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The role of managerial capability on operational performance through supply chain digitalization and adaptability

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Abstract

Changes in the global business environment constrain companies to adopt digital technology to enhance their performance and competitiveness. This study aims to analyze the role of managerial capability on operational performance through supply chain digitalization and supply chain adaptability in manufacturing companies in Indonesia. Managerial capability is a key factor that enables organizations to design effective strategies, allocate resources efficiently, and foster internal collaboration and external partnerships. The study has distributed questionnaires to 117 respondents from various middle and top managerial functions within the manufacturing company. The questionnaire was designed using a five-point Likert scale and distributed offline and online using a Google Form link. Data analysis employed Partial Least Squares – Structural Equation Modeling (PLS-SEM) to examine the outer model and inner model. The results indicate that managerial capability has a significant impact on supply chain digitalization and supply chain adaptability, but does not directly affect operational performance. Instead, the effect of managerial capability on operational performance is mediated by supply chain adaptability and the combination of supply chain digitalization and adaptability. Supply chain digitalization plays a crucial role in enhancing supply chain adaptability, ultimately leading to a positive impact on operational performance. These findings confirm that supply chain digitalization not only increases the speed of information flow and transparency but also strengthens the company's ability to adapt to market dynamics. The practical implications of this research are the need for manufacturing companies to continuously develop managerial competencies that support digital technology investments, strengthen an adaptive organizational culture, and foster synergy between internal and external functions. For academics, this research provides a conceptual contribution in explaining the mediating relationship between managerial capabilities, supply chain digitalization, supply chain adaptability, and operational performance in the era of digital transformation.

Keywords: Leadership capability, Supply chain digitalization, Supply chain adaptability, operational performance.

1. Introduction

Changes in global competitiveness make technology increasingly crucial for organizational development, enabling the production of products or processes with a high level of competitiveness (Jimenez-Jimenez et al., 2019). Information technology can be a digital system owned by an industry that facilitates faster and more efficient communication

between functions within the company, thereby enhancing operational performance (Sunder & Prashar, 2024; Karttunen et al., 2023). The technology owned by the company encourages the organization to increase efficiency and rapid innovation (Virmani et al., 2025; Lim et al., 2024). Technology has enabled companies to implement strategic processes that effectively maintain their sustainability (Alvarenga et al., 2023). The digitalization that organizations implement not only transforms manual processes into integrated and automated ones (Aamer et al., 2023) but also builds strategies to enhance the competitiveness of manufacturing companies (Wang et al., 2025; Siagian et al., 2024). Digitalization has become crucial for businesses in facing current competition, where manual business processes no longer provide high efficiency in managing the balance between demand and supply functions (Sharma & Joshi, 2023). The external environment determines whether companies can effectively utilize information technology in their business activities, enabling the quick access and sharing of information (Zhao et al., 2023; Al Tera et al., 2024).

The company's digitalization can integrate operations automatically, making it easier for departments to communicate well (Alvarenga et al., 2023). The digitalization that is formed can eliminate errors that occur due to employee fatigue and become a company learning system (Sunder & Prashar, 2024). The company's digitalization can be integrated with data provided by customers (Al-Khatib et al., 2024; Ahmad Amouei et al., 2023). The digitalization implemented by the company enables the production of real-time data, which can be accessed by related departments (Doetzer & Pflaum, 2021; Li et al., 2024; Jia et al., 2024). This condition affects company management by influencing the decision-making process based on available data and reports (Upadhyay et al., 2023). Company management can make decisions that anticipate external changes, enabling them to respond more quickly to market changes (Ahmad Amouei et al., 2023).

The role of management is crucial in developing a company's digital system (Alvarenga et al., 2023). Management can establish strategic policies to quickly respond to the global market and implement internal changes efficiently if the company has an adequate digital system in place to align its operations (Lim et al., 2024). Capability management is crucial for companies to adapt quickly to external changes (Dhaundiyal & Coughlan, 2022). Management obtains real-time data and analysis results that accurately reflect operational conditions, thus serving as a foundation for addressing external company issues (Song et al., 2024). The company's management can overcome daily business difficulties and problems by utilizing adequate data from its own information technology system (Li et al., 2024; Siagian et al., 2024). Management capability can encourage continuous updates to the company's digital system (Pérez-Aróstegui et al., 2015). Management can direct employees to utilize technology to produce data in real-time within self-directed work teams and flexible, cross-functional workforces (Sunder & Prashar, 2024). Management commitment is needed to adapt software and hardware that is adequate for the company's needs (Ngo, 2020). Continuously updated information technology devices can strengthen decision-making for management by supporting data (Upadhyay et al., 2023). The management capability it possesses can drive strong digitalization of the supply chain (Ahmad Amouei et al., 2023).

Management's ability to plan information technology development can significantly impact the sustainability of the digital supply chain (Ionescu et al., 2022). Management can maintain the importance of digitalization for all components of the supply chain (Karttunen et al., 2023). Management's commitment to the digital supply chain can facilitate proper synchronization within the company, especially across functional boundaries, and foster strong collaboration with external partners (Jia et al., 2024). Top management can provide reliable resources for building a digital supply chain, ensuring that information and data sharing with suppliers and customers runs smoothly (Ahmad Amouei et al., 2023). Manufacturing companies strive to effectively implement digital supply chains, enabling suppliers to understand the company's actual needs and the ongoing production process (Karttunen et al., 2023; Harianto et al., 2024). The digital supply chain that is formed allows companies to communicate quickly with suppliers and customers (Sharma & Joshi, 2023). Management's ability to identify the level of digital supply chain needs as a determining factor in implementation (Song et al., 2024; Pirmanta et al., 2021). Management's need to make informed decisions based on market conditions is crucial in developing procedures that produce processes tailored to the company's needs (Dhaundiyal & Coughlan, 2022). Management can accelerate the internal supply chain's adaptability process to adjust to external changes (Tarigan et al., 2021).

Management's ability to overcome internal problems enables the company to integrate departments, thereby increasing supply chain adaptability through the use of information technology (Pérez-Aróstegui et al., 2015). A reliable management capability can develop the right strategy and foster strong cross-functional synchronization, enabling a robust response to changes in the external environment (Munir et al., 2022). Management can organize cross-functional and inter-organizational systems to run simultaneously, thereby increasing supply chain adaptability (Dubey et al., 2018). Management capability can optimize internal resources to run business processes effectively, thereby building strong supply chain adaptability (Mainga, 2017). Strategic decisions made by management, as a form of management capability, can ensure synchronous relations with external partners, thereby enhancing supply chain adaptability (Nenavani & Jain, 2022).

The company's digital supply chain can provide the data needed by external partners (Aamer et al., 2023; Harianto et al., 2024). Customers can gain a better understanding of the company's business processes, thereby improving supply chain adaptability with high flexibility (Doetzer & Pflaum, 2021). The company's digital supply chain enables suppliers and customers to participate in product development quickly (Ionescu et al., 2022). Suppliers can access company data in real-time and track the position of raw material inventory, enabling them to prepare for the company's needs and increase supply chain adaptability (Sharma & Joshi, 2023). The company's digital supply chain can identify both external and internal changes, allowing it to be maintained and adjusted to stay in line (Wang et al., 2025). Effective management capabilities are crucial for establishing this alignment, enabling synergy between supply chain components and promoting robust supply chain adaptability (Zhao et al., 2023). The company's management ability to maintain a digital supply chain and adaptability in the supply chain improve operational performance (Dubey et al., 2018; Tukamuhubwa et al., 2024). A digital supply chain within a company can reduce repetitive work processes, thereby increasing the efficiency and effectiveness of company

resources (Al-Khatib et al., 2024; Karttunen et al., 2023). A digital supply chain enables companies to increase the speed of executing the right program, thereby reducing costs and resources, and improving performance (Al Tera et al., 2024). Digital data makes the company more transparent, thus impacting department synchronization and work productivity (Upadhyay et al., 2023). The company's ability to build a digital supply chain can provide new and user-friendly services, resulting in increased customer satisfaction and timely product delivery (Virmani et al., 2025).

The above description has explored the current phenomena in the business environment, and the advanced technology available in the market. The advances in technology, especially in critical industries for national economics like manufacturing sector have grown rapidly. This advancement has made changes in the global business landscape to the fast-paced and borderless transactions that helps organizational operational efficiency. Additionally, previous research has shown that there is no guarantee that technology adoption will always succeed. Adapting to technology, such as digitalization, requires prerequisites from the firm-specific factors to succeed, including managerial capability. By focusing on the managerial capability of the firm, it will help the company to lead, manage and monitor effective digitalized systems for the stakeholders, especially all parties in its business supply chain – including the employees, customers, and suppliers. Even so, previous research indicates a discrepancy between findings across different sectors or industries. Hence, it needs more robust research to ensure the relevant results for a specific industry sector and geographic location.

Thus, the study examines the role of management capability in operational performance, with a focus on the impact of supply chain digitalization and supply chain adaptability. Based on this title, the study has three objectives: first, to determine the influence of managerial capability on supply chain digitalization, supply chain adaptability, and operational performance. Second, the impact of supply chain digitalization on enhancing supply chain adaptability and operational performance. Third, to examine the role of supply chain digitalization and adaptability.

2. **Literature Review**

2.1. Managerial capability

Managerial capability is the ability of company management to relate, build relationships, and coordinate the resources owned to achieve predetermined goals (Dhaundiyal & Coughlan, 2022). Managers in the company can determine strategic steps to produce performance improvements by maintaining strong coordination and collaboration (Mainga, 2017). Company leaders are the driving force behind innovation, which provides a powerful impetus for achieving goals. Managerial capabilities provide a competitive advantage for the company in building business strengths that are difficult for competitors to replicate (Derwik & Hellström, 2017; Siagian et al., 2024). The ability to recognize changes in the external environment and make rapid changes within the company is a key advantage. Management can view external changes as opportunities or threats to the business (Alvarenga et al., 2023), which can be directly communicated to all employees to be able to make rapid changes to anticipate it (Al-Khatib et al., 2024). The knowledge possessed by

company management can identify valuable information that can be adapted to the company's specific conditions and lead to strong innovation.

The managerial capabilities possessed can determine strategic decisions and tactical steps for the company in managing its resources. The company's top management can coordinate effectively between related functions to anticipate threats, thus enabling a quick recovery (Aamer et al., 2023). The company's managerial ability to efficiently carry out business processes and restore normal conditions is a crucial factor in maintaining resilience (Munir et al., 2022). The managerial capabilities possessed can accelerate and improve change management, thus becoming a strong opportunity for business (Tarigan et al., 2018). Managerial capability plays a strong role in generating the effectiveness of a company's operational processes (Siagian et al., 2024). Management can establish rules and organizational structures as an effective form of relational management in improving performance (Dhaundiyal & Coughlan, 2022). Effective management within an organization can create sustainable added value, thereby enhancing the company's efficiency and effectiveness. Management should be able to identify opportunities and manage internal change to increase competitiveness.

2.2. Supply chain digitalization

Digitalization is crucial for companies in maintaining business continuity, as it enables them to be well-connected and integrated with suppliers and customers through supply chain digitalization (Virmani et al., 2025; Pirmanta et al., 2021). Companies can maintain process consistency by adopting an operational model that is tailored to their specific needs and transforming it into an intelligent system, such as utilizing sensors, actuators, programmable logic controllers, manufacturing execution systems, and flexible and autonomous lines (Sunder & Prashar, 2024). Supply chain digitalization is important for companies to maintain strong communication with customers regardless of geographical distance, by creating a digital business model (Wang et al., 2025). Adopting digitalization in the supply chain enables companies to share planning and information with suppliers on an ongoing basis, allowing for continuous coordination (Alvarenga et al., 2023; Harianto et al., 2024). Companies can increase their competitiveness by adopting information technology and providing information technology facilities through supply chain digitalization (Upadhyay et al., 2023; Karttunen et al., 2023). The use of information technology by companies, utilizing internet technology, enables external partners to access information smoothly (Zhao et al., 2023).

Supply chain digitalization is utilized by companies with suppliers through e-procurement and just-in-time inventory management, enabling both parties to monitor the procurement of raw materials according to their needs (Sharma & Joshi, 2023). Companies can identify the right key suppliers to provide raw materials according to specified specifications (Aamer et al., 2023). The company's established order fulfillment process can produce good efficiency (Ionescu et al., 2022). Supply chain digitalization used by companies with downstream parties who use product results in the use of information technology in e-distribution, e-manufacturing, and e-sales (Ahmad Amouei et al., 2023). Manufacturing companies that fail to utilize digitalization risk losing market share and, consequently, experiencing a decline in competitiveness (Alvarenga et al., 2023). The

importance of digitalization for companies to meet customer expectations, which are increasingly driven by the need for speed and ease of service (Al Tera et al., 2024; Doetzer & Pflaum, 2021). Digitalization in the supply chain is a promising process for increasing visibility and transparency throughout the supply chain, as it facilitates the rapid collection and sharing of information among all stakeholders (Song et al., 2024; Jia et al., 2024). Digitalization in the manufacturing industry can enhance company competitiveness (Al-Khatib et al., 2024; Lim et al., 2024).

2.3. Supply chain adaptability

The company's ability to respond quickly to changes that encompass all activities related to material processing or the conversion of goods from the raw material stage to delivery to customers is referred to as supply chain adaptability (Li et al., 2024). Companies continually strive to anticipate uncertainty by making strategic and operational adjustments to respond to changes in the supply chain flow effectively (Song et al., 2024). Supply chain adaptability enables the maintenance of a balance between internal and external environmental changes, ensuring the continuity of the production process (Li & Yang, 2025). The company strives to maintain a good flow of information and goods from the upstream supply chain to the downstream (Garay-Rondero et al., 2019). Rapid supply chain adaptability can significantly enhance a company's performance. Flexibility in managing operational systems can improve supply chain adaptability (Dubey et al., 2018).

Management's ability to adjust available resources to achieve the company's stated goals can be in the same direction to increase competitiveness (Derwik & Hellström, 2017). A company's ability to anticipate uncertain business changes by using technology is an improvement in supply chain adaptability (Karttunen et al., 2023). The company's ability to conduct environmental scanning to identify emerging market trends and potential disruptions, allowing for early mitigation (Munir et al., 2022; Yu et al., 2019). Supply chain adaptability that can maintain resource flexibility that allows for adjustments to the company's operational capacity (Tukamuhubwa et al., 2024). This situation will have consequences for the procurement of raw materials needed by the company. Supply chain integration can provide accurate and real-time information, leading to increased supply chain adaptability (Zhao et al., 2023). Coordination with external and cross-functional partners can ensure information flows accurately and quickly throughout the supply chain network (Lim et al., 2024). Organizational learning enables continuous improvement by drawing on experiences of adaptation.

Supply chain adaptability requires high-quality information to facilitate effective communication with related parties (Nenavani & Jain, 2022). Supply chain adaptability fosters strong collaboration between company partners, leading to increased competitiveness (Dubey et al., 2018). Digital technology used by companies can support increased supply chain adaptability (Ngo, 2020). Digitalization affects the availability and speed of information for management and employees, enabling rapid adaptation and informed decision-making (Munir et al., 2022). Supply chain adaptability is a crucial factor for companies in maintaining competitiveness, as it enables them to establish strategic steps to enhance supply chain resilience (Tukamuhubwa et al., 2024). The supply chain's

ability to capitalize on opportunities in an uncertain, changing environment. Companies strive to adapt and survive by leveraging their advantages over competitors (Ionescu et al., 2022). The company's supply chain capabilities enable it to maintain a smooth operational flow, from purchasing raw materials to delivering products to end-users (Yu et al., 2019). The company's ability to adapt quickly enables it to maintain normal processes, thereby increasing resilience (Wang et al., 2025).

2.4. Operational performance

Company performance is a combination of tangible and intangible resources, as well as company capabilities. Company operational performance serves as a benchmark for management in maintaining effectiveness and efficiency in producing products and business processes (Al Tera et al., 2024). The company's operational performance can provide management with an overview of the optimal use of resources (Tarigan et al., 2021). Companies can address waste that occurs in operations by analyzing and monitoring each process in the supply chain (Munir et al., 2022). The strategic steps taken by the company to monitor and control operations properly can maintain product quality consistently to meet the needs of the company's customer orders (Sunder & Prashar, 2024). Companies can anticipate delays in the production process by thoroughly understanding the detailed characteristics of each production process, ensuring that the company's accuracy in producing products consistently meets production time targets (Yu et al., 2019).

A company's ability to meet customer demands and meet established standards can increase customer satisfaction. The company's ability to fulfill specific customer orders can increase its competitiveness (Li & Yang, 2025). The company's ability to meet customer requirements through effective fulfillment can provide a unique competitive edge, thereby improving operational performance (Lim et al., 2024). A company's operational capability is closely related to its internal operational effectiveness, which enables it to produce products on time and of high quality. High operational performance is achieved through strong cross-functional coordination, which enables the fulfillment of customer orders and the provision of consistent raw materials, as well as a continuous production process (Karttunen et al., 2023). Integrated cross-functional integration can facilitate the flow of accurate and complete information, enabling more informed decisions that improve the company's operational performance (Zhao et al., 2023). The company's ability to complete customer orders and make timely deliveries is a key indicator of high operational performance (Sunder & Prashar, 2024).

2.5. Relationship between research concepts

2.5.1. The relationship between managerial capability and supply chain digitalization.

Managerial capability becomes crucial for organizations when adopting digitalization technology across all functional departments, enabling them to create goals that align with the company's needs (Virmani et al., 2025). The ability of management to manage resources capable of implementing supply chain digitalization (Al-Khatib et al., 2024). Company management can support the adoption of information technology as a means of digitalizing the supply chain for use in routine company operations (Upadhyay et al., 2023). Coordination between external partners can run smoothly according to management's

direction, facilitated by supply chain digitalization (Al Tera et al., 2024). Company managers can utilize digitalization of the supply chain to enhance the company's competitiveness (Aamer et al., 2023). Management's ability to map technology needs by involving all internal functions can accelerate the digitalization of the supply chain (Alvarenga et al., 2023). Reliable management can effectively utilize supply chain digitalization as a targeted transformation to strengthen competitive advantage (Li et al., 2024). Managerial capability can enable organizations to adapt to the digitalization of the supply chain with the latest technology, thereby increasing competitiveness (Lim et al., 2024). A competent manager is able to communicate effectively with internal and external partners to leverage supply chain digitalization, ensuring operations run smoothly (Dhaundiyal & Coughlan, 2022; Song et al., 2024). A strong manager can utilize data on the digitalization of the supply chain ecosystem to make informed decisions (Sharma & Joshi, 2023). The formed digital supply chain ecosystem can strengthen collaboration with external partners with managerial skills in building it (Ionescu et al., 2022). Based on this explanation, the hypothesis H1 can be established.

H1: Managerial capability influences supply chain digitalization.

2.5.2. The relationship between managerial capability and supply chain adaptability.

Managerial capability has a strong synergy with supply chain adaptability. Managerial ability to establish strong coordination with external partners can improve supply chain adaptability (Derwik & Hellström, 2017). The ability of leaders to set strategies that align with external partners and control resources to be more resilient to disruption requires supply chain adaptability. Strong coordination within the organization is a result of managerial capability, which enables rapid and effective adjustments for supply chain partners (Mainga, 2017). The company's ability to anticipate market changes is a crucial aspect of managerial capability in adopting the correct supply chain adaptability (Karttunen et al., 2023). Management's ability to build a rapid response can anticipate changes that occur as a result of reliable supply chain adaptability by using enterprise resource planning (Tarigan et al., 2018). Company management has established robust business processes that have been consistently implemented, resulting in improvements to the company's supply chain adaptability and performance (Dhaundiyal & Coughlan, 2022). A culture within an organization that has been formed in an orderly manner through managerial reliability can create knowledge management that has an impact on targeted supply chain adaptability (Dubey et al., 2018). Competent company management can build a sustainable supply chain system that is adaptable and integrated with the company's strategy (Tarigan et al., 2021). Based on this explanation, the hypothesis H2 can be established.

H2: Managerial capability affects supply chain adaptability.

2.5.3. The relationship between managerial capability and operational performance.

Managerial capability plays a crucial role in establishing company-level strategies to achieve a competitive advantage. Managerial capability is crucial in determining appropriate performance goals (Tarigan et al., 2018). Effective management by company leadership can result in the efficient utilization of resources, leading to improved operational performance. The resulting cross-functional coordination within the company

can lead to increased work effectiveness, with internal integration resulting in reduced operational costs (Pérez-Aróstegui et al., 2015). The ability of top management to determine appropriate business processes in the company reduces inefficiencies, thereby improving the company's operational performance (Dhaundiyal & Coughlan, 2022). Practical management skills can ensure that internal functions work synergistically to provide a swift response to external changes (Derwik & Hellström, 2017). Coordination between functions has been established quickly and can contribute to operational performance, as it is a key management role. Management's role in facilitating operational needs in response to external changes can maintain the continuity of the production process, thus providing consistent supply chain performance (Munir et al., 2022). Strong managerial capacity in managing company operations can encourage improvements in operational performance (Tarigan et al., 2021). Based on this explanation, the hypothesis H3 can be established.

H3: Managerial capability has a significant impact on operational performance.

2.5.4. The relationship between supply chain digitalization and supply chain adaptability.

Supply chain digitalization is a powerful driver of supply chain adaptability. Companies are effectively leveraging digitalization to achieve robust process integration, significantly improving supply chain adaptability (Upadhyay et al., 2023). Utilizing technology to digitalize the supply chain and maintain visibility of information flow has an impact on the accuracy of decision-making, thereby increasing supply chain adaptability (Li et al., 2024; Virmani et al., 2025). The company quickly obtains information from external sources, creating a strong digital system that provides a strong response to external partners (Ionescu et al., 2022; Garay-Rondero et al., 2019). The company's rapid adaptation to external changes has been achieved by effectively utilizing digital supply chain solutions, including online procurement, big data analysis, additive manufacturing, and optimization models (Sharma & Joshi, 2023; Aamer et al., 2023). Existing digital technology can collect data in real-time to detect changes in external conditions, allowing for the quick resolution of disruptions or obstacles (Zhao et al., 2023; Li et al., 2024). Digitalization enhances the visibility of information systems, making them a key asset for companies in determining their ability to adapt compared to competitors (Al Tera et al., 2024; Lim et al., 2024). A company's rapid and well-formed response can be provided if the digitalization system has been properly adopted (Al-Khatib et al., 2024; Karttunen et al., 2023). Customer needs for the products or services provided can be identified quickly if a digitalization system is available (Wang et al., 2025; Doetzer & Pflaum, 2021). The communication that the company builds with suppliers can synergize well by using integrated digital technology (Song et al., 2024; Karttunen et al., 2023; Harianto et al., 2024). Based on this explanation, the hypothesis H4 can be established.

H4: Supply chain digitalization influences supply chain adaptability.

2.5.5. The relationship between supply chain digitalization and operational performance.

Supply chain digitalization can integrate processes within a company, enabling smooth communication between departments and positively impacting performance (Al Tera et al., 2024). Digitalization enables a rapid flow of information within the company, resulting in increased efficiency (Virmani et al., 2025). Coordination of the supply chain flow

with suppliers and customers can run smoothly as a digital system, thus providing improvements in operational service level performance (Sunder & Prashar, 2024). Supply chain digitalization enables the receipt of operational data in real-time from both internal and external sources (Wang et al., 2025), which can influence decision-making and facilitate the anticipation of external changes (Jia et al., 2024). Effective digitalization of the supply chain can maintain timely processes by fostering strong coordination between departments (Upadhyay et al., 2023; Pirmanta et al., 2021). Synchronization between cross-functional functions within the company can run smoothly, reducing the need for raw material adjustments to meet customer orders, resulting in a decrease in inventory (Garay-Rondero et al., 2019). Supply chain digitalization enables internal companies to communicate effectively with external partners, thereby shortening the operational cycle (Zhao et al., 2023). Consistency in production results can be achieved when there is alignment between company functions and increased digitalization of the supply chain (Alvarenga et al., 2023; Aamer et al., 2023). Information technology that facilitates digitalization in companies enables operational processes to run stably (Al-Khatib et al., 2024; Ionescu et al., 2022) and enhances competitiveness (Lim et al., 2024). Companies can maintain stable and even improve performance by maintaining and strengthening digitalization (Sharma & Joshi, 2023; Li et al., 2024; Garay-Rondero et al., 2019). Supply chain digitalization enhances operational performance by enabling informed decision-making based on thorough data analysis (Song et al., 2024). Based on this explanation, the hypothesis H5 can be established.

H5: Supply chain digitalization affects operational performance.

2.5.6. The relationship between supply chain adaptability and operational performance.

Supply chain adaptability is crucial for companies to maintain relationships with their upstream and downstream partners, thereby improving operational performance (Nenavani & Jain, 2022). Management continually strives to maintain supply chain adaptability, enabling it to adjust to external changes and sustain operational performance quickly (Zhao et al., 2023). Companies can anticipate rapid changes in customer orders, allowing them to quickly communicate with suppliers to ensure delivery accuracy is maintained (Li & Yang, 2025). The company's supply chain adaptability enables it to adjust to internal and external conditions, thereby meeting the specified product quality (Ngo, 2020). Supply chain adaptability enables companies to adjust to changing production conditions, allowing for flexibility in adjusting production and delivery volumes (Yu et al., 2019). Companies can maintain operational performance by paying attention to inventory control, thereby anticipating needs and optimizing resources (Munir et al., 2022). Supply chain adaptability can maintain high adaptability, thereby ensure normal company operations and enable the ability to overcome sudden obstacles (Dubey et al., 2018). Supply chain adaptability, combined with the company's operational flexibility in maintaining work rhythm and business process flow, can help maintain high productivity (Garay-Rondero et al., 2019). Based on this explanation, the hypothesis H6 can be determined.

H6: Supply chain adaptability improves operational performance.

2.5.7. The relationship between managerial capability and operational performance through supply chain digitalization and supply chain adaptability.

The managerial capability possessed by the company can sustain a sound system, ensure the consistency of its operational work and improving performance (Dhaundiyal & Coughlan, 2022). Management's ability to allocate resources effectively enables the maintenance of a robust digitalization system (Alvarenga et al., 2023), allowing for seamless integration between functions that synergize to produce improved performance (Al Tera et al., 2024). Top management's commitment to maintaining updated information technology facilities can improve digitalization systems and high responsiveness to external partners (Zhao et al., 2023). Managerial capability is the foundation for companies in building supply chain digitalization and adaptability in anticipating market changes (Derwik & Hellström, 2017). Companies with a strong digitalization system can access data in real-time (Al-Khatib et al., 2024), enabling management to make informed decisions in response to external factors by adjusting external conditions to maintain operational performance (Li et al., 2024). Top management consistently provides employees with adequate training to maintain supply chain digitalization and quickly adapt to global changes (Song et al., 2024). Companies need to maintain operational performance with timely delivery by strengthening digitalization (Ionescu et al., 2022) and provide fast and accurate management response decisions. Companies with high managerial competency can enhance supply chain integration, which serves as a foundation for supply chain digitalization (Garay-Rondero et al., 2019) and improve adaptability to enhance operational performance and competitiveness. The information generated within a company to generate digital supply chains to anticipate uncertainty and increase adaptability plays a crucial role for management. The company's managerial capabilities actively contribute to creating a rapid response to maintain excellence by utilizing digital systems (Lim et al., 2024). Based on this explanation, hypotheses H7, H8, and H9 can be established.

H7: Managerial capability impacts operational performance through supply chain digitalization.

H8: Managerial capability affects operational performance through supply chain adaptability.

H9: Managerial capability affects operational performance through supply chain digitalization and adaptability.

Based on the above arguments, the relationship between concepts is illustrated in Figure 1.

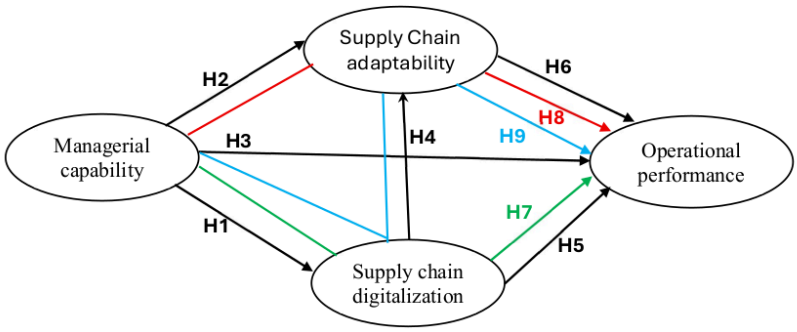

Figure 1. The research model

3. Research Method

This study involves four variables: managerial capability, supply chain digitalization, supply chain adaptability, and operational performance. The managerial capability is defined by adopting five measurement items from Dhaundiyal & Coughlan (2022), namely managerial ability to coordinate (MC1), managerial ability to communicate (MC2), managerial ability to create bonding (MC3), managerial ability to adapt resources (MC4), and managerial ability to adapt (MC5). Supply chain digitalization is assessed adopting Al Tera et al. (2024) and Song et al. (2024) with measurement items: digital system running well in the purchasing department (SCD1), the digital system running well in the production department (SCD2), the digital system running well in the sales department (SCD3), the digital system running well in the warehouse department (SCD4), the digital system can be accessed by suppliers (SCD5), and the digital system can be accessed by customers (SCD6). Supply chain adaptability is determined with six measurement items by adopting Dubey et al. (2018) namely: the management ability to monitor external supplier conditions (SCA1), the ability to monitor external customer conditions (SCA2), the ability to develop new suppliers (SCA3), the ability to evaluate customer needs (SCA4), the ability to produce design flexibility (SCA5), and the ability to know the condition of the company's products (SCA6). Measurement for the operational performance includes five measurement items by adopting Sundar & Prashar (2024) and Yu et al. (2019), namely: production productivity (Op.P1), delivery service level (Op.P2), inventory level (Op.P3), quality products (Op.P4), and work safety (Op.P5). Data collection was conducted offline and online. Researchers conducted offline data collection by distributing questionnaires to industry practitioners in several regions of Indonesia, including Batu City, Bandung City, Jakarta City, Malang City, Semarang City, Sidoarjo City, Solo City, Surabaya City, and Yogyakarta City. Researchers administered questionnaires to industry practitioners. The second stage involved distributing questionnaires to enumerators who had received proper explanations on how to complete them. The next stage involved online data collection, which was facilitated by creating a Google Form to reach all practitioners in Indonesia easily. The results of the direct distribution of questionnaires were 46 questionnaires that could be further processed, and from distribution via Google Form, 71 questionnaires were obtained. The total number of questionnaires that were further processed to determine the respondent profile was 117.

The respondent profile is demonstrated in Table 1, with 86 males (73%) and 32 females (27%). Functional areas in the company in the accounting and finance function 23 (19%), marketing and sales 35 (30%), planning production inventory control and supply chain management department 13 (11%), production and operational 22 (19%), purchasing and material management 15 (13%), engineering 6 (5%) and information technology 4 (3%). Based on the organizational structure, the breakdown is as follows: top management (8%), managers (56%), supervisors & senior staff (11%), and junior staff (11%). Respondent

characteristics based on length of service: more than 9 years, 45 people (38%), 6-9 years, 24 (20%), 3-6 years, 32 (27%), and less than 3 years, 17 (14%). Supply chain digitalization requires application technology within the company, with the majority (61%, 52%) being self-developed, and SAP accounting for 32% (27%). Moreover, finally, the number of company employees is distributed across a large workforce category of more than 100 employees, 37 (31%), a medium workforce category of 20 to 100 employees, 76 (64%), and a small workforce category of Less than 20 employees, 5 (4%).

Table 1. Respondent Characteristics

Characteristic	Description	Qty	Percentage
Gender	Male	86	73%
	Female	32	27%
Respondent from the functional	Accounting & Finance	23	19 %
	Marketing & Sales	35	30%
	Planning Production Inventory Control & Supply Chain Management	13	11%
	Production & Operational	22	19%
	Purchasing & Material Management	15	13%
	Engineering	6	5%
	Information Technology	4	3%
Structure the respondent in the organization	Top management	8	6%
	Manager	56	57%
	Supervisor & Senior Staff	43	19%
	Junior Staff	11	17%
Working in industry	More than 9 years	45	38%
	6 -9 years	24	20%
	3 - 6 years	32	27%
	Less than 3 years	17	14%
Application of digitalization	SAP	32	27%
	ORACLE	12	10%
	BAAN, JD EDWARDS & MFGPRO	4	3%
	Microsoft Dynamic	9	8%
	Self-Development	61	52%
Amount of employee	More than 100 employees	37	31%
	20 to 100 employees	76	64%
	Less than 20	5	4%

4. **Results and Discussion**

The data that can be further processed is from 117 respondents in a manufacturing company that has already implemented digital supply chain management, as indicated by

the application system used. The company can provide information that suppliers and customers can access regarding the company's current condition. The manufacturing company already has an information system that can access data from raw material and finished goods warehouses for external partners. Data processing was carried out to obtain assessment criteria of fit validity greater than 0.500 for loading factors and AVE (Average Variance Extracted) values. Reliability testing is considered satisfactory if the composite reliability and Cronbach's Alpha are above 0.70. The criteria for these test results are shown in Figure 2.

Table 2: Assessment of Criteria of the Outer Model

Item	Mean	Factor Loading	Composite reliability	Cronbach alpha	AVE
Managerial Capability	4.167		0.874	0.820	0.583
MC1	4.051	0.827			
MC2	4.136	0.725			
MC3	4.237	0.791			
MC4	4.034	0.790			
MC5	4.376	0.676			
Supply Chain Digitalization	4.144		0.882	0.840	0.556
SCD1	4.025	0.679			
SCD2	4.060	0.740			
SCD3	4.119	0.717			
SCD4	4.144	0.811			
SCD5	4.314	0.748			
SCD6	4.203	0.772			
Supply Chain Adaptability	4.095		0.880	0.835	0.551
SCA1	4.186	0.614			
SCA2	4.008	0.800			
SCA3	4.042	0.772			
SCA4	4.136	0.718			
SCA5	4.017	0.778			
SCA6	4.178	0.759			
Operational Performance	4.247		0.850	0.782	0.533
Op.P1	4.254	0.649			
Op.P2	4.302	0.803			
Op. P3	4.198	0.670			
Op. P4	4.250	0.695			
Op.P5	4.233	0.816			

Assessment of the outer loading validity criteria for managerial capability with the lowest value in MC5 (managerial ability to adapt) of 0.676 and AVE 0.583, the lowest for supply chain digitalization is SCD1 (the digital system running well in the purchasing department) of 0.679 and AVE 0.556, the lowest of supply chain adaptability is SCA1 (the ability to monitor external supplier conditions) of 0.614 and AVE 0.551, the lowest item of operational performance is Op.P1 (production productivity) of 0.649 and AVE 0.533. All measurement items of each variable have met the validity test requirements, with values above 0.500. The assessment of the outer loading criteria for reliability in Table 2 meets the requirements above 0.700 for composite reliability and Cronbach's alpha. Managerial capability has an average value of 4.167, with measurement item values ranging from 4.025 to 4.376, indicating that managerial ability is crucial in determining policies build competitiveness and commitment to company operations. Supply chain

digitalization was assessed with an average value of 4.144 and a mean value of measurement items ranging from 4.025 to 4.314, indicating that the company has shared information with external partners and that internal partners can access data in real-time through the company's information technology system. Supply chain adaptability with a mean value of 4.095 and a mean value of measurement items of 4.008 - 4.186, indicating that the company's supply chain adaptability can adapt to external changes by providing a fast and appropriate response. Finally, the operational performance variable, with a mean value of 4.247 and a range of measurement items from 4.198 to 4.302, indicates that the company's delivery quality and accuracy have been perfect. Based on the results of data processing, the value for the predictive model Q was obtained.^{2}: 1- [1-0.443) x (1-0.567) x (1-0.402)] = 0.856 = 85.6 %. The predictive model indicates that operational performance is primarily determined by managerial capability, supply chain digitalization, and adaptability, accounting for 85.6%, while the remaining 14.4% is attributed to other variables not discussed in the research model. The assessment of the outer and inner model criteria has met the requirements; therefore, the research hypothesis testing (H1-H9) can proceed.

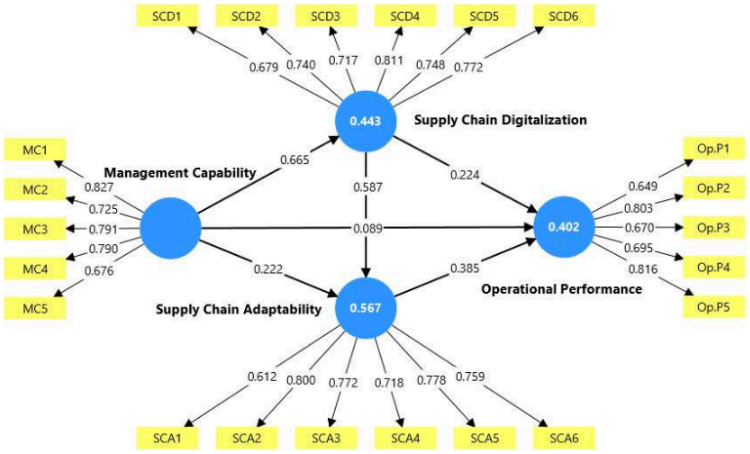

Table 3 Results Hypotheses Testing

Hypothesis of Research	Path Coefficient	T statistics	P values
(H1) Management Capability -> Supply Chain Digitalization	0.665	12.095	0.000
(H2) Management Capability -> Supply Chain Adaptability	0.222	2.503	0.012
(H3) Management Capability -> Operational Performance	0.089	0.688	0.492
(H4) Supply Chain Digitalization -> Supply Chain Adaptability	0.587	7.057	0.000
(H5) Supply Chain Digitalization -> Operational Performance	0.224	1.657	0.097

(H6) Supply Chain Adaptability -> Operational Performance	0.385	3.229	0.001
(H7) Management Capability -> Supply Chain Digitalization -> Operational Performance	0.149	1.453	0.146
(H8) Management Capability -> Supply Chain Adaptability -> Operational Performance	0.086	2.020	0.043
(H9) Management Capability -> Supply Chain Digitalization -> Supply Chain Adaptability -> Operational Performance	0.151	2.444	0.015

The managerial capability towards supply chain digitalization, as the first hypothesis, obtained a t-statistic value of 12.095 (>1.960) and a p-value of 0.000 (<0.050), which was declared accepted. The first hypothesis was that managerial capability had a significant effect on the digitalization of the supply chain, with a coefficient of 0.665. The company's managerial capability reflected its ability to coordinate and adapt resources, which had a significant influence on the company's digitalization of the supply chain. This was achieved through the development of a digital system that ran smoothly in the warehouse department and could be accessed by both customers and staff. The results of the study have supported the results of previous studies, which stated that managerial capability towards supply chain digitalization (Virmani et al., 2025; Al-Khatib et al., 2024; Dhaundiyal & Coughlan, 2022; Upadhyay et al., 2023; Al Tera et al., 2024; Song et al., 2024; Ionescu et al., 2022).

The second hypothesis, which posits managerial capability as a factor influencing supply chain adaptability, obtained a t-statistic value of 2.503 (>1.960) and a p-value of 0.012 (<0.050), which was deemed accepted. The second hypothesis found that managerial capability had a significant effect on the supply chain adaptability, with a coefficient of 0.222. The managerial capability owned by the company, as indicated by the managerial ability to create bonding and adapt resources, influenced supply chain adaptability, enabling the ability to evaluate customer needs and produce design flexibility. The results of the study support those of previous studies, which have stated that managerial capability towards supply chain adaptability (Dhaundiyal & Coughlan, 2022; Mainga, 2017; Derwik & Hellström, 2017; Karttunen et al., 2023; Tarigan et al., 2018; Dubey et al., 2018).

The managerial capability hypothesis regarding operational performance, as the third hypothesis, obtained a t-statistic value of 0.688 (<1.960) and a p-value of 0.492 (>0.050), which was rejected. The third hypothesis found that managerial capability had a significant effect on the supply chain adaptability, with a coefficient of 0.089. The managerial capability of the company suggests that managerial ability to communicate and allocate resources does not have a direct impact on operational performance. The results of the study indicate that managerial capability does not have a direct impact on operational performance due to the need for a forum used by top management in producing company effectiveness and efficiency (Tarigan et al., 2018; Pérez-Aróstegui et al., 2015; Dhaundiyal & Coughlan, 2022; Derwik & Hellström, 2017; Munir et al., 2022).

The fourth hypothesis, namely that supply chain digitalization affects supply chain adaptability, yielded a t-statistic value of 7.057 (>1.960) and a p-value of 0.000 (<0.050); therefore, the hypothesis is accepted. The fourth hypothesis suggests that supply chain

digitalization has a significant effect on supply chain adaptability, with a coefficient of 0.587. The company's digital supply chain, with its digital systems running smoothly across the production department, sales department, and other areas, has a significant impact on supply chain adaptability, enabling the ability to monitor external customer conditions and evaluate customer needs. The results of the study have supported the results of previous studies, which stated that supply chain digitalization on supply chain adaptability (Upadhyay et al., 2023; Li et al., 2024; Virmani et al., 2025; Ionescu et al., 2022; Garay-Rondero et al., 2019; Sharma & Joshi, 2023; Aamer et al., 2023; Zhao et al., 2023; Al Tera et al., 2024; Lim et al., 2024; Wang et al., 2025; Doetzer & Pflaum, 2021).

The fifth hypothesis, namely supply chain digitalization on operational performance, obtained a t-statistic value of 1.657 (>1.65) and a p-value of 0.097 (<0.1). The hypothesis is accepted at a 10% significance level. The fifth hypothesis states that supply chain digitalization has a significant effect on supply chain adaptability, with a coefficient of 0.224. The company's digital supply chain system, accessible to both suppliers and customers, has a positive impact on operational performance, resulting in improved delivery service levels and inventory management. The results of the study support those of previous studies, which have found that supply chain digitalization has a positive impact on operational performance (Sunder & Prashar, 2024; Virmani et al., 2025; Al-Khatib et al., 2024; Jia et al., 2024; Karttunen et al., 2023).

The sixth hypothesis, namely supply chain adaptability and operational performance, yielded a t-statistic value of 3.229 (>1.96) and a p-value of 0.001 (<0.05), indicating that the hypothesis was accepted. The sixth hypothesis was that supply chain adaptability had a significant effect on operational performance, with a coefficient of 0.385. The company's supply chain adaptability, which encompasses the ability to monitor external supplier conditions and develop new suppliers, has had a positive impact on operational performance, leading to increased production productivity and higher-quality products. The results of the study align with those of previous studies, which have consistently demonstrated that supply chain adaptability impacts operational performance (Nenavani & Jain, 2022; Zhao et al., 2023; Ngo, 2020; Li & Yang, 2025; Yu et al., 2019; Munir et al., 2022).

The seventh hypothesis, which states that managerial capability affects operational performance through supply chain digitalization, yielded a t-statistic value of 1.453 (<1.96) and a p-value of 0.146 (>0.05), indicating that the hypothesis was not rejected. The seventh hypothesis was that managerial capability did not affect operational performance through supply chain digitalization. The eighth hypothesis, with the statement of managerial capability on operational performance through supply chain adaptability, obtained a t-statistic value of 2.020 (>1.96) and a p-value of 0.043 (<0.05), indicating that the hypothesis is accepted. The eighth hypothesis is that managerial capability influences operational performance through supply chain adaptability. The ninth hypothesis, with the statement of managerial capability on operational performance through supply chain digitalization and adaptability, obtained a t-statistic value of 2.444 (>1.96) and a p-value of 0.015 (<0.05), indicating that the hypothesis is accepted. The ninth hypothesis was obtained that managerial capability influences operational performance through supply chain digitalization and adaptability.

Manufacturing companies in Java have widely adopted information technology that has been integrated across cross-functional areas. Continuous management commitment is necessary to perform maintenance effectively, ensuring the adequate update of software and hardware. Managerial capabilities are essential for determining policies that maintain healthy relationships with suppliers and customers within the information system. The involvement of suppliers and customers in the established information system, which involves accessing the required data and participating in the development of the company's system electronically, is a form of digitalization within the supply chain. A company's managerial competence can lead to a level of supply chain adaptability that matches external changes. The company's managerial expertise in directing human resources to optimize the use of supply chain digitalization can enhance supply chain adaptability and operational performance, leading to strong competitiveness. The study's results have significant implications for both practitioners and academics. Implications for practitioners based on the study's results indicate that managerial capabilities need to be directed not only at strategic decision-making but also operationalized in the context of supply chain digitalization and adaptability. Companies need to invest in information technology systems and also be able to adapt to current needs. Managers in a company can maintain good relationships and build strong cross-functional collaboration to create synergy. Managerial skills can create an adaptive organizational culture. For manufacturing companies in Indonesia, strengthening supply chain adaptability through appropriate digitalization will have a direct impact on production timeliness, inventory efficiency, and improved service quality to customers. This research is beneficial for academics, as it can serve as a basis for developing conceptual models and further research on how organizations navigate the challenges of the digital era and global market uncertainty through practical and strategic leadership roles.

5. Conclusions

This study examines the role of managerial capability in operational performance, focusing on the impact of supply chain digitalization and supply chain adaptability. The study's findings are summarized as follows. Managerial capability has a significant effect on supply chain digitalization and supply chain adaptability. However, managerial capability does not directly affect operational performance. Supply chain digitalization and adaptability significantly impact operational performance. As expected, supply chain digitalization and supply chain adaptability mediated the impact of managerial capability on operational performance. Managerial capability plays a crucial role as a foundation in shaping the company's operational performance, but its influence does not occur directly; instead, it occurs through intermediary mechanisms. Managerial capability is proven to encourage the increased digitalization of the supply chain and supply chain adaptability. Digitalization enhances the visibility and integration of supply chain processes, while adaptability enables companies to respond to market changes quickly and flexibly. Supply chain digitalization and adaptability play a significant role in enhancing operational performance. The results of the study confirm that supply chain digitalization, utilizing integrated information technology, can be a driver of supply chain adaptability, which in turn can have a significant impact on operational performance. Manufacturing companies in Indonesia need to

develop managerial leadership to provide strong support for digital transformation and focus on increasing adaptability to achieve sustainable operational excellence.

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