IRJEMS International Research Journal of Economics and Management Studies
Published by Eternal Scientific Publications
ISSN: 2583 – 5238 / Volume 4 Issue 2 February 2025 / Pg. No: 89-94
Paper Id: IRJEMS-V4I2P110, Doi: 10.56472/25835238/IRJEMS-V4I2P110

Original Article

Exploring the Impact of Supply Chain Quality Management Dimensions on Innovation Performance in Medical Device Distribution Companies

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Received Date: 15 January 2025 Revised Date: 27 January 2025 Accepted Date: 29 January 2025 Published Date: 05 February 2025

Abstract: *This study investigates the impact of management support and commitment, supplier participation, and customer focus on innovation performance in the medical device distribution sector in Indonesia. Conducted across companies operating in Sumatra, Java, and Kalimantan, the research captures the unique dynamics of Supply Chain Quality Management (SCQM) in regions pivotal to the national economy. Employing purposive sampling and multiple linear regression analysis, the findings reveal that management support and commitment significantly enhance innovation performance (Std. Coeff: 0.315, p = 0.001), emphasizing the critical role of leadership and strategic resource allocation. Supplier participation also positively influences innovation performance (Std. Coeff: 0.303, p = 0.002), highlighting the importance of collaborative partnerships in fostering innovation. Furthermore, customer focus is shown to significantly improve innovation performance (Std. Coeff: 0.305, p = 0.001), underscoring the value of a customer-centric approach in driving innovation. The study contributes to SCQM literature by extending its application to the medical device distribution sector and provides actionable insights for improving innovation outcomes through enhanced supply chain practices.*

Keywords: *Supply Chain Quality Management, Innovation Performance, Management Support, Supplier Participation, Customer Focus.*

I. INTRODUCTION

Supply chain quality management (SCQM) has emerged as a critical factor in enhancing organizational performance across several dimensions, including operational efficiency and innovation potential. However, although the literature on SCQM increasingly recognizes its importance, it has not extensively explored the effects of specific SCQM characteristics on innovation performance. This gap highlights the need for a deeper understanding of how SCQM practices and competencies affect the innovative outcomes of an organization (Hong et al., 2019; Fernandes et al., 2016). Moreover, while the integration of TQM and SCM is considered to be a critical strategy for innovation, it remains one of the under-researched areas (Fernandes et al., 2016; Arrfou, 2019).

Effective SCQM practices are known to enhance the quality of products and services, encourage a culture of continuous improvement, and support innovation (Fernandes et al., 2022; MacHado et al., 2016; Gunawan et al., 2024). SCQM with TQM helps organizations leverage upstream and downstream supply chain relationships to generate value and increase customer satisfaction, thus gaining competitive advantages (MacHado et al., 2016; Mehregan et al., 2023; Quang et al., 2016). This study expands on these premises to fill the literature vacuum by examining the specific dimensions of SCQM and their contributions to enhancing innovation performance.

This research primarily aims to establish theoretical frameworks elucidating the links among SCQM practices, capabilities, and business performance, with a special emphasis on innovation (Hong et al., 2019; Fernandes et al., 2016; Arrfou, 2019). It will empirically evaluate these frameworks across many industries by identifying key SCQM characteristics such as supplier quality management, internal process management, and customer focus (Hong et al., 2020). The role of this present study is meant to examine factors that may impact the relationship between SCQM practice and innovation performance, such as knowledge transfer, continuous improvement, and leadership: Hong et al., 2019; Gunawan et al., 2024; Mehregan et al., 2023.

Previous studies suggest that SCQM practices have a great impact on SCQM capabilities, which greatly enhance innovation performance (Fernandes et al., 2016; Quang et al., 2016). The integration of SCQM and TQM techniques is

required for innovation and improvement in organizational performance as a whole (Arrfou, 2019; Mehregan et al., 2023; Vnou ková & Urbancová, 2020). More so, SCQM dimensions have been identified to have a positive correlation with multiple perspectives of the Balanced Scorecard. These include the customer, financial, internal process, and learning and growth perspectives, which are important for innovation (Gunawan et al., 2024; Arrfou, 2019). This article intends to explore how SCQM factors influence innovation performance in medical device distribution firms. The study aims to enhance theoretical progress and practical consequences in SCQM and innovation by addressing gaps in the existing literature and providing empirical validation.

II. LITERATURE REVIEW

A) Management Support and Commitment

Management commitment and support are key elements in the successful implementation of SCQM and innovation programs. There is evidence that management commitment is positively associated with SCI and innovation performance, particularly in SMEs (Chen et al., 2023). Management commitment has an influence on many aspects of the supply chain, including internal processes, relationships with customers, and partnerships with suppliers. With this integration across all the dimensions, management allows firms to produce better innovation output. However, there is a different level of effectiveness in commitment to management based on organizational context and practice (Xu & Zhao, 2022). For instance, strong leadership and quality commitment provide an appropriate environment for innovation by encouraging teamwork, resource availability, and strategy alignment.

Innovation performance is the primary determinant of success in a global marketplace. These are also shaped by other antecedents, including market orientation, total quality management, and supply chain integration, as emphasized by Aziz et al., 2024. Effective SCQM practices supported by a good commitment from robust management significantly contribute to innovation performance by encouraging a collaborative environment for innovation, as described by Shan et al., 2023 and Uddin, 2022. For example, supply chain partnerships and knowledge sharing are mediating factors that enhance innovation performance (Shan et al., 2023). The integration of SCQM and TQM practices creates synergies that enhance both operational and innovation performance, enabling firms to remain competitive in dynamic markets.

The relationship between SCQM, management support, and innovation performance is well-documented in the literature. SCQM practices, when implemented with strong management support, enhance innovation performance by improving supply chain integration and fostering a culture of continuous improvement (Chen et al., 2023). Management's role in driving SCQM initiatives is critical, as it ensures strategic alignment, resource allocation, and stakeholder engagement. Additionally, the incorporation of SCQM dimensions, such as supplier quality management and customer focus, with the commitment of management to quality and innovation, will provide a robust foundation for superior innovation outcomes (Hong et al., 2019; Fernandes et al., 2016). The hypothesis of this research is based on the following description.

H1: Management support and commitment affect innovation performance

B) Supplier Participation

The literature shows that TQM combined with SCM practices highly improves firm performance and competitive advantage. Mehregan et al. (2023) and Arrfou (2019) emphasized that integration helps proactively solve quality issues in the supply chain, promoting innovation. Companies that practice these integrated activities can enjoy increased cooperation, simplified processes, and continuous improvement, leading to a more innovative supply chain. SCM practices have a direct influence on innovation performance because they encourage an ecosystem that supports new product development and process innovation. According to Sabir et al. (2023) and Khalil et al. (2019), collaboration helps firms combine resources and expertise to generate innovative solutions. Kähkönen et al. (2017) added that a well-designed SCQM framework improves organizational adaptability and supports the timely execution of innovative strategies.

Strong supplier-buyer relationships form the basis for successful SCQM practices. According to Gunawan et al. (2024), effective collaboration between suppliers and buyers enhances product innovation and business performance. Trust and transparency created through these relationships help partners to collaborate toward a shared innovation objective. The participation of suppliers in different stages of NPD is not the same everywhere. Moon et al. (2018) and Lau (2011) found that supplier engagement in the early stages of ideation and concept development is key for significant innovation breakthroughs but diminishes during the execution and commercialization phases. This variability underlines the strategic importance of planning when introducing the suppliers into the innovation process.

For efficient optimization of supplier participation in innovation projects, performance measurement systems must be effective. According to Patrucco et al. (2022), such an approach requires a balance between quantitative and qualitative assessments like delivery timelines and defect rates and collaboration quality and knowledge sharing. These measures improve transparency and accountability and promote a culture of continuous improvement among suppliers. Incorporating innovation-

enabling practices within SCQM, such as joint problem-solving and co-development initiatives, empowers firms to overcome challenges and capitalize on opportunities. These practices not only enhance innovation outcomes but also strengthen the overall resilience of the supply chain. Based on this description, the hypothesis of this research is as follows.

H2: Supplier participation affect innovation performance

C) Customer Focus

Omar et al. (2006) stated that companies that pay more attention to customer requirements exhibit better responsiveness and flexibility in their manufacturing process. This enables organizations to respond promptly to changes in market requirements and, thus, maintain efficiency and performance. Customer feedback is a critical input to innovation. Pinto and Romero (2020) and Kim et al. (2015) pointed out that firms can identify opportunities for improvement and new product development by seeking and integrating customer insights. This approach helps to develop a culture of continuous innovation and enhances competitive advantage.

Innovation performance is one of the key determinants of organizational success, driven by many factors such as market orientation, TQM practices, and supply chain integration. According to Aziz et al. (2024a), market orientation helps develop a culture of innovation where the needs of customers and trends in the market are adhered to. By aligning with market dynamics, the firms can easily predict what customers expect and innovate products accordingly, thus sustaining relevance and competitiveness over time.

TQM practices, especially those that focus on customer-centricity and continuous improvement, are critical to the innovation performance. Pinto and Romero (2020), Aziz et al. (2024b), and Vermeulen et al. (2020) reported that a quality-oriented organizational culture, which TQM fosters, is supportive of innovative practices development and deployment. Supply chain processes need to be integrated smoothly to encourage innovation; according to Vermeulen et al. (2020) and Fernandes et al. (2016), integrated supply chains help to facilitate collaboration, knowledge sharing, and efficient resource utilization- all factors that are considered crucial in driving innovation performance. Based on this description, the hypothesis of this research is as follows.

H3: Customer focus affect innovation performance

The conceptual framework for this study illustrates the relationship between dimensions of Supply Chain Quality Management (SCQM) and Innovation Performance in medical device distribution companies.

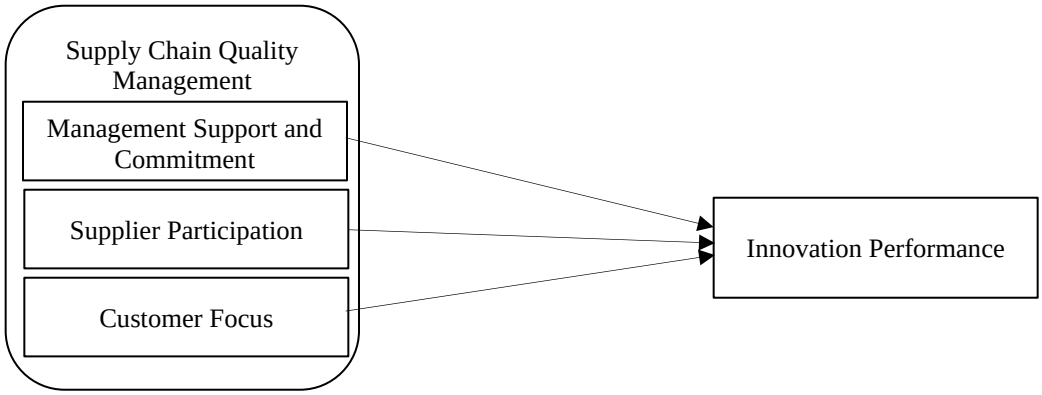

Fig. 1 Conceptual Framework

III. METHODOLOGY

The study adopts a quantitative research design to analyze the relationships among dimensions of Supply Chain Quality Management on innovation performance. The primary data was collected through structured surveys distributed to key personnel in medical device distribution companies. The quantitative approach ensures the reliability and generalizability of the findings by using measurable variables and statistical analyses. The research was conducted in medical device distribution companies located in Sumatra, Java, and Kalimantan. These regions were selected because of their significant contribution to Indonesia's national economy and their pivotal role in the logistics, innovation, and operational activities of the medical device distribution industry.

The study employs purposive sampling to select the sample population. This non-probability sampling technique allows for the deliberate selection of companies that meet specific criteria, ensuring a representative sample. The inclusion criteria include: (a) Companies actively involved in the distribution of medical devices; (b) Companies with established supply chain management practices; (c) Firms demonstrating varying levels of innovation and operational performance.

Data was gathered through a structured questionnaire distributed to supply chain managers, operational heads, and innovation team leaders in the selected companies. The questionnaire was designed to measure Supply Chain Quality Management dimensions and Innovation performance. The collected data was analyzed using multiple linear regression analysis. This statistical technique was chosen to examine the relationships between the independent variables (dimensions of SCQM) and the dependent variable (innovation performance).

III. RESULTS AND DISCUSSION

In this study, innovation performance is the dependent variable, while the independent variables consist of Management Support and Commitment, Supplier Participation, and Customer Focus. The results of the multiple regression model calculation using SPSS software show the following results:

Table 1: Regression Results

Path	Std. Coeff	t-value	P-value	Test-results
H-1 Management support and commitment → innovation performance	0.315	3.466	0.001	Supported
H-2 Supplier participation → innovation performance	0.303	3.134	0.002	Supported
H-3 Customer focus → innovation performance	0.305	3.342	0.001	Supported

These results indicate the following: the influence of management support and commitment has a strong and positive influence on innovation performance in terms of a standardized coefficient, t-value, and p-value of 0.315, 3.466, and 0.001, respectively. Hence, H1 holds that establishing management is an important driver of innovation because of successful practice implementation for Supply Chain Quality Management (SCQM). There is a positive relationship between supplier participation and innovation performance, shown by a standardized coefficient of 0.303 at a t-value of 3.134 and a p-value of 0.002. This supports H2, hence strengthening further the notion that the relationship between firms and their suppliers is critical to attaining innovation goals. Customer focus is proven to positively influence innovation performance with a standardized coefficient of 0.305, a t-value of 3.342, and a p-value of 0.001. It supports H3 and further supports the fact that customers are pivotal in leading the innovations in the supply chain.

A) Discussion

Previous studies have emphasized the importance of management in creating an innovation-friendly environment (Chen et al., 2023; Xu & Zhao, 2022). Management's quality and innovation commitment ensures strategic alignment, proper resource allocation, and strong integration across supply chain processes. Management fosters collaboration among internal teams, suppliers, and customers to enhance innovation outcomes and operational efficiency. Furthermore, the literature emphasizes that the involvement of management in SCQM practices enhances the employees' trust and motivation levels and allows organizations to respond to dynamic market requirements (Shan et al., 2023; Uddin, 2022). Even though the efficacy of management commitment may differ based on the context of the organization, its impact on innovation performance is a vital determinant of competitive advantage in the medical device distribution sector.

Strong supplier partnerships facilitate the exchange of critical knowledge and resources, enabling co-development initiatives that drive product and process innovations (Moon et al., 2018; Lau, 2011). In the context of medical device distribution, supplier participation ensures the timely delivery of high-quality inputs, which is essential for maintaining operational continuity and supporting innovation efforts. Supplier involvement in new product development is important for fostering creativity and accelerating the innovation process; this holds especially during the early stages of NPD, such as in Gunawan et al. (2024). However, this requires that the performance measurement system is sound enough to hold accountable the supplier collaborating with a firm. Indeed, as mentioned by Patrucco et al. (2022), the quantitative and qualitative assessment will evolve in designing an ecosystem that fosters continuous improvement and innovation.

Organizations that consider the needs and opinions of their customers are best placed to seize market opportunities and create innovative products that meet emerging needs (Pinto & Romero, 2020; Kim et al., 2015). Firms can improve their responsiveness and responsiveness by actively involving customer insights in the design and development of their products. More than that, the customer-focused approach is aligned well with TQM principles, such as continuous improvement and alignment to customer expectations, as discussed in Aziz et al. (2024). This integration of SCQM and TQM practices creates a strong framework for the fostering of innovation, which would allow firms to achieve superior performance in dynamic and competitive markets.

B) Theoretical Contribution

The paper gives empirical evidence of the dimensions of SCQM impacting innovation performance in the medical device distribution industry. In that regard, management support, supplier participation, and customer focus have significant improvements in enabling innovation. Findings validate the existing theories related to SCQM and spread it further to apply to the Indonesian contexts of the sector, which is logistically complex as well as innovation-driven.

C) Practical Contribution

For practitioners, the findings call for the SCQM dimensions to assume top priority in their strategic agendas. Then, management should be fiercely committed to quality and innovation with resources and policies aligned towards the organizational goals. Supplier relations, just like customer-centric culture, must be established strongly. Also, firms should make investments in training programs to strengthen SCQM skills among employees and partners. The initiatives will further strengthen supply chain integration and improve the culture of continuous improvement across the organization, fostering innovation and operational excellence.

D) Limitations and Future Research

Although the present study is interesting, its relevance is limited only to medical device distribution companies within Indonesia. There is a high potential for other sectors or other regions to investigate the generalization of these results. Longitudinal studies also can provide the necessary insights concerning the long-run impact of SCQM practices on firm performance.

IV. CONCLUSION

It tries to assess whether management support and commitment, supplier participation, and customer focus have a relation with the medical device distribution sector's innovation performance. The effects of management support and commitment towards innovation performance were significant. There was a significant positive impact on innovation performance with the factor of supplier participation. Customer focus positively impacts innovation performance. With robust SCQM practices, firms can strengthen their innovation capabilities for continued competitiveness in the increasingly dynamic and demanding global marketplace. It provides a good insight for both academics and practitioners and lays out a foundation for future studies and practical applications in supply chain and innovation management.

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