competitive Edge in Crisis: The Role of MCS in Managing Environmental Disruptions

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Abstract

This proposed study aims to examine the role of Management Control Systems (MCS) as a strategic resource for sustaining competitive advantages during environmental crises. In today's volatile business environment, organizations face numerous challenges from economic downturns, political instability, and natural disasters. These crises create uncertainty, making it difficult for companies to maintain or improve their competitive position. This research explores how MCS can mediate the relationship between environmental crises and competitive advantage by providing structure, adaptability, and decision-making support. It suggests that MCS, through tools like performance measurement, employee empowerment, and standardized procedures, help organizations maintain strategic alignment and foster innovation. A questionnaire-based survey will be conducted to gather insights from top managers responsible for MCS design and implementation. The survey will focus on five key dimensions of MCS: employee empowerment, visual performance measurement, inventory tracking, strategic reporting systems, and standardized work. By investigating these aspects, the study aims to provide a deeper understanding of how MCS can support organizations in navigating environmental disruptions and securing long-term success.

Keywords: Management Control Systems (MCS), Competitive advantages, Environmental crises

DOI: 10.7176/EJBM/17-1-11
Publication date: February 25th 2025

1. Introduction

Effective control practices are fundamental to the survival and sustainable growth of any business, regardless of its size structure, or industry Simons (1987), (Otley 2014, Otley and Soin 2014, Simons 2019, Rehman, Elrehail et al. 2023). In an increasingly complex and uncertain business environment, ensuring that operations align with strategic objectives is essential. MCS serve as a critical mechanism for monitoring performance, mitigating risks, and driving organizational efficiency (Shurafa and Mohamed 2016, Hasanudin, Yuliansyah et al. 2019). By integrating financial and non-financial controls, MCS not only safeguard stability but also enhance adaptability, enabling firms to navigate challenges and seize competitive advantages. MCS serve as an organization's instrument to accomplish its goals, secure its survival, particularly in times of environmental crisis, and promote growth by creating and sustaining sustainable behavioral patterns and offering helpful data to support planning, decision-making, and performance assessment (Henri 2006, Theriou, Maditinos et al. 2017, Silva, Rodrigues et al. 2021, Jukka 2023). "The formalized routines and procedures using information to maintain or alter patterns in organizational activity" is the general definition of MCSs. This includes formalized information-based processes for planning, budgeting, cost control, environmental scanning, competitor analysis, performance evaluation, resource allocation, and employee rewards (Simons 1987). As we live in a rapidly changing environment, there is a need for a tool to continuously scan the surrounding environment to identify existing or potential threats, as well as current or future opportunities.

However, environmental scanning alone is not sufficient unless supported by effective communication channels that facilitate the exchange of information, enabling timely and accurate decision-making, which, is one of the key roles of MCS (Otley 2014, Otley and Soin 2014, Simons 2019). In an environment shaped by uncertainty, it is crucial to deeply understand what aspects of the MCS need modification to address emerging challenges. This requires a thorough comprehension of the pressure that environmental uncertainty exerts on MCS design to ensure alignment with the surrounding environment (Chenhall 2003, Eldridge, van Iwaarden et al. 2013, Eker and Eker 2019, Luiz and Beuren 2023, Nguyen, Liu et al. 2023). Such external pressures can either drive the development of sustainable competitive advantages or push a business out of the market if the response is inadequate. This paper propose to examine the influence and pressure of environmental crises—such as wars, pandemics, and economic downturns—and explore how these pressures on MCS can potentially lead to competitive advantages. A business without sustainable competitive advantages faces significant challenges in ensuring its survival, particularly during periods of uncertainty. In this context, competitive advantages help retain customers over the long term, ensuring consistent revenue generation and cash flow, which are critical for

survival (Ma 2000, Christensen 2001, Markus and Rideg 2021). Without sufficient cash flow, a business's ability to sustain itself is severely jeopardized.

2. The relationship between Environmental Crisis and MCS

even more critical for organizations (Ditillo 2004, Otley 2014, Eker and Eker 2019, Luiz and Beuren 2023, Nguyen, Liu et al. 2023). These systems serve as fundamental tools, not just for performance evaluation, but for strategic guidance, enabling organizations to navigate through the complexities and challenges posed by such unstable environments (Eldridge, van Iwaarden et al. 2013). MCS provides a structured approach for monitoring and controlling various aspects of organizational performance, which is essential when external conditions are unpredictable and volatile (Kattan, Pike et al. 2007, Otley and Soin 2014, Abu Afifa and Saleh 2022).

One of the main challenges faced by organizations during periods of turmoil is the high level of uncertainty regarding the future. In such situations, making predictions about outcomes becomes increasingly difficult. Companies may be unsure about market trends, consumer behavior, and the overall economic environment. This is where MCS plays a vital role by offering real-time feedback on both financial and non-financial indicators, helping organizations respond promptly to new developments. By relying on actual data rather than assumptions, MCS allows managers to make informed decisions that are more aligned with the rapidly changing realities (Shurafa and Mohamed 2016, SHURAFA 2017, Passetti, Battaglia et al. 2021, Wu and Kong 2021, Lewinson Skörd and Racov 2023).

Furthermore, the continuity of operations is a significant concern during times of crisis, especially when companies are faced with supply chain disruptions, resource shortages, or shifting market demands, MCS helps organizations track and monitor performance on an ongoing basis, providing managers with the insights needed to make adjustments as necessary (Kattan, Pike et al. 2007). By offering a detailed view of key performance indicators (KPIs), these systems help to identify potential issues early, allowing for the timely implementation of corrective actions (Simons 2019). This proactive approach is especially important in times of crisis, where swift decision-making can mean the difference between success and failure.

In addition to monitoring performance, MCS plays a crucial role in guiding strategy formulation and implementation during crises. Organizations often need to rethink and adjust their strategies to align with the new, unpredictable environment (Langfield-Smith 1997, Passetti, Battaglia et al. 2021). Whether it's shifting from a growth-oriented strategy to a more conservative approach or modifying operational tactics to respond to changing customer needs, MCS provides the framework for assessing the effectiveness of these strategic shifts. Continuous evaluation of strategies through MCS ensures that organizations remain focused on their long-term objectives while adapting to short-term challenges(Leoni, Lai et al. 2021, Wu and Kong 2021).

Another critical aspect of MCS in times of uncertainty is its ability to promote transparency and improve communication within the organization. In turbulent times, effective communication becomes even more crucial, as uncertainty can create confusion and a lack of trust among employees. By providing a clear and comprehensive view of organizational performance, MCS helps bridge this communication gap (Eldridge, van Iwaarden et al. 2013, Otley and Soin 2014, Passetti, Battaglia et al. 2021, Carter and Speklé 2024). It fosters transparency by making performance data accessible to all levels of the organization, from top management to frontline employees. This transparency not only builds trust but also encourages greater collaboration across different teams, ensuring that everyone is aligned toward the common goal of navigating through the crisis.

Innovation and adaptability are key factors in helping organizations survive and thrive during periods of uncertainty (Simons 2019, Luiz and Beuren 2023). With the right data and insights provided by MCS, companies are better equipped to innovate and pivot their business models. For example, during a crisis, a company might need to adopt new technologies, explore alternative markets, or reimagine its products and services. MCS helps identify areas where innovation is needed and tracks the outcomes of new initiatives. By continuously monitoring performance, organizations can quickly evaluate whether their innovation efforts are yielding positive results or if further adjustments are needed (Distanont 2020, Sjöholm 2024, Weber, Pedell et al. 2024) .

Many researchers noted that, during times of crisis, organizations are often confronted with their corporate social responsibility (CSR) commitments, particularly in relation to their local communities. In periods of turmoil, CSR initiatives can be either scaled back or, conversely, expanded depending on the company's ability to maintain its operations (Jones 2020, Rolf 2023, Glavas and Visentin 2024). In contrast, other researcher stress the role of MCS in assisting organizations in integrating CSR into their strategies more effectively by tracking and measuring the impact of CSR activities (Arjaliès and Mundy 2013, Hosoda 2020, Rinawiyanti, Huang et al. 2021). For instance, MCS can monitor how well the company’s CSR initiatives align with its long-term goals, and how they are perceived by the public and other stakeholders (Arjaliès and Mundy 2013, Rinawiyanti, Huang et al. 2021). By ensuring that CSR is actively managed, MCS not only supports the company’s ethical

obligations but also strengthens its reputation, which can be particularly valuable in turbulent times when public sentiment can have a significant impact on business success. An empirical research conducted by Rinawiyanti, Huang et al. (2021), aims to investigate the extent to which the MCS adoption in CSR integration into business strategy has an impact on companies' performance, revels that the CSR strategic integration has a positive and significant impact on companies' performance, including employee, operating and financial performance.

Therefore, the role of MCS in crisis management extends beyond immediate survival. In the long term, MCS can help organizations build resilience by fostering a culture of continuous improvement. Through regular monitoring and evaluation, MCS enables organizations to learn from their experiences and integrate those lessons into future strategies. This continuous feedback loop helps companies build adaptive capacity, ensuring that they are better prepared to face future challenges (Ditillo 2004, Kattan, Pike et al. 2007, Denhardt and Denhardt 2010, Eldridge, van Iwaarden et al. 2013, Otley and Soin 2014, Eker and Eker 2019).

Overall, MCS plays a pivotal role in helping organizations manage performance and make informed decisions during times of uncertainty and crisis. These systems not only provide a framework for monitoring performance and implementing corrective actions but also support the strategic adaptation and innovation needed to survive and thrive in turbulent times. Furthermore, by promoting transparency, improving communication, and integrating CSR into business strategies, MCS helps organizations build resilience and maintain a positive reputation. As such, MCS becomes an indispensable tool for navigating through crises and ensuring long-term success.

Building on the previous discussion and prior research, it has been widely recognized that external factors, especially environmental turbulence, significantly influence organizational strategies and internal processes (Otley 2014, Otley and Soin 2014). As companies encounter various forms of uncertainty—whether economic, political, or social—they are often driven to adjust their operations and strengthen their internal mechanisms (Nguyen, Liu et al. 2023). MCS play a pivotal role in this context, offering organizations the tools necessary to navigate challenges, monitor performance, and ensure alignment with strategic objectives (Lewinson Skörd and Racov 2023, Luiz and Beuren 2023). Therefore, the following hypothesis is proposed to examine whether Palestinian companies, operating under the heightened environmental crisis characterized by political conflict—especially following the events of October 7th, 2023—effectively respond to such extreme uncertainty.

H1- The environmental crises has a positive and significant impact on the adoption and utilization of MCS.

3. The relationship between MCS and Competitive Advantages

Both researchers and practitioners have highlighted that MCS, through tools such as standard operating procedures, visual performance metrics, and employee empowerment, play a crucial role in achieving competitive advantage (Tupamahu, Ghozali et al. 2019). Through tools like performance measurement, budgeting, and strategic planning, MCS fosters innovation and efficiency, which are critical for gaining a competitive edge (Nani and Safitri 2021, Luiz and Beuren 2023). Additionally, MCS supports better decision-making by providing timely and relevant information, allowing businesses to respond effectively to external pressures (Chenhall 2003, Otley 2014, Shurafa and Mohamed 2016). When designed to be flexible and responsive, MCS can help organizations differentiate themselves, retain customers, and maintain profitability. Ultimately, MCS plays a pivotal role in integrating strategy with operational execution, ensuring that competitive advantages are not only achieved but also sustained over time (Simons 2019). In this context, Measuring visual performance offers insights regarding time that are closely linked to strategic goals and are easily understood by employees (Fullerton, Kennedy et al. 2013).

It aids in guaranteeing the production of high-quality products and timely deliveries that meet customer requirements (Maskell, Baggaley et al. 2011). Thus, MCS's has the ability to align organizational resources, strategies, and operations to produce high quality product and services Fullerton, Kennedy et al. (2014) likewise discovered that employing visual performance metrics as one of the feedback and information communication tool reduced cycle times, rework, and waiting periods. These findings suggest that visual representation of performance metrics will enhance production adaptability. Therefore, MCS serves as a framework for monitoring and evaluating performance, ensuring that strategic goals are met efficiently.

Based on that, the relationship between MCS and competitive advantages is deeply interconnected. For example, MCS offers standard instructions for employees to facilitate coordination during operations, while also enhancing work effectiveness and efficiency. Standardization will offer advantages that shorten response times for faster shipping, lower the error rate in production processes, and enhance firms' competitiveness regarding pricing (Rondeau, Vonderembse et al. 2000, Tupamahu, Ghozali et al. 2019) Accordingly, MCS provides the structure and processes needed to achieve and sustain organizational goals in a competitive market.

Additionally, MCS, via its standard operating procedures, can manage customer order handling, material procurement, product testing, and offer contingency plans that support maintaining quality and adaptability in the manufacturing process (Kennedy and Widener 2008). It assists in overseeing workflows in every operational task to guarantee consistent quality. Moreover, Empowerment fosters a workforce motivated by enhanced knowledge and the capability to deliver high-quality products or services. Empowerment enables employees to engage actively in making swift and accurate decisions, thereby aiding in the attainment of organizational objectives (Fullerton and McWatters 2002, Kennedy and Widener 2008, Tupamahu, Ghozali et al. 2019). Thus, MCS facilitates continuous performance monitoring and feedback, helping organizations identify inefficiencies and areas for improvement for better quality. This adaptability is crucial in responding to environmental uncertainties and turning challenges into opportunities. Therefore, MCS needed to promotes collaboration across departments, improving communication and information flow, which is vital for timely and informed decision-making. Importantly, MCS drives innovation by encouraging the evaluation of alternative strategies and investments that enhance a company's value proposition. It ensures that organizational goals are met while maintaining flexibility to adapt to shifting market conditions, which is a key factor in creating sustainable competitive advantages. By integrating financial and non-financial metrics, MCS supports a holistic approach to strategy execution, helping businesses secure their position in the market. Based on the preceding discussion and the previously mentioned studies, the following hypothesis has been formulated:

H2: There is a positive relationship between MCS and competitive advantage.

4. The Mediating Role of MCS between Environmental Crisis and Competitive Advantage

text The relationship between environmental crises, MCS and competitive advantage has become a significant area of interest in the field of strategic management. In today's volatile business environment, companies are increasingly exposed to environmental crises such as economic recessions, political instability, natural disasters, and public health emergencies .These external factors often create uncertainty, posing challenges for organizations striving to maintain or improve their competitive position in the market (Ditillo 2004, Otley 2014, Otley and Soin 2014, Abu Afifa and Saleh 2022, Lewinson Skörd and Racov 2023, Luiz and Beuren 2023). MCS act as mediating mechanisms that help organizations adapt, make strategic decisions, and achieve competitive advantage despite these disruptions. An environmental crisis is an event or series of events that disrupts the normal operations of a company, either in the short term or long term. Crises can be economic, such as a financial recession or market downturn, or they can be social, political, health, or even environmental, like wars or natural disasters (Kattan, Pike et al. 2007, Shurafa and Mohamed 2016, Passetti, Battaglia et al. 2021, Wu and Kong 2021). These crises often lead to uncertainty, changes in market demand, disruptions in supply chains, and shifts in regulations. This unpredictable environment forces organizations to adapt quickly and make decisions that may directly influence their survival and long-term success (López-Gamero, Molina-Azorin et al. 2011, Otley 2014). Crises expose the vulnerabilities of organizations, challenging existing business models and strategies. However, they also provide opportunities for companies to innovate and rethink their operations. Luiz and Beuren (2023) highlighted that environmental uncertainty plays a pivotal role in shaping innovation, which, in my view, could potentially driving competitive advantages. This relationship, as they observed, may stem from the substantial positive impact of MCS on both product and process innovation. In this context, the role of MCS becomes paramount in supporting firms through this uncertainty.(Eldridge, van Iwaarden et al. 2013, Abu Afifa and Saleh 2022).

Management control systems are frameworks and tools that help organizations align their resources, processes, and actions with strategic objectives(Simons 2019). MCS are not limited to financial controls like budgeting or performance measurements; they encompass a broader set of mechanisms including cultural controls, administrative controls, and operational systems. These controls help organizations ensure that their strategies are executed efficiently and effectively, even in the face of external turbulence (Langfield-Smith 1997, Chenhall 2003, Fullerton, Kennedy et al. 2013). In times of environmental crisis, MCS may serve as a mediator that bridges the gap between external uncertainties and the internal strategic goals of a company. When external crises disrupt normal operations, MCS can help organizations by providing structure and direction, enabling adaptability, facilitating information flow and decision-making, ensuring alignment with strategic goals, and promoting organizational learning and innovation (Govindarajan 1984, Ditillo 2004, Eldridge, van Iwaarden et al. 2013, Eker and Eker 2019, Laguir, Gupta et al. 2022).

During a crisis, businesses often struggle with maintaining focus and direction (SHURAFA 2017). MCS provide a structured framework for decision-making, ensuring that strategies are not only reactive but proactive in addressing the challenges posed by the crisis. MCS, particularly flexible systems, allow firms to recalibrate their strategies and operations (Simons 1987, Simons 2019). For instance, performance measurement systems can track changes in the business environment, alerting managers to areas that require immediate attention or

strategic adjustments. MCS also facilitate communication and the flow of information across different levels of the organization (Chenhall 2003, Shurafa and Mohamed 2018, Rehman, Elrehail et al. 2023). In turbulent times, this becomes even more crucial, as decision-makers need access to real-time data to make informed, timely decisions. MCS ensure that this information is accurate, accessible, and relevant to the decision-making process (Eldridge, van Iwaarden et al. 2013, Otley 2014, Otley and Soin 2014, Luiz and Beuren 2023).

Accordingly, MCS help organizations maintain alignment with their strategic objectives despite external disruptions. For example, even in the face of an environmental crisis, an MCS ensures that short-term measures like cost-cutting or resource reallocation do not derail the long-term vision of the organization. Within this perspective, Zaman (2004) emphasized that the performance evaluation process should incorporate both financial and non-financial measures to ensure that short-term financial gains are not achieved at the expense of long-term success. This alignment is essential for maintaining a competitive advantage over time. Crises often create a sense of urgency that drives organizations to innovate. MCS can foster a culture of innovation by encouraging risk-taking, learning from failures, and adapting to new market realities. These systems help companies manage innovation processes and ensure that innovations contribute to sustaining or enhancing competitive advantage (Freel 2005).

Competitive advantage refers to the ability of an organization to outperform its competitors by offering unique value, achieving superior efficiency, or responding more effectively to customer needs and market demands(Nilsson and Rapp 2005). During environmental crises, competitive advantage becomes even more critical as firms need to act swiftly and decisively to secure their position in the market. MCS plays a key role in helping organizations gain or sustain competitive advantage in such situations. MCS systems provide the flexibility needed to pivot strategies and respond to changing market conditions (Otley 2014, Otley and Soin 2014). For instance, MCS can guide companies in reallocating resources to more profitable or less risky areas, allowing them to seize opportunities and mitigate threats during crises. Furthermore, the data-driven nature of MCS supports continuous improvement, ensuring that the organization remains competitive by optimizing processes, reducing costs, and increasing customer satisfaction (Chenhall 2003).

MCS can also help firms develop dynamic capabilities—abilities that enable an organization to sense, seize, and reconfigure resources in response to environmental changes. By utilizing MCS, firms can identify emerging trends, respond to changes in customer preferences, and adapt to regulatory shifts in ways that create or sustain a competitive edge. Research provides substantial evidence supporting the mediating role of MCS between environmental crises and competitive advantage. According to studies by Simons (1995) and Chenhall (2003), organizations with robust MCS are better positioned to respond to environmental disruptions. These systems help organizations remain resilient, align internal processes with external challenges, and make data-driven decisions that enhance performance even under adversity.

In addition, dynamic capabilities theory (Teece et al., 1997) highlights the importance of MCS in developing a firm's ability to adapt and innovate, which is critical for gaining competitive advantage during uncertainty. They arrived at the conclusion. “Whether and how a firm’s competitive advantage is eroded depends on the stability of market demand”. Whereas market demand is closely related to environmental and economic stability. These studies collectively show that MCS serves as a vital tool for organizations to navigate crises while maintaining their competitive position. Hence, Firms that effectively utilize MCS can not only weather the storm of environmental disruptions but also leverage those disruptions as opportunities for long-term success.

The mediating role of MCS between environmental crises and competitive advantage is crucial for organizations looking to thrive in uncertain and turbulent times. MCS help organizations maintain alignment with strategic objectives, enable adaptability, facilitate timely decision-making, and foster innovation—all of which are essential for achieving competitive advantage in the face of crises. Organizations that develop strong MCS are better positioned to manage risks, seize opportunities, and remain resilient in times of uncertainty, ensuring long-term success despite external disruptions. Based on the above discussion and the existing literature, the following hypothesis has been developed:

H3: MCS mediate the relationship between environmental crises and competitive advantages.

5 Research Design

To evaluate whether managers perceive MCS as a strategic resource for sustaining competitive advantages amid environmental crises, a questionnaire-based survey could be administered. This survey would specifically target top managers responsible for designing and implementing MCS. Utilizing this approach, which has proven effective in previous research, enables the collection of valuable insights into managerial perceptions of MCS and its role in crisis management. (Grafton, Lillis et al. 2010, Zizlavsky 2014, Shurafa and Mohamed 2016, Micheli and Mura 2017, Shurafa and Mohamed 2018, Sarker, Ali et al. 2021, Martins, Oliveira et al. 2023). The

questionnaire can employ a 5-point Likert scale for validation, ranging from strongly disagree to strongly agree. This method, consistent with prior research, facilitates the measurement of the study's model dimensions. The figure below (Figure 1) represents the proposed study model.

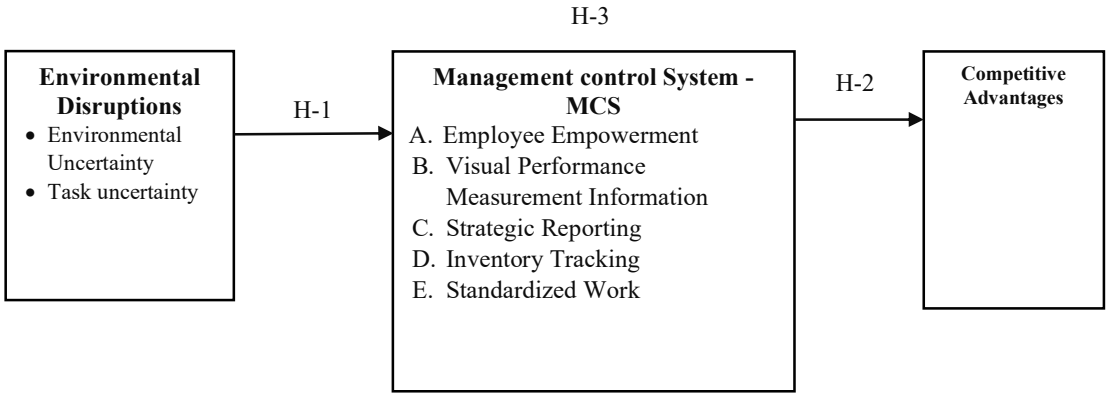

Figure 1: Study Model

6 Variables Measurements

To measure the study model and test the proposed hypothesis, the researcher can use the following measurements, which have been adopted from previous studies. The measurement of MCS, is assessed using five dimensions (employee empowerment, visual performance measurement information, inventory tracking, strategic reporting system and standardized work) adapted from scales utilized in several previous studies. The measures of empowerment and visual performance measurement information were adapted from the Shingo Prize Guidelines, the 14 principles outlined in *The Toyota Way (Liker and Choi 2004)*, and the work ofKennedy and Widener (2008). Empowerment was assessed using a seven-item scale that evaluates employee involvement and participation in problem-solving and continuous improvement initiatives. Meanwhile, visual performance measurement information was measured using an eight-item scale, focusing on the visibility, accessibility, and strategic alignment of performance-related data.

Additionally, inventory tracking and a streamlined strategic reporting system measures was adopted from the work of Nguyen, Liu et al. (2023) as they developed it based on the frameworks proposed by Kennedy and Widener (2008),Maskell, Baggaley et al. (2011), and Cunningham, Fiume et al. (2003). The inventory tracking measure, consisting of three items, captures the significance of inventory monitoring in ensuring product cost accuracy and the extent of cost allocations. Standardized work is essential for enhancing efficiency, consistency, and continuous improvement. As highlighted by Kristensen and Israelsen (2014) and later refined by Tupamahu, Ghozali et al. (2019), it provides a structured framework to optimize workflows, reduce variability, and support strategic planning. This approach ensures organizations can systematically transition toward improved operational performance. Environmental crises introduce significant challenges for organizations, particularly in managing uncertainty and adapting to dynamic conditions. As examined by Gordon and Narayanan (1984) and it was used by Nguyen, Liu et al. (2023), environmental uncertainty and task uncertainty are critical dimensions influencing decision-making and strategic planning. These measures assess the stability of external factors, market predictability, competitive pressures, and the complexity of organizational tasks. Understanding these uncertainties enables firms to develop resilient management strategies and enhance their ability to navigate turbulent environments effectively. These measures provide a comprehensive framework to analyze the study's core concepts (see Table 1).

Table 1. Variables Measurements

Variable	Reference
Management Control System MCS (4 dimensions) Respondents can be asked to indicate the level of agreement or disagreement to the following statements: **A. Employee Empowerment (EMPR)** • Majority of shop-floor workers are cross trained. • Shop-floor workers participate in quality decisions. • Management is committed to quality-related training. • Resources for training are readily available. • All employees are encouraged to make suggestions for problem solving. • Employees are recognized for superior quality performance. • We have a great deal of employee involvement type programs. **B. Visual Performance Measurement Information (VLPM)** • Many performance measures are collected on the shop floor. • Performance metrics are aligned with operational goals. • Visual boards are used to share information. • Information on quality performance is readily available. • Charts showing defect rates are posted on the shop floor. • We have created a visual mode of organization. • Information on productivity is readily available. • Quality data are displayed at work stations. **C. Inventory Tracking (INVTR)** • Tracking inventories is an important accounting function. • Assigning accurate overhead costs to product is critical. • Assigning labor costs to inventory is critical. **D. strategic reporting system** • Simplified Strategic Reporting System (SSRPT). • Indicate your agreement to the following. • statements related to your management accounting system: • Our accounting system has been simplified in the past 3 years. • Our accounting closing process has been streamlined. • Our management accounting system supports our strategic initiatives. • Our accounting information system facilitates. **E. Standardized Work** • Work studies are made and diagrams are made. • They are continuously updated and reliable. • Employees know what is value added and not. • Maps that show current state – current best practice flow of operations. • Action plans to control how to get from current state to future state. • Mapping ensures that actions plan are followed and behavior is not falling back to the "usual".	Fullerton, Kennedy et al. (2013), Kennedy and Widener (2008), Maskell, Baggaley et al. (2011), and Cunningham, Fiume et al. (2003) (Kristensen and Israelsen 2014, Tupamahu, Ghozali et al. 2019)
Competitive strategic priorities (performance compared to competitors: well below = 1, well above = 7) (degree of importance to the business unit: of little importance = 1, very important = 7). • Provide high quality products • Low production costs • Provide unique product features • Low price • Make changes in design and introduce new products quickly • Make rapid volume and/or product mix changes • Provide fast deliveries • Make dependable delivery promises • Provide effective after-sales service and support	(Chenhall 2005)

• Product availability • Customize products and services to customer needs	
Environmental Crisis (Two dimensions: Environmental Uncertainty and Task uncertainty). Respondents can be asked to express their perspectives on statements assessing Environmental Uncertainty and Task Uncertainty using a five-point Likert scale **A. Environmental Uncertainty** • The legal, political, and economic constraints surrounding my firm have stayed the same. • My firm's external economic environment has become more unpredictable. • My firm's external technological environment has become more unpredictable. • It is more challenging for my firm to maintain or improve the market share in my industry. • My firm's competitors provide similar products to mine with cheaper prices or the same prices but with more advanced features or functions. • New products and/or services have emerged more often in my industry over the last five years. • Product marketing and distribution are very competitive in my industry • Competitors have done things threatening to my firm. • The tastes and preferences of my firm's customers have become more unpredictable. • The behavior of competitors has become more unpredictable. **B. Task uncertainty** • Established materials (manuals, standards, directives, statutes, technical and professional books, and the like) cover the work. • We know a lot of procedures and standard practices to do the work well. • We rely on established procedures and practices. • Work is derived from various events. • It takes a lot of experience and training to know what to do when a problem arises. • Tasks require an extensive and demanding search for a solution.	(Gordon and Narayanan 1984, Nguyen, Liu et al. 2023)

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