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Supply Chain Agility mediates the Influence of Supply Chain Integration, Supply Chain Visibility and Digital Transformation on Supply Chain Performance

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Abstract: This study aims to analyze the influence of supply chain integration, supply chain visibility, and digital transformation on supply chain performance, with supply chain agility as a mediating variable in Indonesian companies and the logistics industry. A descriptive qualitative approach was employed through a literature review of 60 scientific articles published between 2021 and 2026, sourced from Springer, Wiley, ProQuest, Emerald, Taylor & Francis, Sage, SINTA, Copernicus, and Google Scholar. Data analysis involved reduction, descriptive and comparative presentation, and synthesis of research findings. The results indicate that supply chain integration, visibility, and digital transformation positively influence supply chain agility and performance. Furthermore, supply chain agility contributes to improved supply chain performance. The findings also demonstrate that supply chain agility mediates the relationships between supply chain integration, visibility, digital transformation, and supply chain performance. This study highlights the importance of integrating supply chain processes, enhancing information visibility, and adopting digital technologies to strengthen organizational agility and improve supply chain performance in Indonesia's logistics sector.

Keywords: Supply Chain Performance, Supply Chain Agility, Supply Chain Integration, Supply Chain Visibility, Digital Transformation

INTRODUCTION

In the era of globalization and turbulent market dynamics, supply chain management plays a crucial role in determining the competitiveness and sustainability of an organization or industry. The changing business landscape, driven by global economic uncertainty, post-pandemic recovery, and fluctuations in consumer demand, requires supply chain networks to operate more efficiently, integrated, and responsively. The integrated management of the flow

of goods, information, and finances is no longer just a routine operational activity; it has become a key strategy in optimizing value for customers (Zhao et al., 2023).

Indonesia's economy expanded by 5.11% in 2025, while the transportation and warehousing sector grew 8.78% over the same period, according to Statistics Indonesia (BPS). Within this sector, warehousing, transportation support services, postal services, and courier activities grew by 9.66%, reflecting rising demand for storage, goods distribution, and delivery services. Despite this positive development, Indonesia's logistics performance continues to face challenges. The World Bank's Logistics Performance Index (LPI) 2023 ranked Indonesia 61st with a score of 3.0, declining from 46th place with a score of 3.15 in 2018. This situation suggests that the expansion of transportation and warehousing activities has not necessarily translated into improved logistics performance. Meanwhile, BPS highlights the advancement of Industry 4.0 technologies as a key driver of transformation in logistics, particularly in warehousing, expedition, and courier services. Therefore, companies need to strengthen supply chain integration, improve information visibility, and optimize digital technology adoption to enhance overall supply chain performance (Supply Chain Indonesia, 2026).

Table 1. Supporting Data on the Condition of Indonesia's Supply Chain and Logistics

No	Indicator	Year	Value/Condition	Implications for research
1	Economic growth of Indonesia	2025	5,11%	Showing an increase in economic activity that requires supply chain support
2	Growth of transportation and warehousing	2025	8,78%	Showing the expansion of logistics activities
3	Growth of warehousing, transportation support services, postal and courier services	2025	9,66%	Showing the increasing need for distribution and storage
4	Logistics Performance Index Indonesia	2023	Score 3,0	Showing that there is still room for improvement in logistics performance
5	Indonesia's LPI Ranking	2023	61	Showing Indonesia's logistics performance position in global measurements
6	LPI Indonesia	2018	Score 3,15; rank 46	Showing performance changes compared to the previous period
7	The development of digital technology 4.0	2024/2025	The trend is increasing	Promoting digital transformation across warehousing, freight forwarding, and courier services.

Source: BPS (2025/2026), World Bank LPI 2023 and BPS *Statistics of Warehousing, Expedition and Courier 2024/2025*

The supply chain industry currently faces significant challenges, particularly high logistics costs and limited responsiveness to supply chain disruptions. High employee turnover intentions and low workforce engagement can further undermine operational productivity, contributing to departmental information silos, delivery delays, and inefficient inventory management. These challenges are largely associated with inadequate integration between upstream and downstream supply chain partners, insufficient real-time information visibility, and the slow implementation of digital technologies across supply chain networks. Addressing these issues requires organizations to strengthen cross-functional collaboration, improve data transparency, and accelerate digital transformation to enhance operational efficiency, responsiveness, and overall supply chain performance (Ricardianto et al., 2023).

Various previous studies have examined the factors that influence supply chain performance as well as operational performance. Previous studies often focused on testing partial variables, such as the direct impact of supply chain integration on performance, or the adoption of digital technology on operational efficiency. However, the findings across studies

still show variation and inconsistency; some studies find that digital integration and transformation have a significant direct impact on performance, while other studies indicate that this direct impact is relatively weak if not supported by the internal organizational capabilities of flexibility and agility (Nureen et al., 2023).

Most of the previous literature analyzes the elements of integration, visibility, and technology separately or focuses on the manufacturing sector in developed countries. There is still a research gap regarding how supply chain integration, supply chain visibility, and digital transformation work simultaneously in shaping supply chain agility as a mediating variable, particularly in the context of logistics companies and supply networks in developing countries like Indonesia. Furthermore, the integration between digital capability readiness and the operational responsiveness of logistics human resources has not yet been comprehensively mapped within a single integrated conceptual model (Aslam et al., 2023).

Previous studies have predominantly examined supply chain integration, visibility, and digital technology as separate factors or concentrated on manufacturing industries in developed economies. Consequently, limited research has explored the combined effects of supply chain integration, supply chain visibility, and digital transformation on supply chain agility as a mediating mechanism, particularly among logistics companies and supply chain networks in developing economies such as Indonesia. In addition, the relationship between organizational digital readiness and the operational responsiveness of logistics personnel remains insufficiently investigated within a unified conceptual framework. Addressing these gaps is essential to developing a more comprehensive understanding of how interconnected supply chain capabilities enhance agility and ultimately improve supply chain performance in the Indonesian logistics context (Jing & Fan, 2024).

Based on the research background, this study seeks to examine how existing literature explains the relationships between supply chain integration, supply chain visibility, digital transformation, supply chain agility, and supply chain performance. Specifically, the study reviews the reported effects of supply chain integration, supply chain visibility, and digital transformation on supply chain agility and supply chain performance, as well as the influence of supply chain agility on supply chain performance. Furthermore, this study synthesizes previous research findings to explore the mediating role of supply chain agility in the relationships between supply chain integration, supply chain visibility, digital transformation, and supply chain performance, particularly within the context of the logistics industry and supply chain networks in Indonesia.

METHOD

This study adopts a descriptive qualitative approach using a literature review to examine, assess, and synthesize existing empirical and conceptual research on the relationships between supply chain integration, supply chain visibility, digital transformation, and supply chain performance, with supply chain agility serving as a mediating variable. The study relies on secondary data collected from previously published scholarly works, including journal articles, conference proceedings, and relevant research reports. The literature was sourced from national and international academic databases and indexing platforms, including Springer, Wiley, ProQuest, Emerald, Taylor & Francis, Sage, SINTA, Copernicus, and Google Scholar. A total of 60 scientific articles published between 2021 and 2026 were selected for review. The selection process considered the academic credibility of the sources, publication quality, and relevance to the research objectives to ensure a comprehensive synthesis of the existing literature (Susanto et al., 2024).

Data were gathered through a documentation process involving the systematic examination of selected scientific articles. The collected information was then analyzed through several stages, including data reduction, descriptive and comparative presentation, and

the formulation of conclusions by synthesizing findings from the reviewed studies. To enhance the credibility and consistency of the results, source triangulation was applied by comparing evidence from multiple previous studies. This process involved identifying recurring themes, prevailing patterns, and areas of convergence among the research findings. Through this analytical procedure, the study develops a comprehensive synthesis of existing knowledge and establishes an integrated conceptual model that explains the relationships among supply chain integration, supply chain visibility, digital transformation, supply chain agility, and supply chain performance. (Zulfikar et al., 2024).

RESULTS AND DISCUSSION

Results

Based on the problem formulation above, the results of this literature study are as follows:

Supply Chain Performance

Supply chain performance is the level of overall effectiveness and efficiency of the supply network's operations in meeting customer needs and achieving the company's strategic goals. This construct measures the extent to which activities connected from suppliers to end consumers can optimize resource use, reduce operational costs, and maintain product quality standards (Gupta et al., 2021).

The indicators or dimensions found in the supply chain performance variable include: 1) Cost Efficiency: Measuring the extent to which the supply chain can reduce total operational costs, including procurement, inventory storage, processing, and transportation and distribution costs without sacrificing quality; 2) Order Fulfillment Reliability: Assessing the timeliness, quantity accuracy, and condition integrity of the products received by customers; 3) Fulfillment Cycle Time: Measuring the total duration required from the moment the customer places an order until the product or service is physically received and ready for use (Visamitanan & Assarut, 2021).

Supply chain performance variables are relevant to previous research conducted by: (Pushpamali et al., 2021), (Can Saglam et al., 2021).

Supply Chain Agility

Supply chain agility is the strategic and operational ability of a supply network to quickly and efficiently detect, respond to, and adapt to sudden market changes, demand uncertainty, or external disruptions. This construct reflects the speed of a company in changing production volume, adjusting the product portfolio, or altering distribution channels without causing significant cost overruns or a decline in service quality (Patel & Sambasivan, 2022).

The indicators or dimensions present in the supply chain agility variable include: 1) Market Responsiveness: The ability of the supply chain to detect and quickly respond to market demand fluctuations, trend changes, or consumer preferences in real-time; 2) Operational Flexibility: The capability to adjust production volumes, product mixes, or delivery routes without triggering significant operational disruptions or cost overruns; 3) Supplier Adaptation Speed: The ability to quickly reallocate orders, adjust contracts, or collaborate with alternative suppliers in the event of supply chain disruptions or crises (Pasupuleti et al., 2024).

The supply chain agility variable is relevant to previous research conducted by: (Aldhaheri & Ahmad, 2023), (Alfalla-Luque et al., 2023).

Supply Chain Integration

Supply chain integration refers to the extent to which a company strategically collaborates and aligns its core processes with supply chain partners, both suppliers on the upstream side and customers on the downstream side. This construct involves the integrated

management of the physical flow of goods, information flow, and financial flow to create a smooth and efficient system (Tiwari, 2021).

Indicators or dimensions within the supply chain integration variable include: 1) Internal Integration: The extent to which departments within a company (such as production, logistics, marketing, and finance) are interconnected, share data, and have aligned operational goals; 2) Supplier Integration: The level of strategic partnership with upstream suppliers, including joint planning, synchronization of procurement schedules, and supplier involvement in product development; 3) Customer Integration: Practices of collaboration and direct information exchange with downstream customers to understand real needs, plan demand forecasts, and improve service quality (Siagian et al., 2021).

Supply chain integration variables are relevant to previous research conducted by: (Ganbold et al., 2021), (Tiwari, 2021).

Supply Chain Visibility

Supply chain visibility defines a company's ability to access, track, and share operational data and crucial information in real-time across all levels of the supply network. This construct includes transparency in product flow, inventory status, delivery locations, production schedules, and potential distribution bottlenecks from upstream to downstream (Khan et al., 2024).

Indicators or dimensions within the supply chain visibility variable include: 1) Inventory Information Transparency: The ability to accurately track the position, quantity, and status of goods inventory at every point in the supply chain (warehouse, transit, to retail store); 2) Goods Flow Tracking Capability: Access to real-time data regarding the physical location, movement, and estimated time of arrival (ETA) of goods during the delivery process; 3) Accessibility: The ease with which all members of the supply network can access and exchange reliable operational data without being hindered by internal system silos (Agrawal et al., 2024).

The supply chain visibility variable is relevant to previous research conducted by: (Baah et al., 2022), (Khan et al., 2024).

Digital Transformation

Digital transformation in the supply chain is a comprehensive integration process of advanced digital technologies into all operational aspects and supply network strategies to change the way businesses operate and deliver value. This construct does not merely refer to the adoption or computerization of basic IT tools, but rather a fundamental change in culture, processes, and work models through the utilization of technologies such as the Internet of Things (IoT), Big Data Analytics, artificial intelligence, Cloud Computing and Blockchain (Tavana et al., 2022).

Indicators or dimensions within the digital transformation variable include: 1) Adoption of Advanced Digital Technologies: The level of integration of modern digital devices and systems such as the Internet of Things, artificial intelligence, cloud computing, and big data analytics into supply chain activities; 2) Process Automation: The extent to which operational and administrative workflows (order entry, warehouse management, up to automated billing processing) have shifted from manual procedures to automated systems; 3) Ecosystem Digitalization: The readiness and connectivity of the company's digital platforms with business partner systems to support transactions and automatic data exchange (Jing & Fan, 2024).

The variable of digital transformation is relevant to previous research conducted by: (Spanaki et al., 2025), (Jing & Fan, 2024).

Previous Research

Based on the aforementioned findings and previous research, the research discussion is formulated as follows:

Table 2. Relevant Findings from Previous Research

No	Author (Years)	Research Results	Similarity with this research	Difference with this research	Hypothesis
1	(Shukor et al., 2021)	The supply chain integration construct affects supply chain agility and organizational flexibility in manufacturing companies	The equation for the independent variable is supply chain integration and the dependent variable is supply chain agility	The difference in other dependent variables is organizational flexibility.	H1
2	(Baah et al., 2022)	The constructs of supply chain visibility and supply chain flexibility affect supply chain agility	The equation for the independent variable is supply chain visibility and the dependent variable is supply chain agility	The difference in other independent variables is the flexibility of the supply chain	H2
3	(Mutambik, 2024)	The construct of strategic collaboration and digital transformation influences supply chain agility and performance	The equation is that the independent variable is digital transformation, and the dependent variable is supply chain agility	The difference in other independent variables is strategic cooperation	H3
4	(Abdallah et al., 2021)	The construct of supply chain integration and export performance affects supply chain performance	The equation is that the independent variable is supply chain integration, and the dependent variable is supply chain performance	The difference in other independent variables is export performance	H4
5	(Huang et al., 2023)	The constructs of supply chain capabilities, visibility, and resilience affect supply chain performance	The equation on the independent variable of supply chain visibility, dependent on supply chain performance	Differences in other independent variables are supply chain capability and resilience	H5
6	(Rana et al., 2025)	The construct of digital transformation affects the supply chain performance in transportation companies	Equation on the independent variable of digital transformation, dependent on supply chain performance	There is a research object conducted on a transformation company	H6
7	(Mukhsin et al., 2022)	The construct of supply chain agility and supplier flexibility affects supply chain performance	The equation for the independent variable is supply chain agility and the dependent variable is supply chain performance	The difference in other independent variables is the flexibility of the supplier	H7

Discussion

Based on the problem formulation, research objectives, and previous research results mentioned above, the discussion on supply chain research in Indonesia is as follows:

1. The Influence of Supply Chain Integration on Supply Chain Agility

Based on literature reviews and relevant prior research, it is evident that supply chain integration influences supply chain agility within companies or organizations.

To enhance supply chain agility, companies or organizations must implement three indicators of supply chain integration: 1) Internal integration: The company's ability to coordinate and integrate activities across internal units or functions; 2) Supplier integration: The company's ability to establish coordination, communication, and information exchange with suppliers; and 3) Customer integration: The company's ability to establish coordination and information exchange with customers regarding needs, preferences, demand volumes, fulfillment times, and shifts in market requirements.

Successfully implementing these three integration indicators fosters supply chain agility, which can be measured by the following indicators: 1) Market responsiveness: The company's ability to identify changes in demand, customer needs, competitive conditions, and the market environment, and to respond quickly and appropriately; 2) Operational flexibility: The company's ability to adjust operational processes and activities in response to changes in demand volume, product variety, schedules, resource constraints, or operational disruptions; and 3) Supplier adaptation speed: The supplier's ability to rapidly adjust to changes in the company's requirements whether regarding supply volume, delivery schedules, material

specifications, quality, or demand conditions. Supplier integration is a crucial aspect because changes in the company's requirements must be quickly interpreted and addressed by suppliers.

Research conducted by (Shukor et al., 2021), found that supply chain integration influences supply chain agility.

2. The Influence of Supply Chain Visibility on Supply Chain Agility

Based on literature reviews and relevant prior research, it is evident that supply chain visibility influences supply chain agility within companies or organizations.

To enhance supply chain agility, companies or organizations should implement three key indicators of supply chain visibility: 1) Inventory information transparency: The company's ability to provide accurate and up-to-date inventory information, allowing for a clear understanding of stock availability. This enables companies to anticipate inventory shortages or surpluses more quickly; 2) Goods flow tracking capability: The company's ability to monitor the movement of goods from suppliers to customers, thereby tracking the location and status of the goods. This facilitates the detection of delays or disruptions in the distribution process; and 3) Accessibility: The ability of supply chain stakeholders to obtain necessary information easily and in a timely manner. Good information accessibility supports coordination and faster decision-making.

When companies or organizations successfully implement these three supply chain visibility indicators, they can achieve supply chain agility, which is measurable through the following indicators: 1) Market responsiveness: The company's ability to respond quickly and accurately to changes in demand, customer needs, and market conditions. Information visibility helps companies identify these changes early; 2) Operational flexibility: The company's ability to adjust operational processes and activities in response to changes in demand, inventory, or supply chain conditions. Flexibility allows the company to maintain effective operations amidst changing circumstances; and 3) Supplier adaptation speed: The supplier's ability to adjust supply quantities, timing, quality, or specifications to meet the company's changing needs. Rapid access to information enables suppliers to make these adjustments more promptly.

The study was conducted by (Baah et al., 2022), found that supply chain visibility influences supply chain agility.

3. The Influence of Digital Transformation of Supply Chain Agility

Based on literature reviews and relevant prior research, it is evident that digital transformation influences supply chain agility within companies or organizations.

To enhance supply chain agility, companies or organizations should implement three key indicators of digital transformation: 1) Adoption of advanced digital technologies: A company's ability to implement technologies such as IoT, Big Data Analytics, AI, Cloud Computing, and Blockchain to support supply chain activities. Adopting these technologies enables faster information acquisition and decision-making; 2) Process automation: A company's ability to automate various supply chain activities to reduce manual processes, increase operational speed, and minimize errors; and 3) Ecosystem digitalization: A company's ability to integrate digital technologies with suppliers, customers, and supply chain partners, thereby fostering more connected information exchange and coordination. This facilitates a faster response to changes within the supply chain network.

When companies or organizations successfully implement these three digital transformation indicators, they can achieve supply chain agility, which is measurable through the following indicators: 1) Market responsiveness: A company's ability to respond quickly and accurately to changes in customer demand and needs. Digital transformation aids in acquiring market information faster, serving as a basis for decision-making; 2) Operational flexibility: A company's ability to adjust operational processes and activities in response to

changes in demand, inventory levels, or supply chain disruptions. Digital technology and automation facilitate these adjustments; and 3) Supplier adaptation speed: A supplier's ability to adjust supply quantities, timing, quality, or specifications in line with the company's changing needs. Ecosystem digitalization accelerates information exchange, enabling suppliers to make adjustments more rapidly.

Research conducted by (Mutambik, 2024), found that digital transformation influences supply chain agility.

4. The Influence on Supply Chain Integration on Supply Chain Performance

Based on literature reviews and relevant prior research, it is evident that supply chain integration influences the supply chain performance of companies or organizations.

To enhance supply chain performance, companies or organizations should implement three key indicators of supply chain integration: 1) Internal integration: Connecting and aligning information flows and operational processes across internal departments (such as production, logistics, and marketing) to eliminate information silos; 2) Supplier integration: Establishing strategic partnerships with upstream suppliers through coordinated procurement schedules, joint planning, and data transparency. This approach ensures a smooth supply of raw materials and minimizes the risk of procurement delays; and 3) Customer integration: Fostering collaboration and intensive communication with downstream customers to understand actual market needs and generate precise demand forecasts. These practices enable companies to respond to order changes more quickly and accurately.

Successfully implementing these three supply chain integration indicators leads to improved supply chain performance, which can be measured by the following metrics: 1) Cost efficiency: Measuring the company's ability to optimize and reduce total supply chain operational costs spanning procurement, storage, and distribution without compromising product quality or service standards; 2) Order fulfillment reliability: Assessing the accuracy of timing, order quantities, and the condition of goods upon receipt by the customer (ensuring they arrive intact and undamaged). This indicator reflects the consistency and quality of the company's supply chain services; and 3) Fulfillment cycle time: Measuring the total duration from the moment a customer places an order until the product is received and ready for use. A shorter fulfillment cycle time correlates with higher levels of responsiveness and customer satisfaction.

A study conducted by (Abdallah et al., 2021), found that supply chain integration affects supply chain performance.

5. The Influence on Supply Chain Visibility on Supply Chain Performance

Based on literature reviews and relevant prior research, it is evident that supply chain integration influences the supply chain performance of companies or organizations.

To enhance supply chain performance, companies or organizations should implement three key indicators of supply chain visibility: 1) Inventory information transparency: The company's ability to accurately present data regarding inventory position, quantity, and status at every point in the supply chain. This enables real-time stock monitoring to prevent both stockouts and overstock situations; 2) Goods flow traceability: Access to monitor the physical movement of goods, transit locations, and precise estimated times of arrival along distribution channels; and 3) Accessibility: The ease with which all supply network members and stakeholders can access reliable operational data without being hindered by internal system silos. This facilitates rapid and transparent information exchange between business entities.

When companies or organizations successfully implement these three supply chain visibility indicators, supply chain performance improves. This improvement can be measured by the following indicators: 1) Cost efficiency: Measuring the extent to which a company can

optimize and reduce total supply chain operational costs spanning procurement, storage, and distribution without compromising product quality or service standards; 2) Order fulfillment reliability: Assessing the timeliness, quantity accuracy, and condition of goods received by customers (ensuring they are intact and undamaged). This indicator reflects the consistency and quality of the company's supply chain services; and 3) Fulfillment cycle time: Measuring the total duration from the moment a customer places an order until the product is received and ready for use. A shorter fulfillment cycle time corresponds to higher levels of responsiveness and customer satisfaction.

A study conducted by (Huang et al., 2023), found that supply chain visibility affects supply chain performance.

6. The Influence of Digital Transformation on Supply Chain Performance

Based on literature reviews and relevant prior research, it is evident that digital transformation impacts supply chain performance within companies or organizations.

To enhance supply chain performance, companies or organizations should implement three key indicators of digital transformation: 1) Adoption of advanced digital technologies: The extent to which advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), cloud computing, and big data analytics are integrated into supply chain operations; 2) Process automation: The transition of operational and administrative workflows (e.g., order processing, warehouse management, and invoicing) from manual procedures to automated systems; and 3) Ecosystem digitalization: The readiness and connectivity of the company's digital platforms with the systems of business partners (suppliers and customers) to facilitate direct data exchange. This ecosystem integration supports smooth transactions, transparency, and automated coordination among business entities.

When companies or organizations successfully implement these three digital transformation indicators, supply chain performance improves. This improvement can be measured by the following indicators: 1) Cost efficiency: Measuring the extent to which a company can optimize and reduce total supply chain operating costs spanning procurement, storage, and distribution without compromising product quality or service standards; 2) Order fulfillment reliability: Assessing the timeliness, accuracy of quantities, and the condition of goods received by customers (ensuring they arrive intact and undamaged); this indicator reflects the consistency and quality of the company's supply chain services; and 3) Fulfillment cycle time: Measuring the total duration from the moment a customer places an order until the product is received and ready for use. A shorter fulfillment cycle time correlates with higher levels of responsiveness and customer satisfaction.

A study conducted by (Rana et al., 2025), found that digital transformation affects supply chain performance.

7. The Influence of Supply Chain Agility on Supply Chain Performance

Based on literature reviews and relevant prior research, it is evident that supply chain agility influences the supply chain performance of companies or organizations.

To enhance supply chain performance, companies or organizations should implement three key indicators of supply chain agility: 1) Market responsiveness: The ability to rapidly detect and respond to consumer trends, preferences, and demand fluctuations in real-time, ensuring the supply chain remains relevant and adaptable to sudden market changes; 2) Operational flexibility: The supply chain's capability to adjust production volumes, product mixes, or delivery routes without causing significant operational disruptions or cost escalations, thereby maintaining operational continuity amidst uncertainty; and 3) Supplier adaptation speed: The ability to quickly adjust agreements, reallocate orders, or collaborate

with alternative suppliers during supply disruptions, ensuring the continued availability of raw materials despite upstream channel interruptions.

Successfully implementing these three agility indicators can improve supply chain performance, which is measurable through the following indicators: 1) Cost efficiency: Measuring the extent to which a company optimizes and minimizes total supply chain operational costs spanning procurement, storage, and distribution without compromising product quality or service standards; 2) Order fulfillment reliability: Assessing the accuracy of timing, order quantities, and the condition of goods received by customers (ensuring they arrive intact and undamaged), which reflects the consistency and quality of the company's supply chain services; and 3) Fulfillment cycle time: Measuring the total duration from the moment a customer places an order until the product is received and ready for use. The shorter the fulfillment cycle time, the higher the level of responsiveness and customer satisfaction.

A study conducted by (Mukhsin et al., 2022), found that supply chain agility affects supply chain performance.

8. The Effect of Supply Chain Integration on Supply Chain Performance Mediated by Supply Chain Agility

Based on literature reviews and relevant prior research, it is evident that supply chain integration influences supply chain performance within companies or organizations, with supply chain agility acting as a mediating factor.

To enhance supply chain performance, companies or organizations should implement and focus on supply chain integration and agility, encompassing the following aspects: 1) Internal integration: Connecting and aligning information flows and operational processes across internal departments (such as production, logistics, and marketing) to eliminate information silos; 2) Supplier integration: Establishing strategic partnerships with upstream suppliers through coordinated procurement schedules, joint planning, and data transparency; 3) Customer integration: Fostering collaboration and intensive communication with downstream customers to understand actual market needs and generate precise demand forecasts; 4) Market responsiveness: The company's ability to detect and respond to consumer trends, preferences, and demand fluctuations rapidly and in real-time; 5) Operational flexibility: The supply chain's capability to adjust production volumes, product mixes, or delivery routes without causing significant operational disruptions or cost escalations; and 6) Supplier adaptation speed: The ability to quickly adjust work agreements, shift order allocations, or collaborate with alternative suppliers in the event of supply disruptions.

When companies or organizations successfully implement supply chain integration and agility, supply chain performance improves; this can be measured through indicators such as: 1) Cost efficiency: Measuring the extent to which the company optimizes and minimizes total supply chain operational costs, spanning procurement, warehousing, and distribution; 2) Order fulfillment reliability: Assessing the timeliness, accuracy of quantities, and the condition of goods received by customers (ensuring they arrive intact and undamaged); and 3) Fulfillment cycle time: Measures the total duration required from the moment a customer places an order until the product is received and ready for use. The shorter the fulfillment cycle time, the higher the level of responsiveness and customer satisfaction.

A study conducted by (Rahman et al., 2025), found that supply chain integration affects supply chain performance, mediated by supply chain agility.

9. The Effect of Supply Chain Visibility on Supply Chain Performance Mediated by Supply Chain Agility

Based on literature reviews and relevant prior research, it is evident that supply chain visibility influences supply chain performance, with supply chain agility acting as a mediating factor.

To enhance supply chain performance, companies or organizations must implement and focus on supply chain visibility and agility, encompassing the following aspects: 1) Inventory information transparency: The company's ability to accurately present data regarding the position, quantity, and status of inventory at every point in the supply chain; 2) Goods flow tracking capability: Access to monitor the physical movement of goods, transit locations, and precise estimated times of arrival along distribution routes; 3) Accessibility: The ease with which supply network members and stakeholders can access reliable operational data without being hindered by internal system silos; 4) Market responsiveness: The company's ability to detect and respond to consumer trends, preferences, and demand fluctuations rapidly and in real-time; 5) Operational flexibility: The supply chain's capability to adjust production volumes, product mixes, or delivery routes without causing significant operational disruptions or cost escalations; and 6) Supplier adaptation speed: The ability to quickly adjust work agreements, shift order allocations, or collaborate with alternative suppliers in the event of supply disruptions.

When companies or organizations successfully implement supply chain visibility and agility, supply chain performance improves; this can be measured through the following indicators: 1) Cost efficiency: Measuring the extent to which the company can optimize and minimize total supply chain operational costs, spanning procurement, storage, and distribution; and 2) Order fulfillment reliability: Assessing the level of timeliness, quantity accuracy, and the condition of goods received by customers ensuring they arrive intact and undamaged. This indicator reflects the consistency and quality of the company's supply chain services; and 3) Fulfillment cycle time: Measures the total duration from the moment a customer places an order until the product is received and ready for use. The shorter the fulfillment cycle time, the higher the level of responsiveness and customer satisfaction.

A study conducted by (Emon, 2025), found that supply chain visibility affects supply chain performance, mediated by supply chain agility.

10. The Impact of Digital Transformation on Supply Chain Performance Mediated by Supply Chain Agility

Based on literature reviews and relevant prior research, it is evident that digital transformation influences supply chain performance in companies or organizations, with supply chain agility acting as a mediating factor.

To enhance supply chain performance, companies or organizations must implement digital transformation and supply chain agility measures, including: 1) Adoption of advanced digital technologies: The extent to which advanced technologies—such as the Internet of Things (IoT), Artificial Intelligence (AI), Cloud Computing, and Big Data Analytics—are integrated into supply chain operations; 2) Process automation: Transitioning operational and administrative workflows (e.g., order processing, warehouse management, and billing) from manual procedures to automated systems; 3) Ecosystem digitalization: The readiness and connectivity of the company’s digital platforms with business partners' systems (suppliers and customers) to facilitate direct data exchange; 4) Market responsiveness: The company's ability to detect and respond to consumer trends, preferences, and demand fluctuations rapidly and in real-time; 5) Operational flexibility: The supply chain's capability to adjust production volumes, product mixes, or delivery routes without causing significant operational disruptions or cost escalations; and 6) Supplier adaptation speed: The ability to quickly adjust work agreements, shift order allocations, or collaborate with alternative suppliers in the event of supply disruptions.

When companies or organizations successfully implement these digital transformation and supply chain agility measures, supply chain performance improves; this can be measured through indicators such as: 1) Cost efficiency: Measuring the extent to which the company optimizes and reduces total supply chain operating costs spanning procurement, storage, and distribution without compromising product quality or service standards; 2) Order fulfillment reliability: Assesses the level of timeliness, quantity accuracy, and the condition of goods received by the customer ensuring they arrive intact and undamaged. This indicator reflects the consistency and quality of the company's supply chain services; and 3) Fulfillment cycle time: Measures the total duration from the moment a customer places an order until the product is received and ready for use. The shorter the fulfillment cycle time, the higher the level of responsiveness and customer satisfaction.

A study conducted by (Mutambik, 2024), found that digital transformation affects supply chain performance, mediated by supply chain agility.

Conceptual Framework

The conceptual framework is determined based on the problem statement, research objectives, and prior studies relevant to the topic of this literature-based research:

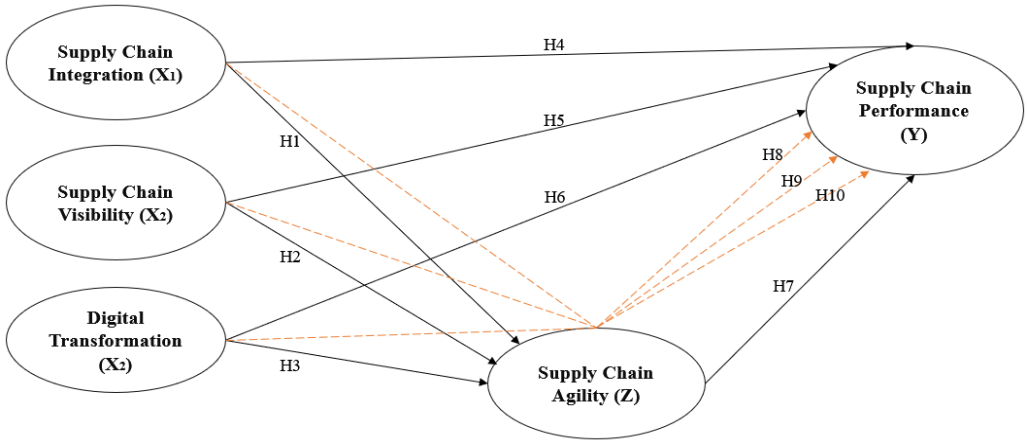


Figure 1. Conceptual Framework

Based on Figure 1 above, the constructs of supply chain integration, supply chain visibility, and digital transformation influence supply chain performance, mediated by supply chain agility. However, in addition to the constructs of supply chain integration, supply chain visibility, digital transformation, and supply chain agility that affect supply chain performance, there are other influencing constructs, including:

1) Supply chain flexibility: (Enrique et al., 2022), (Kamalahmadi et al., 2022), (Singh & Mathiyazhagan, 2024).
2) Supply chain resilience: (Shishodia et al., 2023), (Dubey et al., 2023), (Zhao et al., 2023).
3) Supply chain risk management: (Emrouznejad et al., 2023), (El Baz & Ruel, 2021), (Nwamekwe & Igbokwe, 2024).

CONCLUSION

Conclusion

Based on the research questions, findings, and discussion, this literature review, which considers the context of logistics companies in Indonesia, concludes that supply chain integration, supply chain visibility, and digital transformation are important factors associated with supply chain agility and supply chain performance. The reviewed literature indicates that supply chain integration, visibility, and digital transformation contribute to strengthening

supply chain agility, while also supporting improved supply chain performance. Furthermore, supply chain agility plays a significant role in enhancing supply chain performance by enabling organizations to respond more effectively to operational changes and supply chain disruptions. The synthesis also highlights the mediating role of supply chain agility in the relationships between supply chain integration, supply chain visibility, digital transformation, and supply chain performance. These findings underscore the importance of integrating supply chain processes, improving real-time information visibility, and leveraging digital technologies to enhance organizational responsiveness and achieve better supply chain performance in Indonesia's logistics industry.

Recommendations

For logistics companies in Indonesia, supply chain performance can be enhanced by simultaneously strengthening internal integration, supplier integration, and customer integration. Companies should also improve supply chain visibility through information systems that provide accurate and timely updates on inventory levels, order status, shipment locations, and estimated delivery times. Furthermore, digital transformation should be aligned with operational processes and human resource capabilities to ensure that technological investments translate into tangible performance improvements. The novelty of this study lies in its integrated conceptual framework, which positions supply chain agility as a mediating variable linking supply chain integration, supply chain visibility, and digital transformation to supply chain performance within the Indonesian logistics context. Unlike studies that examine these factors independently, this framework synthesizes their interrelationships to explain how interconnected supply chain capabilities strengthen organizational responsiveness, adaptability, and operational effectiveness. This integrated perspective provides a foundation for logistics companies to develop more agile, transparent, and digitally enabled supply chains while offering direction for future empirical research to validate the proposed relationships in Indonesia's logistics industry.

Research Limitations

This study has several limitations that should be considered when interpreting its findings. First, the research employs a literature review approach based on secondary data from previously published scientific articles, conceptual studies, and relevant research reports. Consequently, it does not involve primary data collection through surveys, interviews, observations, or direct assessments of operational activities within specific logistics companies in Indonesia. Therefore, the findings reflect the synthesis and interpretation of existing literature rather than the actual conditions of individual companies or the entire population of logistics enterprises in the country. Second, differences in research contexts, methodologies, sample characteristics, measurement instruments, and analytical techniques across the reviewed studies may influence the consistency and comparability of the findings. Third, the availability and accessibility of relevant publications, particularly those addressing supply chain integration, supply chain visibility, digital transformation, supply chain agility, and supply chain performance in developing economies, may limit the comprehensiveness of the review. Furthermore, the study does not statistically test the proposed relationships or quantify the magnitude of direct and indirect effects among the variables. Accordingly, the identified relationships should be interpreted as conclusions derived from the synthesis of existing literature rather than definitive empirical evidence applicable to all logistics companies in Indonesia. Future research is therefore encouraged to employ quantitative or mixed-method approaches, including surveys of logistics companies, interviews with supply chain managers, and structural equation modeling, to validate the proposed conceptual framework. Such investigations could provide stronger empirical evidence regarding the mediating role of

supply chain agility and clarify how organizational integration, information visibility, and digital transformation contribute to supply chain performance across different logistics sectors, company sizes, and operational environments in Indonesia.

REFERENCES

Abdallah, A. B., Rawadiah, O. M., Al-Byati, W., & Alhyari, S. (2021). Supply chain integration and export performance: the mediating role of supply chain performance. *International Journal of Productivity and Performance Management*, *70*(7), 1907–1929.

Agrawal, T. K., Kalaiarasan, R., Olhager, J., & Wiktorsson, M. (2024). Supply chain visibility: A Delphi study on managerial perspectives and priorities. *International Journal of Production Research*, *62*(8), 2927–2942.

Aldhaheri, R. T., & Ahmad, S. Z. (2023). Factors affecting organisations' supply chain agility and competitive capability. *Business Process Management Journal*, *29*(2), 505–527.

Alfalla-Luque, R., Luján García, D. E., & Marin-Garcia, J. A. (2023). Supply chain agility and performance: evidence from a meta-analysis. *International Journal of Operations & Production Management*, *43*(10), 1587–1633.

Aslam, H., Waseem, M., Roubaud, D., Grebinevych, O., Ali, Z., & Muneeb, D. (2023). Customer integration in the supply chain: the role of market orientation and supply chain strategy in the age of digital revolution. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05191-y

Baah, C., Opoku Agyeman, D., Acquah, I. S. K., Agyabeng-Mensah, Y., Afum, E., Issau, K., Ofori, D., & Faibil, D. (2022). Effect of information sharing in supply chains: understanding the roles of supply chain visibility, agility, collaboration on supply chain performance. *Benchmarking: An International Journal*, *29*(2), 434–455.

Can Saglam, Y., Yildiz Çankaya, S., & Sezen, B. (2021). Proactive risk mitigation strategies and supply chain risk management performance: an empirical analysis for manufacturing firms in Turkey. *Journal of Manufacturing Technology Management*, *32*(6), 1224–1244.

Dubey, R., Bryde, D. J., Dwivedi, Y. K., Graham, G., Foropon, C., & Papadopoulos, T. (2023). Dynamic digital capabilities and supply chain resilience: The role of government effectiveness. *International Journal of Production Economics*, *258*, 108790.

El Baz, J., & Ruel, S. (2021). Can supply chain risk management practices mitigate the disruption impacts on supply chains' resilience and robustness? Evidence from an empirical survey in a COVID-19 outbreak era. *International Journal of Production Economics*, *233*, 107972.

Emon, M. M. H. (2025). The mediating role of supply chain responsiveness in the relationship between key supply chain drivers and performance: Evidence from the FMCG industry. *Brazilian Journal of Operations & Production Management*, *22*(1), 2580.

Emrouznejad, A., Abbasi, S., & Sıcakyüz, Ç. (2023). Supply chain risk management: A content analysis-based review of existing and emerging topics. *Supply Chain Analytics*, *3*, 100031.

Enrique, D. V., Lerman, L. V., de Sousa, P. R., Benitez, G. B., Santos, F. M. B. C., & Frank, A. G. (2022). Being digital and flexible to navigate the storm: How digital transformation enhances supply chain flexibility in turbulent environments. *International Journal of Production Economics*, *250*, 108668.

Ganbold, O., Matsui, Y., & Rotaru, K. (2021). Effect of information technology-enabled supply chain integration on firm's operational performance. *Journal of Enterprise Information Management*, *34*(3), 948–989.

Gupta, H., Kumar, S., Kusi-Sarpong, S., Jabbour, C. J. C., & Agyemang, M. (2021). Enablers

to supply chain performance on the basis of digitization technologies. *Industrial Management & Data Systems*, *121*(9), 1915–1938.

Huang, Y.-F., Phan, V.-D.-V., & Do, M.-H. (2023). The impacts of supply chain capabilities, visibility, resilience on supply chain performance and firm performance. *Administrative Sciences*, *13*(10), 225.

Indonesia, S. C. (2026). *Transportasi dan Pergudangan, Penopang Pertumbuhan Ekonomi*. Badan Pusat Statistik (BPS), Berita Logistik, Ekonomi, Lembaga Konsultasi Logistik, Lembaga Pelatihan Logistik, Lembaga Penelitian Logistik, Lembaga Pengembangan Logistik, Lembaga Pengkajian Logistik, Logistics, Logistik, Logistik Indonesia, Penopang, Per. https://supplychainindonesia.com/transportasi-dan-pergudangan-penopang-pertumbuhan-ekonomi/

Jing, H., & Fan, Y. (2024). Digital transformation, supply chain integration and supply chain performance: Evidence from Chinese manufacturing listed firms. *Sage Open*, *14*(3), 21582440241281616.

Kamalahmadi, M., Shekarian, M., & Mellat Parast, M. (2022). The impact of flexibility and redundancy on improving supply chain resilience to disruptions. *International Journal of Production Research*, *60*(6), 1992–2020.

Khan, T., Emon, M. M. H., & Rahman, M. A. (2024). A systematic review on exploring the influence of Industry 4.0 technologies to enhance supply chain visibility and operational efficiency. *Review of Business and Economics Studies*, *12*(3), 6–27.

Mukhsin, M., Taufik, H. E. R., Ridwan, A., & Suryanto, T. (2022). The mediation role of supply chain agility on supply chain orientation-supply chain performance link. *Uncertain Supply Chain Management*, *10*(1), 197–204.

Mutambik, I. (2024). The role of strategic partnerships and digital transformation in enhancing supply chain agility and performance. *Systems*, *12*(11), 456.

Nureen, N., Xin, Y., Irfan, M., & Fahad, S. (2023). Going green: how do green supply chain management and green training influence firm performance? Evidence from a developing country. *Environmental Science and Pollution Research*, *30*(20), 57448–57459.

Nwamekwe, C. O., & Igbokwe, N. C. (2024). Supply chain risk management: Leveraging AI for risk identification, mitigation, and resilience planning. *International Journal of Industrial Engineering, Technology & Operations Management*.

Pasupuleti, V., Thuraka, B., Kodete, C. S., & Malisetty, S. (2024). Enhancing supply chain agility and sustainability through machine learning: Optimization techniques for logistics and inventory management. *Logistics*, *8*(3), 73.

Patel, B. S., & Sambasivan, M. (2022). A systematic review of the literature on supply chain agility. *Management Research Review*, *45*(2), 236–260.

Pushpamali, N. N. C., Agdas, D., Rose, T. M., & Yigitcanlar, T. (2021). Stakeholder perception of reverse logistics practices on supply chain performance. *Business Strategy and the Environment*, *30*(1), 60–70. https://doi.org/https://doi.org/10.1002/bse.2609

Rahman, M. K., Hossain, M. A., Piprani, A. Z., & Abdullah, A. R. (2025). Impact of tech-driven integration, flexibility, and ambidexterity on supply chain integration and performance in manufacturing firms: moderating role of uncertainty and agility. *Future Business Journal*, *11*(1), 72.

Rana, J., Daultani, Y., Goswami, M., & Kumar, S. (2025). Exploring the impact of supply chain digital transformation on supply chain performance: an empirical investigation. *Business Strategy and the Environment*, *34*(3), 3497–3521.

Ricardianto, P., Yanto, T. A., Wardhono, D. T., Fachrial, P., Sari, M., Suryobuwono, A. A., Perwitasari, E. P., Gunawan, A., Indriyati, & Endri, E. (2023). The impact of service quality, ticket price policy and passenger trust on airport train passenger loyalty.

Uncertain Supply Chain Management, *11*(1), 307–318. https://doi.org/10.5267/j.uscm.2022.9.012

Shishodia, A., Sharma, R., Rajesh, R., & Munim, Z. H. (2023). Supply chain resilience: A review, conceptual framework and future research. *The International Journal of Logistics Management*, *34*(4), 879–908.

Shukor, A. A. A., Newaz, M. S., Rahman, M. K., & Taha, A. Z. (2021). Supply chain integration and its impact on supply chain agility and organizational flexibility in manufacturing firms. *International Journal of Emerging Markets*, *16*(8), 1721–1744.

Siagian, H., Tarigan, Z. J. H., & Jie, F. (2021). Supply chain integration enables resilience, flexibility, and innovation to improve business performance in COVID-19 era. *Sustainability*, *13*(9), 4669.

Singh, R. K., & Mathiyazhagan, K. (2024). Integrating flexibility and sustainability in supply chains: a practice-based view on leadership, knowledge and digital quality management practices. *The International Journal of Logistics Management*, *35*(6), 1961–1980.

Spanaki, K., Dennehy, D., Papadopoulos, T., & Dubey, R. (2025). Data-driven digital transformation in operations and supply chain management. In *International Journal of Production Economics* (Vol. 284, p. 109599). Elsevier.

Susanto, P. C., Arini, D. U., Marlita, D., Yuntina, L., & Saribanon, E. (2024). Mixed Methods Research Design Concepts : Quantitative , Qualitative , Exploratory Sequential , Exploratory Sequential , Embedded and Parallel Convergent. *International Journal of Advanced Multidisciplinary (IJAM)*, *3*(3), 471–485.

Tavana, M., Shaabani, A., Raeesi Vanani, I., & Kumar Gangadhari, R. (2022). A review of digital transformation on supply chain process management using text mining. *Processes*, *10*(5), 842.

Tiwari, S. (2021). Supply chain integration and Industry 4.0: a systematic literature review. *Benchmarking: An International Journal*, *28*(3), 990–1030.

Visamitanan, K., & Assarut, N. (2021). Impact of Green Supply Chain Management Practices on Employee Engagement and Organizational Commitment: Mediating Role of Firm Performance. *Global Business Review*. https://doi.org/10.1177/09721509211018569

Zhao, N., Hong, J., & Lau, K. H. (2023). Impact of supply chain digitalization on supply chain resilience and performance: A multi-mediation model. *International Journal of Production Economics*, *259*, 108817.

Zulfikar, R., Sari, F. P., Fatmayati, A., Wandiri, K., Haryati, T., Jumini, S., Nurjanah, Annisa, S., Kusumawardhani, O. B., Mutiah, R., Linggi, A. I., & Fadilah, H. (2024). Quantitative Research Methods (Theory, Method, and Practice). In *Jurnal Ilmu Pendidikan* (Vol. 7, Issue 2). Widina Media Utama.