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Operational Management Strategies in Responding to Supply Chain Uncertainty

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Abstract

Purpose - In an era of globalization and evolving market dynamics, uncertainty in the supply chain poses a major challenge for companies. This article aims to evaluate operational management strategies implemented to respond to this uncertainty.

Design/Methodology/Approach - This study adopted a *literature review approach* with a qualitative descriptive method. Literature sources were obtained through searches in scientific databases, namely *Google Scholar* and *ScienceDirect* .

Findings - Through the literature review and conceptual approach, it was found that strategies such as supplier diversification, vertical collaboration, digitalization through technologies such as IoT and AI, and the application of *Agile Supply Chain principles* can increase a company's flexibility and responsiveness to supply chain threats. Proactive risk management is key to creating sustainable operational resilience.

Originality/Value - The evaluation results show that adaptive and integrative capabilities in operational strategies are crucial for a company's success in maintaining competitive advantage amidst global market uncertainty.

Keywords: operational management; operational strategy; supply chain

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I. INTRODUCTION

In the face of globalization and market dynamics, operational management plays a crucial role in business continuity. Competition now occurs across supply chains, not just between companies. (Salam, et al., 2017). Some companies are able to excel amidst uncertainty because of an effective supply chain that supports strategic objectives through interdependent value-adding processes (Hartanto, 2021). Therefore, operational management that can strategically manage the supply chain is key to creating sustainable competitive advantage amid global challenges and market uncertainty.

The supply chain in management strategy includes a system that encompasses all activities, resources, organizations, and information (Qrunfleh & Tarafdar, 2014), involved in the production and distribution of goods or services, from the production process to the end consumer (Etgar, 2008). Some of the main components in the supply chain include suppliers, producers, distributors, sellers, and customers (Czinkota, et al., 2021). The supply chain also helps manage risk, minimize costs, and increase customer satisfaction (Zhao, et al., 2013). Its main goal is to optimize the flow of goods and information so that products can be easily and quickly available in the market.

Modern supply chains are increasingly complex and vulnerable to various forms of disruption, both in terms of raw material supply, distribution, and production (Widyanti, et al., 2024). This uncertainty requires companies to have an operational management strategy that is adaptive, flexible, and long-term oriented (Mere, 2025). Supply chain uncertainty can be categorized into several types, namely demand uncertainty, supply uncertainty, internal process uncertainty and the external environment in operational management strategies, the main processes such as planning, procurement, production, distribution and inventory management (Gunawan & catur Wahyuni, 2024).

Operational Management Strategies to Face Uncertainty. To overcome uncertainty in the supply chain, companies need to implement adaptive operational management strategies (Purwani & Nurcholis, 2015). An *Agile Supply Chain approach* provides flexibility and rapid response to market changes (Ikasari, et al., 2021). Diversification of suppliers and supply networks reduces the risk of

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dependency, collaboration and vertical integration strengthen coordination between partners (Mursalin, 2014). Digitalization through *IoT, Big Data, and AI* increases visibility and efficiency (Habibi & Panjaitan, 2024).

Meanwhile, proactive risk management ensures a company's readiness to face various potential disruptions. In this context, it is crucial for companies to focus not only on cost efficiency but also on supply chain resilience and flexibility. A long-term operational management strategy must be able to anticipate various forms of potential disruptions, whether technological, regulatory, or changing consumer behavior (Ausat, Suparwata, & Risdwiyanto, 2025). Therefore, companies are required to proactively evaluate and innovate their operational systems to remain competitive and adaptable to global market dynamics.

II. METHOD

This research uses a literature review approach. which is qualitative descriptive. The literature search was conducted from April 2025 to May 2025 using scientific databases, namely Google Scholar and ScienceDirect. Keywords used in the search include *supply chain uncertainty*, *operational strategy*, *agile supply chain*, *digital supply chain*, and *risk management in operations*.

The collected literature was then analyzed using a narrative approach, which involved three main stages: (1) data identification, namely the selection of articles relevant to the topic of operational management strategies and supply chain uncertainty; (2) data evaluation, namely assessing the credibility and validity of the selected scientific sources; and (3) data extraction, namely grouping findings based on certain themes or strategies used by companies in responding to supply chain uncertainty. The following are the names and results of the scientific article search in Table 1.

TABLE I
LITERATURE SEARCH RESULTS AND SOURCES

Study Theme	Source	Number of Searches
Adaptive strategies in dealing with supply chain uncertainty	Gunawan & Catur Wahyuni (2024); Mere (2025); Purwani & Nurcholis (2015); Qrunfleh & Tarafdar (2014)	4
Agile Supply Chain and operational flexibility	Ikasari, et al. (2021); Mursalin (2014); Zhao, et al. (2013)	3
The Role of Digitalization in the Supply Chain (*IoT, Big Data, AI*)	Ausat, Suparwata, & Risdwiyanto (2025); Habibie & Panjaitan (2024); Hartanto (2021)	3
Risk Management in Operations and Supply Chain	Etgar (2008); Salam, et al. (2017); Widyanti, et al. (2024)	3
Vertical integration and collaboration of supply chain partners	Czinkota, et al. (2021); Mursalin (2014)	2
Total		**15**

III. RESULT AND DISCUSSION

Adaptive Strategies in Facing Supply Chain Uncertainty

In an era of global uncertainty, organizations need to adopt effective risk management strategies to ensure stability, growth, and sustainability. Distributing investments and resources across multiple industries, markets, and assets can help mitigate the impact of a single risk event on an organization (Alfiana, et al., 2023). This uncertainty encompasses a wide range of factors, such as regulatory changes, economic fluctuations, shifts in political policy, and disruptions to global supply chains. According to Thiano (2024), companies operating in global markets often face greater risks than companies operating in domestic markets, due to the wider operational scale and external factors that are more difficult to control.

This uncertainty can stem from fluctuating market demand, limited raw material supply, logistical disruptions, or external factors such as economic crises, pandemics, and regulatory changes

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(Sesri Sellina, Zed, & SE, 2025). To address this, companies need to implement adaptive strategies that allow for flexibility and resilience in their operational systems (Setyawasih, et al., 2023). An adaptive strategy allows a company to respond quickly and efficiently to change by adjusting processes, resources, and supply chain workflows (Suwandi, 2023). This approach emphasizes flexible decision-making, openness to change, and strengthened collaboration with supply chain partners (Ernawati, 2023). Therefore, operational risk management is crucial for maintaining business stability and continuity.

Agile Supply Chain Approach

Uncertainty in the global business environment demands that companies have supply chain systems that are not only efficient but also agile and responsive (Adi, 2025). In this context, an Agile Supply Chain approach is a strategic solution that can increase a company's operational flexibility in the face of rapid and unexpected changes (Saputra, et al., 2023). The *Agile Supply Chain* approach emphasizes speed, responsiveness, and flexibility to meet changing customer needs (Tussifah, 2017). Therefore, this system enables companies to dynamically adapt their production processes, accelerate response times to market demand, and adjust operational capacity in real time.

Research results show that implementing agile principles, such as cross-functional collaboration, lead time reduction, and operational reconfiguration capabilities**,** can provide a competitive advantage (Sibay, et al., 2025). Noting that companies with agile supply chains are able to more quickly address supply disruptions and adjust production to market fluctuations. (Lee, 2004; Quaralia, 2022). Thus, the integration of an agile approach in the supply chain not only accelerates the flow of goods and information, but also strengthens the organization's ability to adapt to market dynamics and external risks, which are built through this strategy to become an important foundation in creating a resilient and sustainable supply chain in an era of uncertainty.

Supply Chain Digitalization

Digitalization has become a key driver of global supply chain transformation. Technologies such as the Internet of Things (IoT), Big Data Analytics, and Artificial Intelligence (AI) plays a vital role in creating a more connected, transparent, efficient **and** adaptive supply chain to uncertainty (FAJRI, 2025)**.** IoT enables real-time monitoring of goods movement, asset conditions, and logistics status through sensors installed at all points in the supply chain (Setyabudhi, et al., 2024). Digital transformation is a key factor in shaping a modern, responsive, and efficient supply chain (Hawari & & Adiyono, 2024). Amid global uncertainty, digitalization enables companies to build supply chain systems that are not only fast, but also intelligent and connected (Kuncorosidi & Pamungkas, 2024). Therefore, digitalization is a key driver in the transformation of the global supply chain towards a more connected, transparent, efficient, and adaptive system to uncertainty**.**

IoT sensors, companies can monitor the location and condition of goods in real time, including temperature, humidity, and the status of distribution vehicles (Usanto, et al., 2024). This improves visibility and control over logistics flows and enables early detection of potential disruptions. Big Data Analytics plays a role in collecting, processing, and analyzing large amounts of data from various points in the supply chain (Harefa, 2024). With these capabilities, companies can predict demand, identify risk patterns, and make data-driven decisions. Meanwhile, Artificial Intelligence (AI) strengthens automated decision-making capabilities (Oktavianus, et al., 2023). This AI can dynamically direct logistics, respond to changing supply conditions, and optimize production scheduling. AI is also used in demand planning algorithms, predictive maintenance, and determining the fastest distribution channels (Sariwardani & Si, 2024). Thus, these three technologies strengthen companies' ability to anticipate and respond to disruptions, making digitalization a strategic element in creating competitive advantage in an era of uncertainty.

Operational Risk Management

In an uncertain business environment, risk management is crucial for maintaining operational continuity and supply chain stability (Amien, Harmono, & Syavardie, 2024). Supply chain risks can arise from a variety of sources, including delivery delays, raw material price fluctuations, natural disasters, regulatory changes, geopolitical disruptions, and global pandemics (Nagari, et al., 2024). Therefore, companies must have a proactive and integrated risk management system.

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Supply chain risk management encompasses the processes of risk identification, impact assessment, mitigation strategy development, and ongoing monitoring (Fole, 2023). This strategy focuses not only on responding to disruptions but also on prevention and preparedness. One frequently used approach is risk mapping *and* scenario planning, which assess potential threats at each point in the supply chain (Mukhlis, et al., 2024). Companies with a strong risk culture and data-driven decision-making systems are better prepared to face uncertainty (Pambudi & Andriyanto, 2024). Supplier diversification, strategic stock reserves, and long-term contract agreements are some effective mitigation strategies (Sirine, 2024). Structured, data-driven risk management enables companies to respond to change quickly and strategically (Rachma, 2024). This makes risk management not only a defense tool but also a strategic component in creating a resilient and highly competitive supply chain. (Quaralia, 2022). Thus, collaboration with supply chain partners to share risk information will also be an important part of a resilient system.

Collaboration and Vertical Integration

In the face of supply chain complexity and uncertainty, vertical integration and collaboration between partners are important strategies for creating efficiency, visibility, and operational resilience. Vertical integration refers to the control of more than one stage in the supply chain flow, both upstream (suppliers) and downstream (distribution and customers) (Ambarwati & SE, 2020). Partner collaboration, on the other hand, emphasizes strategic cooperation between independent, yet interdependent, supply chain actors (Kusumaningtyas & Purwantoro, 2023). Therefore, in uncertain situations, vertically integrated companies have greater control over quality, production capacity, and distribution, thus being able to respond more quickly to market changes and operational disruptions.

Collaboration with supply chain partners, such as suppliers, distributors, and logistics providers, is crucial for building a mutually supportive network (Nagari, et al., 2024). Collaboration enables real-time information exchange, decision coordination, and increased transparency (Jamal, et al., 2024). This approach allows for shared risk and faster, more accurate decision-making. Good collaboration also creates trust and long-term commitment between partners, which ultimately strengthens the competitiveness of the entire supply chain network (Ernawati, 2023). In a digital context, the integration of information systems between partners, such as ERP (Enterprise Resource Planning) and SCM (Supply Chain Management), helps align strategies, reduce information silos, and improve data accuracy (Mahendrawathi, 2023). Thus, vertical integration and partner collaboration not only improve operational efficiency but also form a strategic foundation for building a resilient supply chain, adaptive and competitive amidst dynamic global challenges.

IV. CONCLUSION

Operational management plays a strategic role in supporting the effectiveness and efficiency of business processes, particularly in the face of dynamic challenges such as supply chain uncertainty. Strengthening operational management is inextricably linked to the ability of business actors to build adaptive, scalable, and integrated systems. This requires synergy between internal actors (managers, employees, and production systems) and external actors (suppliers, logistics partners, and customers) to create a value chain that is responsive to change.

In light of the reported research findings, efforts to strengthen operational management need to be developed sustainably through the use of technology, increased human resource capacity, and the development of strategies oriented toward collaboration and innovation. With this approach, companies are able not only to maintain operational stability but also to strengthen long-term competitiveness. Therefore, operational management transformation must be an integral part of organizational development strategies in facing increasingly complex global economic challenges. These efforts aim to alleviate business concerns about supply chain uncertainty. They can focus more on developing their businesses without further worry. However, further research is recommended on the factors influencing supply chain uncertainty. This is expected to yield new information for business owners to use as a basis when they experience similar situations.

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