Jurnal Teknik Industri, Vol. 28, No. 1, June 2026
ISSN 1411-2485 print / ISSN 2087-7439 online
DOI: https://doi.org/10.9744/jti.28.1.75-90

The Influence of Information Technology Adoption on Supply Chain Resilience through Purchasing Strategy, Production Flexibility, and Supply Chain Responsiveness

Katherine Trisy Achwan[1], Zeplin Jiwa Husada Tarigan[1*], Zarul Azhar bin Nasir[2]
[1)] School of Business Management, Department of Management, Petra Christian University
Jl. Siwalankerto 121-131 Surabaya, Indonesia
[2)] Faculty of Business and Management, Universiti Teknologi MARA Perak Branch
Cawangan Perak, Kampus Tapah, 35400 Tapah Road, Perak Darul Ridzuan, Malaysia
Email: kathtrisy@gmail.com, zeplin@petra.ac.id*, zarul6105@uitm.edu.my
*Corresponding author

Abstract: Manufacturing companies have adopted information technology to create integrated systems that facilitate coordination within the company and with external partners. This demonstrates the company's ability to generate supply chain resilience to address current global uncertainties. The study obtained data from 112 respondents from manufacturing companies in Indonesia using purposive sampling. The data were processed using PLS with an outer model test, which met the validity and reliability requirements. The results of the research hypothesis testing showed that information technology adoption plays a significant role in improving purchasing strategy, production flexibility, and supply chain responsiveness. Purchasing strategies that segment purchasing categories and involve suppliers in problem-solving can increase production flexibility but do not directly affect supply chain responsiveness. Production flexibility in a company's operations directly impacts supply chain responsiveness and resilience. Purchasing strategy and supply chain responsiveness contribute to supply chain resilience by developing capabilities. Companies can routinely identify risks and recover from disruptions. Practical contributions can provide management insights into building corporate resilience by aligning purchasing strategies, production flexibility, and supply chain responsiveness to optimize information technology for internal and external integration.

Keywords: Information technology adoption, purchasing strategy, production flexibility, supply chain responsiveness, and supply chain resilience.

Introduction

Supply chain resilience has emerged as a key strategic issue for companies worldwide. Supply chain resilience is generally understood as the ability of a supply chain system to anticipate, absorb, adapt, and recover from disruptions without compromising long-term performance. Companies with high levels of supply chain resilience can maintain sustainable performance amid major disruptions, such as the COVID-19 pandemic, by leveraging communication capabilities, big data analytics, and a risk-management orientation [1]. Global interdependence in complex supply networks makes many companies vulnerable to disruption. According to Queiroz *et al.* [2] during the COVID-19 pandemic, companies in developing countries faced severe disruptions to supply, demand, and logistics, making supply chain resilience a key differentiator for those that survived. This highlights that supply chain resilience is no longer simply an operational issue but rather an integral part of competitive strategy. Gu *et al.* [3] show that the patterns of information technology use (exploitative and exploratory) with supplier partners and customers can increase supply chain resilience, which, in turn, positively impacts supply chain performance.

Digitalization and globalization open up more opportunities in the market, but also increase exposed to some risks like as economic uncertainty, geopolitics disruptions, regulatory changes, and demand volatility [4]. According to research, digitalization of the supply chain and green supply chain practices significantly enhance supply chain resilience, ultimately improving the performance of a company. In South Korean manufacturing, it was found that digital technology adoption, including digital infrastructure and technological innovation, significantly enhance supply chain resilience and market performance during the pandemic, particularly due to a supply chain disruption orientation [5]. These findings are consistent with those of Yu *et al.* [6] investigated

the manufacturing companies in China and concluded that digital transformation has positively impacted supply chain resilience. This effect is mediated by supply chain integration such that firms with higher degrees of digital integration are better positioned to mitigate, absorb, and even recover from existing disruptions. Research by [7] demonstrates that in Indonesian manufacturing companies, information processing capability and digital supply chain integration can enhance supply chain resilience through better risk and disruption management. However, recent studies emphasize that information technology alone is not enough.

Supply chain resilience is underpinned by a combination of digital capabilities and functional-level managerial and operational practices, such as purchasing strategies, production flexibility, and supply chain responsiveness. Supply chain capability and an orientation towards risk management are drivers of resilience in [1] as well, alongside the use of technology. According to Moraga *et al.* [8], combining collaboration, visibility, speed, and operational flexibility shape overall adaptive capacity for a supply chain during disruptions. The emphasis on such flexible environment cannot happen without a purchasing strategy. Well-designed procurement strategies, including supplier diversification, long term collaboration and supplier information integration can help mitigate supply disruption risks and enable a company to maintain operational continuity in case of any disruption. Companies in various regions such as Indonesia possess strategic skills, integrated practices and purchasing strategies adapt to uncertain business environments which contribute positively towards their supply chain flexibility and resilience [4]. Production flexibility is a key feature that enables firms to change product volume and variety with little reduction in efficiency or quality. Moraga *et al.* [8] included flexibility as one of the key dimensions of supply chain resilience during the pandemic. The study by Tarigan *et al.* [9] shows that production flexibility serves as a transmission mechanism linking the use of information technology to increased supply chain resilience in Indonesian manufacturing companies.

Supply chain responsiveness is the ability to respond quickly and appropriately to changes in demand and disruptions [10]. The impact of speed in supply chain management. It is possible to examine the significance of speed in supply chain operations, highlighting how prompt response times can boost competitive advantage and customer satisfaction. The condition of supply chain responsiveness can go over how to optimize both time and cost in the supply chain [9]. This research shows that information technology strengthens the overall supply chain resilience, by increasing the responsiveness of supply chain responsiveness and information technology helps the information coordination. The findings of our study indicated that IT adoption can improve these three capabilities and increase supply chain resilience. However, it is important to note that these are still industry and region-specific findings. The worldwide dynamics like accelerated digital transformation, sustainability pressures, and increasing complexity in supplier networks indicate that more studies are necessary to understand how the interactions between information technology adoption, procurement strategies, production flexibility and supply chain responsiveness can ultimately bolster the resilience of any type of companies supply chains comprehensively.

The explanation above indicates three major research objectives can be identified: first, to understand the significance of information technology's influence on purchasing strategies, production flexibility, and supply chain responsiveness. Second, to identify the relationship between purchasing strategy on production flexibility, supply chain responsiveness, and resilience. Third, to determine the magnitude of the impact of production flexibility and supply chain responsiveness on supply chain resilience.

Literature Review

Information Technology Adoption

The adoption of information technology within the supply chain management is no longer understood as simple use of basic information systems, but part of digital transformation which changes the way companies plan and control the flow of materials, information, and finance [3]. Building on the growing scientific discussion in this special issue, digital transformation is seen as a key enables of supply chain resilience because it enhances process integration, shortens information flows, and reduces information gaps among actors within the same supply chain [11]. In line with this, [6] argue that the digital transformation of manufacturing companies improves supply chain resilience, and this relationship is mediated by supply chain integration. Digital transformation improves process integration throughout the supply chain and, as a result, strengthens supply chain resilience, under conditions of market uncertainty [12]. When all partners across the supply chain have access to accurate and up to date information, they are better able to make responsive and data-driven decisions in a changing market environment. Moreover, enterprise digital transformation enhances supply chain

resilience by improving information processing capabilities and cross-functional coordination [13]. Kang *et al.*[5] argue that digitalization of production processes directly improves supply chain resilience and market performance by enabling digital systems for production planning, demand monitoring, and logistics coordination. Long-term, the technology is important because it makes it possible to combine logistical data, monitor shipment status in real time, and improve cooperation between service providers and other supply chain participants [14]. As a result, companies increase flexibility, visibility, and adaptability to disruptions, which ultimately strengthens supply chain resilience. The performance and resilience of supply chains across several industrial sectors can be improved through the use of information technology and integrated supply chain management practices [15]. Process automation and integration of this kind are difficult to achieve without the adoption of information technology across the supply chain.

Purchasing Strategy

Purchasing strategy is the steps a business takes to select suppliers, manage long-term relationships, and design collaborations that support supply sustainability and competitiveness. Purchasing strategy can improve production systems and impact a company's operational performance [9]. Purchasing strategy can build strategic partnerships to adequately maintain operational processes in manufacturing companies [16]. Companies need to align strategic planning with procurement strategies and supplier partnerships. Companies need to sustain activities by regularly evaluating supplier capabilities, developing long-term relationships, and integrating suppliers into their business processes. Strategic sourcing process in the company by analyzing the company's needs, selecting suppliers, and conducting periodic evaluations to reduce risks and manage supplier relationships that have a positive impact on supply chain capabilities [17]. A multiple sourcing strategy is a way for companies to increase resilience when the risk of disruption is high, even though it creates greater complexity and coordination costs [18]. The company's ability to leverage information technology enables it to manage suppliers with significant potential and sustain them [4]. Information technology is utilized to support data integration with suppliers, accelerate supplier evaluation, and improve coordination in the procurement process, making purchasing strategies more adaptive and contributing to increased supply chain resilience [9].

Supply Chain Responsiveness

Supply chain responsiveness is the capability of the supply chain to respond to customer needs and changes in the business environment through close coordination with suppliers and customers, and rapid decision-making along the supply chain network [19]. Supply chain responsiveness, as the basis for sustainable supply chain resilience, in adjusting response speed to disruptions and operational processes, has proven to be an important determinant of business continuity [20]. The manufacturing sector has found that strategic partnerships with suppliers and strong relationships with customers enhance supply chain responsiveness, ultimately driving improved operational performance [19]. Supply chain responsiveness can mediate the relationship between supply chain collaboration in the use of technology to produce better performance [21]. Supply chain responsiveness can run smoothly and be easily understood by customers when it leverages information technology, thereby contributing significantly to the company's organizational performance [22]. [20] Show that supply chain responsiveness plays a role in building company resilience, enabling quick adaptation and recovery from disruptions with the support of digital technologies. Tarigan *et al.*[9] found that information technology investment can increase supply chain resilience and responsiveness, with responsiveness as one of the key mechanisms that translate technology into adaptive capabilities during disruptions.

Production Flexibility

Production flexibility refers to a production system's ability to adjust production volume, variety, and schedule in response to the company's internal and external needs. Production flexibility enables companies to leverage information systems and supply chain capabilities to continuously adjust output to dynamic demand conditions and targets [23]. Production flexibility enables reconfiguring production capacity and work processes to meet changing demand while adjusting to supply constraints. Flexibility in a company can simultaneously increase agility and responsiveness, building resilience and enhancing competitiveness [20]. Production flexibility allows for reallocation of capacity and adjustment of manufacturing schedules to accommodate fluctuations in resource availability and customer needs, thereby mitigating the impact of disruptions on supply chain performance. Information technology strengthens supply chain resilience by increasing production flexibility by leveraging robust information systems to help companies monitor capacity, lead times, and supply in real time, enabling faster, data-driven production adjustment decisions [9].

Flexibility in the supply chain with information systems that enhance the supply chain's capability to respond to changes in the business environment and support sustainable performance [23]. Supply chain resilience in the manufacturing sector places production flexibility as a key strategy in building resilience, along with supplier diversification, digitalization, and integrated risk management, disruption mitigation strategies and emphasized that increasing production capacity flexibility to optimize manufacturing network configuration is an important step in reducing its vulnerability to global instability [24].

Supply Chain Resilience

Supply chain resilience is a company's ability to prepare, respond, adapt, and recover from disruptions, ensuring operational performance and customer service levels are maintained or quickly restored to their original levels. Supply chain resilience, as a dynamic capability, can build a series of mitigation strategies to diversify sources and supply [25]. The implementation of smart manufacturing has a non-linear impact on supply chain resilience, increasing visibility and automation [26]. Kaneberg *et al.* [27] state that dynamic capabilities such as sensing, seizing, and reconfiguring ensure that supply chain resilience continues to function during disruptions and that the supply chain's structure and processes are adjusted. Dynamic capabilities enable companies to integrate, build, and reconfigure resources to maintain resilience in highly uncertain environments [28]. Mitigation strategies in companies that maintain inventory reserves and develop long-term relationships with suppliers strengthen resilience capabilities and reduce the impact of global risks [25]. Supply chain resilience is determined by a company's ability to build strong networks, establish solid coordination, and manage risks to keep operations running smoothly [29]. The strategic configuration the company establishes to build strong collaboration and high flexibility can manage disruptions, keeping risk low [30]. The alignment between digitalized business capabilities and good supply chain governance mechanisms can increase supply chain resilience [31]. Supply chain resilience can be achieved by companies adopting information technology to adequately meet information needs and increase responsiveness, enabling them to recover quickly and operate normally [9]. Supply chain resilience can be well integrated to increase flexibility and capabilities, enabling competition in dynamic environmental conditions [32].

Relationship Between Research Concepts

The Relationship between Information Technology Adoption and Purchasing Strategy

Information technology adoption plays a crucial role in strengthening purchasing strategies. Technological support enables companies to obtain information quickly and accurately, enabling more precise decisions regarding supplier selection, purchase quantities, and performance evaluation. Gu *et al.* [3] state that integrating information across functions in the supply chain allows companies to monitor supplier performance and identify potential risks early. This integration also supports more proactive purchasing strategies that can respond to changing needs. Real-time data allows companies to coordinate more effectively with suppliers, making it easier to monitor delivery status and production requirements [5]. A constantly updated information system enables companies to adjust more quickly to external conditions. In addition, information technology contributions to the implementation of supplier diversification strategies. Tarigan *et al.*[9] state that digital systems help companies identify and compare alternatives suppliers in a more systematic way. Better documentation of supplier performance data also helps reduce the risk of overreliance on a single supplier, since sourcing strategies can be carried out more efficiently. However, organizational readiness remains essential for the successful implementation of information technology. The implementation of information technology requires several supporting factors, including investment in infrastructure, the strengthening of human resource competencies, and adjustment to organizational work culture [18]. If not managed properly, the use of technology may lead to overdependence and reduce flexibility in purchasing decisions [9]. Based on this explanation, the first hypothesis can be established.
H_1: Information technology adoption influences purchasing strategy.

The Relationship Between Information Technology Adoption and Production Flexibility

Production flexibility refers to the extent to which companies can adjust their production volume, product variety, and operational processes in response to changes in demand or supply disruptions. In a dynamic business environment, this capability is essential for maintaining operational continuity and supply chain stability. This flexibility can be strengthened through the adoption of information technology, particularly because it enables companies to access production and supply data in real time through cloud-based systems. [5] Argue that rapid and integrated information allows firms to adjust capacity and product types according to

actual conditions in the field. With greater visibility, production decisions can be made more proactively rather than reactively. The use of digital technology also enables companies to monitor production capacity and raw material availability more effectively [33]. This information helps identify production constraints early, allowing firms to adjust before disruptions become more severe. In research, [6] find that supply chain data integration speeds up coordination across different functions, making it easier to modify production processes efficiently as demand fluctuates. Companies can also monitor machine conditions directly through sensors and monitoring systems based on the internet of things [20]. This type of monitoring allows firms to predict potential damage and quickly realign production schedules when necessary. Although the adoption of information technology improves production flexibility, its implementation also involves challenges such as investment costs and system complexity, which need to be managed carefully [18]. Investment in infrastructure and human resource capabilities are both critical to ensuring effective system performance. The adoption of information technology plays an important role in enhancing production flexibility by increasing data visibility and enabling more accurate production adjustments. Based on this explanation, the second hypothesis can be established.
H_2: Information technology adoption affects production flexibility.

The Relationship Between Information Technology Adoption and Supply Chain Responsiveness

Supply chain responsiveness refers to the ability of delivery processes to respond quickly and appropriately to various changes, including fluctuations in demand, supply-related developments, and other sources of vulnerability. The use of information technology strengthens this capability by enabling firms to obtain accurate information on inventory, shipping, and demand in a timely manner [3]. Quick access to such information allows management to make decisions without waiting for manual reports or lengthy coordination processes. As a result, companies can respond more rapidly to changing conditions. Another technology that significantly improves supply chain responsiveness is the internet of things, in which connected sensors and devices support real-time monitoring of operational conditions, production capacity, and the distribution status of goods [20]. Through this capability, companies can quickly identify problems that may cause delays or disruptions and respond more effectively. Greater visibility also reduces the risk of delayed responses. In addition, blockchain technology can be applied within enterprise systems to improve the speed and reliability of information sharing among supply chain partners [17]. The blockchain can record transactions in a transparent and permanent manner, it can accelerate verification processes and strengthen trust between partners. As Industry 4.0 continues to develop, organizations are increasingly adopting data-driven decision-making, which enables them to respond more quickly and accurately to changing market conditions and supply disruptions [9]. However, the successful implementation of information technology depends not only on the technology itself, but also on system integration readiness and the capability of human resources, both of which are important success factors [18]. Based on this explanation, the third hypothesis can be established.
H_3: Information technology adoption influences supply chain responsiveness.

The Relationship Between Purchasing Strategy and Production Flexibility

Purchasing strategy relates to a company's ability to identify suitable suppliers, negotiate contracts, and secure access to raw materials. Namdar *et al.* [18] state that using multiple suppliers for the same raw material can reduce a company's dependence on a single source. If one supplier is disrupted, the company can rely on alternative sources to continue production. This gives firms greater flexibility to maintain capacity without halting operations. In addition, strategic sourcing, which emphasizes long-term relationships with flexible suppliers, can further enhance production flexibility. Federico *et al.* [17] explain that responsive suppliers with flexible capacity allow companies to adjust production schedules or volumes more easily when product demand increases or decreases rapidly. Furthermore, e-procurement and cloud-based systems help companies improve the monitoring of supplier performance and raw material availability, which in turn can strengthen coordination between both parties [9]. Access to clear and timely information makes it easier for firms to adjust production plans when delays occur or when demand shifts unexpectedly. Real-time data support also enables organizations to make production decisions more quickly and on a more measurable basis. For this reason, purchasing strategies should be designed carefully so that increased flexibility does not reduce overall cost efficiency [17]. Yu *et al.*[6] explain that supplier diversification enables companies to continue operating even when one of their raw material suppliers is disrupted. With a more secure supply base, firms have greater room to adjust production capacity and respond to operational changes. However, Namdar *et al.* [18] cautioned that supplier diversification may also lead to higher coordination and administrative costs. Based on this explanation, the fourth hypothesis can be formulated.
H_4: Purchasing strategy influences production flexibility.

The Relationship Between Purchasing Strategy and Supply Chain Responsiveness

Production activities, distribution processes, and the availability of raw materials all influence a company's supply chain responsiveness. Effective supplier selection and management, therefore, require careful planning in order to support smoother and more responsive operations. Federico *et al.* [17] explain that companies that use multiple suppliers tend to be better prepared for disruptions. When one supplier experiences problems, the company still has alternatives, allowing production to continue. Long-term relationships with suppliers play a crucial role in maintaining trust and enabling them to adapt more quickly to change [18]. The use of technology also strengthens the role of purchasing strategy in increasing responsiveness, thus enabling companies to monitor the availability of raw materials and supplier performance more transparently [9], [20]. Access to accurate and timely information helps companies make faster decisions, including when seeking alternative suppliers or adjusting production plans. Purchasing strategies need to be developed comprehensively and integrated to improve supply chain responsiveness truly. Based on this explanation, the fifth hypothesis can be formulated.

H_5: Purchasing strategy influences supply chain responsiveness.

The Relationship Between Production Flexibility and Supply Chain Responsiveness

Rapidly changing demand forces companies to adjust their production processes without disrupting operational flow. Production flexibility describes a company's ability to adjust production volume and variety without compromising quality. Companies with high production flexibility can adapt their work activities across the board to meet changing demand. Adjustments can be made through capacity adjustments, schedule changes, and product mix modifications as needed. High levels of flexibility enable companies to respond to changes in demand and external constraints more quickly and more measurably, thereby supporting greater supply chain responsiveness. The ability to adjust more quickly and effectively to demand surges or declines enhances supply chain responsiveness. Companies can use alternative materials or reorganize work processes to maintain production despite disruptions to one of their supply sources [17]. Technological developments also enable companies to monitor machine capacity and condition in real time [5]. Based on this explanation, the sixth hypothesis can be formulated.

H_6: Production flexibility affects supply chain responsiveness.

The Relationship Between Purchasing Strategy and Supply Chain Resilience

Supply chain resilience is a decision that needs to be made before disruptions occur, in managing purchasing strategies to select suppliers and build collaborative relationships. A company's dependence on suppliers makes its operations more vulnerable when suppliers experience production constraints, thereby affecting distribution accuracy. The quality of the relationship with suppliers also shapes strategic sourcing, which emphasizes long-term collaboration to facilitate adjustment. Suppliers who are involved in planning and communicating well are usually quicker to adapt to changing needs. Many suppliers are involved in good coordination, making the work process more organized [18]. The purchasing strategy needs to be designed in a balanced, flexible manner to maintain supply chain resilience and ensure efficient implementation. Based on this explanation, the seventh hypothesis can be formulated.

H_7: Purchasing strategy influences supply chain resilience.

The relationship between production flexibility and supply chain resilience

Companies with responsive manufacturing processes tend to be more agile under dynamic conditions. Production flexibility is a company's ability to respond to shifting dynamic market conditions and customer demand. This flexibility is essential for businesses to ensure stable operations and recover quickly in the event of disruptions. They can adapt their production schedules to present day conditions [34]. Production capacity adjustments and variations keep the flow of inputs constant so that disruptions on one side do not immediately affect the entire system [35]. Companies flexibility conducts supply demand balance to some extend [20]. Companies can use technology to keep an eye on production capacity [9]. Rapidly to information enables management to act before the constraints become bigger and more problems. Indeed, technology integration accelerates the configuration of production changes when needed [17]. The criticality of production flexibility in ensuring supply chain resilience, enabling quick changes in production volume and type, indicates a higher level of resilience [36]. Investing in technology can help develop employee competencies and manage targeted processes, thereby speeding up decision making [18]. Based on this explanation, the eighth hypothesis can be formulated.

H8: Production flexibility affects supply chain resilience.

The Relationship Between Supply Chain Responsiveness and Supply Chain Resilience

Supply chain responsiveness is a company's ability to respond quickly and appropriately to external uncertainty. A company's responsiveness is the foundation for supply chain resilience, enabling it to survive, adapt, and recover from disruptions. The greater a company's responsiveness to change, the greater its ability to maintain stability and build long-term resilience [37]. The company's ability to quickly adjust operations to address disruptions early [34]. The ability to respond depends on the completeness of information, enabling parties to coordinate and improve real-time access, so that decisions can be taken more quickly [3]. Smoothly flowing information helps companies determine the steps necessary to adapt to external changes. Federico *et al.* [17] found that prompt action can maintain product availability and accelerate recovery after a disruption. [9] State that integrating information systems and changing work processes requires investment and mature management to respond consistently at speed. Based on this explanation, the ninth hypothesis can be formulated.
H9: Supply chain responsiveness influences supply chain resilience.

Based on the explanation in the introduction and the relationship between the concepts, the research framework is shown in Figure 1.

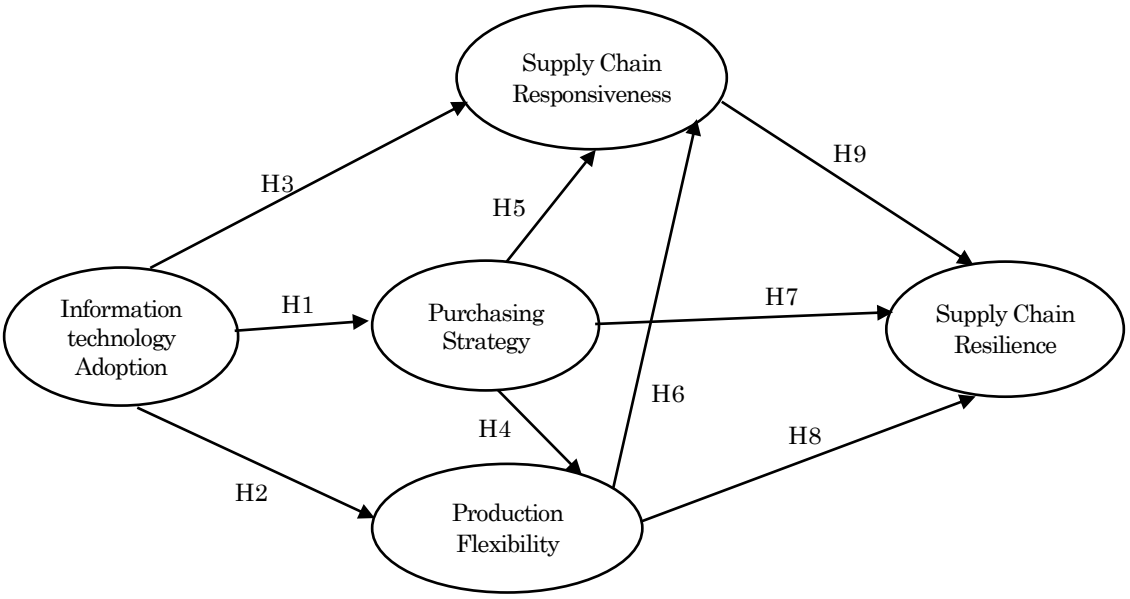

Figure 1. Research conceptual framework

Methods

The research design is quantitative, with the population and sample determined, and data collected via a questionnaire. Statistical analysis is used to test hypothesis. The study has identified data collection practices in manufacturing companies that have implemented cross-functional, integrated information technology. The study sample consists of companies that have implemented integrated information technology for at least 2 years. The respondents are permanent employees who can access data in the company's information system and have at least 2 years of work experience. The study uses purposive sampling, selecting appropriate respondents to complete the research questionnaire.

The questionnaire was developed by constructing operational research variables, each measured by a set of research items. The information technology adoption variable is an organizational process of using and integrating information technology as a system for operational and administrative activities. The measurement items used for information technology adoption are: the company uses information technology routinely (ITA1), uses information technology systems in conducting all work transactions (ITA2), the information technology used is reliable in completing work (ITA3), and the information technology used is complete according to needs (ITA4).

Purchasing strategy is the set of steps an organization takes to select suppliers, manage long-term relationships, and support supply sustainability to meet the company's needs. The measurement items used for purchasing strategy are the company has a segmentation strategy for each purchasing category (PS1), selects suppliers that meet the specified requirements (PS2), evaluates supplier performance (PS3), involves suppliers in forecasts to reduce uncertainty (PS4), and involves suppliers in a collaborative problem-solving process (PS5).

Production flexibility is a company's ability to adapt to changes in customer demand or supply disruptions. Measurement items used for production flexibility are: the company can adjust production output quickly when there is a change in demand (PF1), production capacity can be increased at short notice when demand increases (PF2), can adjust product composition according to customer demand (PF3), can adjust customer product order priorities without causing delays (PF4), and can produce new product designs according to demand (PF5).

Supply chain responsiveness is the ability to respond quickly and accurately to changes in customer demand and market uncertainty. Measurement items used for supply chain responsiveness are: being able to adjust supply plans quickly when demand changes (SCR1), being able to respond quickly to surges in demand without service degradation (SCR2), handling customer complaints quickly (SCR3), providing alternative solutions quickly to customer needs (SCR4), and sharing information with external partners on the status of orders available to relevant parties (SCR5).

Supply chain resilience is a company's ability to respond to, adapt to, and recover from disruptions, quickly returning to its original state. The measurement items used for supply chain resilience are: the company routinely identifies risks in the supply chain (SCRe1), has a clear risk mitigation plan (SCRe2), has a system that can detect disruptions in the supply chain (SCRe3), can quickly restore supply chain operations after a disruption occurs (SCRe4), and has clear recovery procedures for supply chain operations (SCRe5).

The questionnaire was distributed to practitioners using both offline and online methods. Data collection was conducted by directly distributing questionnaires to companies and conducting face validation to assess respondents' understanding of the statement items. Data collection was provided directly to respondents, and online completion was via a Google Form link. A total of 112 questionnaires were collected from all respondents from various manufacturing companies. Data collection was conducted in 2025 by utilizing higher education grant funds for fundamental research. Data collection used purposive sampling, with respondents meeting predetermined criteria: they were permanent employees who had worked at the company for at least 2 years. The respondents selected were the key user in their departments, who could understand the company's supply chain process. Data processing used partial least squares (PLS) to solve all research hypotheses. Data testing in software SmartPLS version 4 used both outer and inner model tests. The outer model was used to test the validity and reliability of the research instrument. In contrast, the inner model was used to test the predictive relevance of the research model and research hypotheses.

Results and Discussions

Based on the results of distributing questionnaires to industry practitioners, 112 respondents completed the research questionnaire both offline and online. The composition of respondents based on their profile information is shown in Table 1.

Table 1 shows that respondents stated that their companies have been adopting information technology for a long time. Most respondents held positions at the manager and supervisor levels, responsible for the business process. These positions regulate procedures and flow, coordinate operations, and report progress to top management. Respondents had a bachelor's degree, demonstrated adequate competency in carrying out the process, had more than 5 years of experience, and had adequate skills and competencies.

Research data processing was carried out using descriptive mean analysis and outer-model testing (validity and reliability), as shown in Table 2.

Table 2 shows that the mean value for information technology adoption was 4.3393, and the measurement items ranged from 4.3036 to 4.3661, indicating that the company has well adopted information technology. The information technology used has become the company's operational and administrative system for carrying out day-to-day activities. Purchasing strategy in the company was obtained with a mean of 4.0893, and the mean value of the measurement items was obtained from 3.9286 - 4.2946, indicating that respondents' perceptions related to the purchasing strategy implemented were in accordance with the company's conditions in procuring

Table 1. Profile of research respondents

Variable	Description	Frequency	%
Gender	Male	76	68 %
	Female	36	32 %
Age	25-30 years old	8	7 %
	31-35 years old	32	29 %
	36-40 years old	23	21 %
	41-45 years old	34	30 %
	46-50 years old	8	7 %
	Above 50 years old	7	6 %
Education	Senior high school or equivalent	9	8 %
	Undergraduate	93	83 %
	Postgraduate	10	9 %
Experience in the company	For 2-4 years	16	14 %
	For 5-7 years	18	16 %
	For 7-10 years	24	21 %
	Above 10 years	54	48 %
Position in the company	Senior staff	15	13 %
	Supervisor	32	29 %
	Manager	56	50 %
	Top Management	9	8 %
length of time in adopting information technology	< 3 years	24	21 %
	3-7 years	26	23 %
	8-10 years	32	29 %
	Above 10 years	30	27 %
Company geographic location	Central Java and Yogyakarta	14	12 %
	DKI Jakarta	50	44 %
	East Java and Bali	12	11 %
	Kalimantan Island	4	4 %
	Sulawesi Island and Ambon	3	3 %
	Sumatra Island	8	7 %
	West Java and Banten	21	19 %

materials that were in accordance with the company's needs and criteria. The company's flexible production system capability was obtained with a mean value of 4.1571 overall and for the measurement items with a mean of 4.0625 - 4.2946, which illustrates the high production flexibility system in the company. This condition indicates that the company can adapt to changes in customer orders and adjust to changes in processes and materials in the production area. Supply chain responsiveness was measured at 4.1196, with item scores ranging from 3.9554 to 4.2321, indicating a high level of responsiveness. The manufacturing company's ability to provide adequate responsiveness to customers in adjusting to demand and other changes. The final variable on supply chain resilience had a mean of 4.1482 and ranged from 4.0625 to 4.2232, indicating that the company has a high level of resilience to environmental uncertainty. The company can maintain the continuity of its operations and partner relationships and maintain good process continuity.

The outer model testing in Table 2 for validity has been met where the measurement item value with the lowest loading factor on information technology adoption is ITA3 at 0.767 (>0.500), purchasing strategy PS4 at 0.680 (>0.500), production flexibility PF3 at 0.700 (>0.500), supply chain responsiveness SCR1 at 0.649 (>0.500), and supply chain resilience SCRe.1 at 0.703 (>0.500). The outer model testing related to validity has met the requirements and is declared valid. The outer model testing for reliability was conducted for information technology adoption, purchasing strategy, production flexibility, supply chain responsiveness, and supply chain resilience, with Cronbach's alphas and composite reliability above 0.700.

The results of the outer model test for validity and reliability met the requirements, so we proceeded to the inner model test to test the structural model and hypothesis. Structural model testing was performed by calculating PLS output in R^2. The R-square values are shown in Table 3.

Analysis shows that factors impacting information technology adoption include production flexibility, purchasing strategy, supply chain responsiveness, and supply chain resilience. The results of the study indicate that the factors studied with purchasing strategy (PS) are 40.90%, production flexibility (PF) is 41.10%, supply chain responsiveness (SCR) is 58.90%, and supply chain resilience (SCRe.) is 56.90%. Despite the model's complexity, the high adjusted R-squared values suggest a strong fit. These results indicate a significant influence

Table 2. Descriptive analysis and outer model test

Item Measurement	Mean	Loading Factor	Composite Reliability	Cronbach Alpha	AVE
Information technologie adoption	**4.3393**				
ITA1	4.3036	0.793			
ITA2	4.3661	0.817	0.885	0.826	0.658
ITA3	4.3393	0.767			
ITA4	4.3482	0.864			
Purchasing strategy	**4.0893**				
PS1	4.2946	0.873			
PS2	3.9821	0.764			
PS3	4.2321	0.769	0.887	0.840	0.612
PS4	3.9286	0.680			
PS5	4.0089	0.812			
Production flexibility	**4.1571**				
PF1	4.0982	0.874			
PF2	4.0625	0.754			
PF3	4.1429	0.700	0.895	0.853	0.632
PF4	4.2946	0.740			
PF5	4.1875	0.793			
Supply chain responsiveness	**4.1196**				
SCR1	4.1071	0.649			
SCR2	4.1161	0.814			
SCR3	3.9554	0.726	0.850	0.782	0.534
SCR4	4.2321	0.763			
SCR5	4.1875	0.689			
Supply chain resilience	**4.1482**				
SCRe.1	4.0893	0.703			
SCRe.2	4.2232	0.814			
SCRe.3	4.0804	0.850	0.880	0.829	0.596
SCRe.4	4.0625	0.719			
SCRe.5	4.2857	0.762			

Table 3. Determination test result (R^2)

Variable	R-square	R-square adjusted
PF (Production Flexibility)	0.411	0.401
PS (Purchasing Strategy)	0.409	0.403
SCR (Supply Chain Responsiveness)	0.589	0.578
SCRe. (Supply Chain Resilience)	0.569	0.557

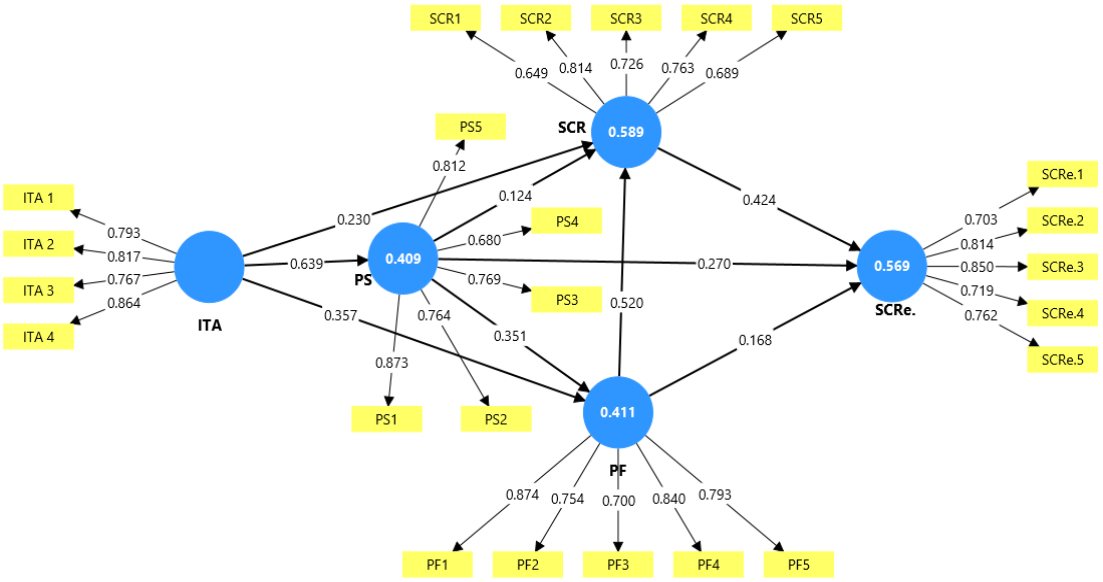

Figure 2. Full structural equation model of research results

of the variables studied, while also recognizing the potential of other variables that have not been studied. The next stage is to calculate$Q2 = 1-(1-R^2_{PF})(1-R^2_{PS})(1-R^2_{SCR})(1-R^2_{SCRe})$ obtained by calculation = 1-(1-0.411)(1-0.409)

(1-0.589)(1-0.569) = 1-0.0617 = 0.9383 = 93.83%. The results of the study show that 93.83% of the variance in supply chain resilience is determined by information technology adoption, production flexibility, purchasing strategy, and supply chain responsiveness. Meanwhile, the remaining 6.17% is determined by other variables not included in the research variables. The results of the study show that $Q^2 > 0$; therefore, it has a high predictive relevance value. The research hypothesis as a test of the second inner model is shown in Table 4 and Figure 2.

Table 4. Summary of direct hypothesis test result

Hypothesis	Original sample	t-statistics	p-values
ITA -> PS (H1)	0.639	10.434	0.000
ITA -> PF (H2)	0.357	3.128	0.002
ITA -> SCR (H3)	0.230	2.099	0.036
PS -> PF (H4)	0.351	3.887	0.000
PS -> SCR (H5)	0.124	1.495	0.135
PF -> SCR (H6)	0.520	4.733	0.000
PS -> SCRe. (H7)	0.270	3.201	0.001
PF -> SCRe. (H8)	0.168	1.664	0.097
SCR -> SCRe. (H9)	0.424	3.651	0.000

Table 5. Summary of indirect hypothesis test result

Hypothesis	Original sample	T statistics	P values
ITA -> SCR -> SCRe.	0.098	1.542	0.123
ITA -> PS -> SCRe.	0.173	3.104	0.002
ITA -> PF -> SCRe.	0.060	1.063	0.288
ITA -> PS -> PF -> SCRe.	0.038	1.239	0.216
ITA -> PS -> SCR -> SCRe.	0.034	1.425	0.154
ITA -> PF -> SCR -> SCRe.	0.079	2.173	0.030
ITA -> PS -> PF -> SCR -> SCRe.	0.050	2.277	0.023

The results of data processing with PLS show that the first hypothesis (H1): information technology adoption influences purchasing strategy, with a value of 0.639. with a t-statistic of 10.434 (>1.96) and a p-value of 0.000 (<0.05) is accepted. This indicates that information technology adoption significantly affects purchasing strategy in manufacturing companies. Adoption of information technology that is used routinely, integrated into transactions, and becomes a mainstay of operations helps companies segment purchases, evaluate suppliers, and coordinate forecasts with partners. Digital systems enable companies to make purchasing decisions more quickly, transparently, and data-driven, thereby making purchasing strategies more adaptive and structured. The second hypothesis (H2) shows that information technology adoption influences production flexibility, with a coefficient of 0.357 and a t-statistic of 3.128 (>1.96), and a p-value of 0.002. (<0.05) is accepted. This indicates that the higher the adoption of information technology, the higher the company's production flexibility. Through the use of integrated information systems, organizations can monitor production capacity, raw material availability, and changes in demand in real time, which enables them to adjust production volumes and respond promptly to demand fluctuations without reducing quality or efficiency. The third hypothesis (H3) shows that information technology adoption influences supply chain responsiveness of 0.230 with a t-statistic of 2.099 (>1.96) and a p-value of 0.036. (<0.05) is considered acceptable. This indicates that information technology improves a company's responsiveness to changes in customer demand and supply chain disruptions. Effective system integration enables information to flow more smoothly across functions and between external partners, thereby supporting faster and more accurate operational decision-making. For information technology adoption, the measurement items refer to the routine use of information technology, the use of information systems in work transactions, the reliability of information technology in completing work, and the completeness of information technology according to organizational needs. Among these indicators, the highest mean score was found in the reliability of information technology in completing work. This suggests that respondents perceive information technology not merely as an administrative tool, but as a dependable operational system that supports daily decision-making, coordination, and transaction processing. This finding strengthens the argument that information technology adoption becomes an enabling capability for improving purchasing strategy, production flexibility, and supply chain responsiveness.

The fourth hypothesis (H4) shows that purchasing strategy influences production flexibility, with a coefficient of 0.351 and a t-statistic of 3.887 (>1.96), and a p-value of 0.000 (<0.05), which is accepted. A well-designed purchasing strategy, including strategies such as supplier diversification supported by regular performance

evaluations, helps ensure the continuous availability of raw materials and enables a more agile response in terms of production capacity and production variations. When supply is maintained effectively, companies have greater flexibility to make operational adjustments. In this study, H5 showed that purchasing strategy had an effect on supply chain responsiveness, with a coefficient of 0.124. The t-statistic 1.495 (<1.96) and p-value 0.135 (>0.05) are rejected. This finding indicates that purchasing strategy does not directly improve supply chain responsiveness. In addition to an effective purchasing strategy, production flexibility and support from information technology also play important roles in influencing responsiveness. The seventh hypothesis (H7) shows that purchasing strategy influences supply chain resilience, with a t-statistic of 3.201 (>1.96) and a p-value of 0.001 (<0.05), indicating acceptance. Purchasing strategies that involve supplier evaluation, collaborative forecasting, and joint problem-solving can strengthen supply chain resilience. Diversification and long-term supplier relationships help companies survive and recover from disruptions. For purchasing strategy, the questionnaire items cover purchasing category segmentation, supplier selection based on predetermined requirements, supplier performance evaluation, supplier involvement in forecasting, and supplier involvement in collaborative problem-solving. The highest-ranking indicator was supplier selection based on specified requirements. This shows that manufacturing companies emphasize supplier qualification and compliance with internal procurement standards. Supplier selection becomes a strategic foundation because the quality, reliability, and responsiveness of suppliers directly affect material availability and production continuity. However, the results also indicate that purchasing strategy does not directly improve supply chain responsiveness. This means that supplier selection and evaluation alone are insufficient to create a fast response to market changes unless they are supported by flexible production systems and information-based coordination.

Hypothesis 6 (H6) shows that production flexibility has a significant effect on supply chain responsiveness, with a t-statistic of 4.733 (>1.96) and a p-value of 0.000 (<0.05); therefore, this hypothesis is accepted. These results suggest that production flexibility has become an important enabler of supply chain responsiveness. The eighth hypothesis (H8) shows that production flexibility influences supply chain resilience by 0.168 with a t-statistic of 1.664 (<1.96) and a p-value of 0.097 (>0.05), which rejects the null hypothesis. This indicates that production flexibility has not directly increased supply chain resilience. Production flexibility likely increases responsiveness before affecting resilience. For supply chain responsiveness, the indicators include the ability to adjust supply plans quickly when demand changes, respond to demand surges without service degradation, handle customer complaints quickly, provide alternative solutions to customer needs, and share order-status information with external partners. The highest-ranking indicators were the ability to share order-status information with external partners and the ability to provide alternative solutions quickly to customer needs. These indicators show that responsiveness is not only related to speed, but also to information transparency and solution-oriented coordination with supply chain partners. In the research framework, this explains why supply chain responsiveness has a direct and significant role in strengthening supply chain resilience. Companies that can communicate order status and offer alternatives quickly are more capable of maintaining service continuity during disruptions.

The ninth hypothesis (H9) shows that supply chain responsiveness influences supply chain resilience by 0.424 with a t-statistic of 3.651 (>1.96) and a p-value of 0.000. (<0.05) is considered acceptable. This indicates that the ability to respond quickly to changes and disruptions is a key factor in building supply chain resilience. Companies that can adjust supply plans, manage sudden increases in demand, and share information efficiently with partners are generally better prepared to withstand disruption and restore operations more quickly. For supply chain resilience, the questionnaire items include routine risk identification in the supply chain, the availability of a clear risk mitigation plan, the existence of a disruption-detection system, the ability to restore supply chain operations quickly after disruption, and clear recovery procedures for supply chain operations. The highest-ranking indicator was the availability of a system that can detect disruptions in the supply chain. This suggests that resilience in manufacturing companies is strongly associated with early detection capability. A company cannot recover quickly if it cannot first identify disruption signals. Therefore, disruption detection serves as a bridge between responsiveness and resilience. When supply chain responsiveness enables fast adjustment and communication, disruption detection allows companies to activate recovery procedures more effectively. The findings of this study confirm that information technology adoption (ITA) provides an important foundation for strengthening supply chain resilience. However, this effect is not direct; rather, it operates through improved purchasing strategy, production flexibility, and, most importantly, supply chain responsiveness.

Based on Table 5, for indirect effect results indicate that information technology adoption does not automatically create supply chain resilience. Instead, its contribution occurs through the managerial and operational

capabilities developed within the company. Information technology provides strategic value when firms use it to improve purchasing strategy, strengthen production flexibility, and accelerate responses to demand changes and supply disruptions. Therefore, information technology should not be viewed merely as a digital tool, but as a foundation for building interconnected organizational capabilities. Purchasing strategy shows that information technology can strengthen supply chain resilience when it supports more systematic supplier management. Information systems help companies segment purchasing categories, select suppliers based on clear criteria, evaluate supplier performance, and involve suppliers in forecasting and problem-solving activities. A data-based purchasing strategy enables companies to maintain supply continuity, reduce the risk of material delays, and recover more quickly when disruptions occur.

Meanwhile, the paths through production flexibility or supply chain responsiveness separately indicate that a single capability is not sufficient to build supply chain resilience. Production flexibility allows companies to adjust production volume, schedules, and order priorities, but this capability must be translated into a rapid response to customer needs and market changes. Similarly, supply chain responsiveness requires support from production flexibility and reliable supply availability so that the company's response is not only fast, but also effective. Management should ensure that investment in information technology is fully integrated into procurement, production, cross-functional coordination, and relationships with external partners.

Investments in information technology generate strategic value only when they are fully integrated into daily managerial and operational activities. For managers in manufacturing companies, these findings suggest that digitalization is not merely a matter of introducing technological systems, but of integrating them into purchasing decisions, production planning, and interdepartmental coordination. The effective use of information technology enables organizations to implement sourcing strategies more effectively through better-targeted supplier evaluations, improved forecasting collaboration, and clearer transaction processes. In turn, a well-structured purchasing strategy can support greater production flexibility and strengthen supply chain resilience. However, purchasing strategy alone does not directly improve responsiveness, indicating that effective procurement must be supported by adaptive operational capabilities.

In addition, production flexibility alone is not sufficient to create a resilient supply chain if it is not accompanied by rapid response mechanisms for supply disruptions and changes in demand. One of the key findings of this study is that supply chain responsiveness serves as a critical link in the development of supply chain resilience. In practice, resilience depends on a company's ability to adjust supply plans in response to demand changes and to maintain effective communication with external partners. In other words, resilience is built when organizations combine digital capabilities and operational flexibility with the ability to respond quickly and in a coordinated manner to changing conditions.

From a strategic perspective, investments in information technology should be justified not only by improvements in real-time data transparency, but also by stronger cross-departmental coordination and faster information sharing among suppliers, customers, and internal functions. Management should therefore view production flexibility and purchasing strategy as integrated rather than separate policies. In conclusion, supply chain resilience is not determined solely by the presence of technology, but by how effectively that technology is translated into practice through appropriate procurement strategies, production flexibility, and the organizational ability to respond quickly and on a scale to change.

Conclusions

The extent to which a company can adopt and utilize information technology in its daily operations becomes a fundamental basis for developing purchasing strategies, production flexibility, and supply chain responsiveness. Integrated digital systems enable firms to manage suppliers more systematically and design more accurate purchasing plans, thereby improving supply security and allowing production processes to adjust more effectively to changing demand. However, although production flexibility allows firms to modify order volumes and priorities more quickly, it does not automatically lead to supply chain resilience. Flexibility contributes to resilience only when digital agility and technological capabilities are effectively translated into agile responses to market changes and supply disruptions.

The findings of this study support the second hypothesis and reinforce the view that supply chain responsiveness plays an important role in strengthening supply chain resilience. Companies that are able to realign supply plans, respond quickly to changes in demand, and maintain effective communication with

external partners are generally better positioned to withstand disruptions. In other words, there is a significant relationship between the adoption of information technology and supply chain resilience, with supply chain responsiveness acting as the main mediating variable in this research model. Therefore, supply chain resilience is shaped not only by the presence of technology, but also by the integration of digital capabilities, appropriate purchasing strategies, production flexibility, and the speed and effectiveness of organizational responses. Through this integration, manufacturing companies can build supply chain resilience that is both adaptive and sustainable. Despite these contributions, this study has several limitations. First, the research was conducted using cross-sectional data, which limits the ability to capture changes in information technology adoption, purchasing strategy, production flexibility, supply chain responsiveness, and supply chain resilience over time. Second, the respondents were drawn from manufacturing companies that had already adopted information technology, so the findings may not fully represent companies at an early stage of digital adoption or firms in non-manufacturing sectors. Third, the study relied on perceptual data collected through questionnaires, which may be influenced by respondents' subjective assessments of their company's capabilities and operational conditions. Fourth, the model focused on selected internal and supply-chain capabilities, while other potentially relevant factors, such as organizational learning, supplier innovation capability, digital maturity, risk culture, leadership commitment, and environmental uncertainty, were not included in the analysis.

Future research can extend this study in several directions. Longitudinal research is recommended to examine how the relationship between information technology adoption and supply chain resilience evolves over time, especially before, during, and after supply chain disruptions. Future studies may also compare different industrial sectors, firm sizes, and regional contexts to test the generalizability of the proposed model. In addition, future research could include moderating variables such as environmental uncertainty, supplier dependence, providing a deeper explanation of when and how information technology adoption contributes most effectively to resilience. Finally, combining survey-based analysis with case studies or qualitative interviews would provide richer insights into how companies translate digital capabilities into practical resilience-building actions.

References

[1] M. A. Yamin, "Investigating the drivers of supply chain resilience in the wake of the COVID-19 pandemic: Empirical evidence from an emerging economy," *Sustainability*, vol. 13, no. 21, p. 11939, Oct. 2021, doi: https://doi.org/10.3390/su132111939.

[2] M. M. Queiroz, S. Fosso Wamba, and R. M. Branski, "Supply chain resilience during the COVID-19: empirical evidence from an emerging economy," *BIJ*, vol. 29, no. 6, pp. 1999–2018, Jul. 2022, doi: https://doi.org/10.1108/BIJ-08-2021-0454.

[3] M. Gu, L. Yang, and B. Huo, "The impact of information technology usage on supply chain resilience and performance: An ambidexterous view," *International Journal of Production Economics*, vol. 232, p. 107956, Feb. 2021, doi: https://doi.org/10.1016/j.ijpe.2020.107956.

[4] Z. Zainurrafiqi and G. Gazali, "Supply chain digitalization, green supply chain, supply chain resilience toward competitiveness and MSMES performance," *JAM*, vol. 22, no. 1, Mar. 2024, doi: https://doi.org/10.21776/ub.jam.2024.022.01.14.

[5] M. Kang, C. Robb, S. Kim, and A. Stephens, "Digital technology adoption for building supply chain resilience amid the COVID-19 pandemic: Evidence from South Korean manufacturers," *OSCM: An Int. Journal*, pp. 65–76, Mar. 2024, doi: https://doi.org/10.31387/oscm0560414.

[6] Y. Yu, L. Xu, and X. Wen, "The impact of digital transformation on supply chain resilience in manufacturing: The mediating role of supply chain integration," *Sustainability*, vol. 17, no. 9, p. 3873, Apr. 2025, doi: https://doi.org/10.3390/su17093873.

[7] A. Galih, "Enhancing supply chain resilience through information processing and digital integration in managing risks and disruptions," *JEBI*, vol. 1, no. 2, pp. 216–230, Jul. 2024, doi: https://doi.org/10.69725/jebi.v1i2.177.

[8] M. V. Moraga, B. P. Go, C. E. Go, H. Tan, and J. Ledesma, "Supply chain resilience during the Covid-19 pandemic: Understanding the role of collaboration, visibility, velocity, and flexibility in supply chain resilience using structural equation modeling approach," *IJMABER*, vol. 5, no. 3, pp. 762–777, Mar. 2024, doi: https://doi.org/10.11594/ijmaber.05.03.03.

[9] R. S. Tarigan, Z. V. B. Tarigan, M. N. D. Maer, Z. J. H. Tarigan, and F. Jie, "The influence of information technology on supply chain resilience through purchasing strategy, production flexibility, and supply chain responsiveness," *Decision Science Letters*, vol. 13, no. 4, pp. 791–806, 2024, doi: https://doi.org/10.5267/j.dsl.2024.9.001.

[10] K. Pratondo, T. Kusmantini, and S. Sabihaini, "Gaining supply chain resilience and performance sustainability through supply chain agility in furniture SMEs in Yogyakarta," *IJSSB*, vol. 5, no. 3, p. 392, Aug. 2021, doi: https://doi.org/10.23887/ijssb.v5i3.37945.

[11] P. Li, Y. Chen, and X. Guo, "Digital transformation and supply chain resilience," *International Review of Economics & Finance*, vol. 99, p. 104033, Apr. 2025, doi: https://doi.org/10.1016/j.iref.2025.104033.

[12] E. M. C. Handijaya, D. S. Kodrat, and T. F. C. W. Sutrisno, "Achieving supply chain resilience: The role of digital transformation and supply chain process integration in market uncertainty," *Jurnal Aplikasi Manajemen*, vol. 22, no. 4, pp. 1252–1266, Dec. 2024, doi: https://doi.org/10.21776/ub.jam.2024.022.04.20.

[13] R. Qi, G. Ma, Q. Zhang, and Q. Wang, "Enterprise digital transformation and supply chain resilience," *Finance Research Letter*, vol. 66, Agustus 2024, doi: https://doi.org/10.1016/j.frl.2024.105564.

[14] L. Judijanto and A. Zulfikri, "Advancing supply chain resilience through cloud-based logistics: A narrative review," vol. 2, no. 3, pp. 147–159, Agustus 2024. https://doi.org/10.61194/sijl.v2i3.625

[15] Wahyudi Wahyudi, "The impact of information technology and supply chain management on firm's operational performance," *IJEMR*, vol. 3, no. 2, pp. 269–282, Jul. 2024, doi: https://doi.org/10.55606/ijemr.v3i2.218.

[16] Z. J. H. Tarigan and H. Siagian, "The effects of strategic planning, purchasing strategy and strategic partnership on operational performance," *Uncertain Supply Chain Management*, vol. 9, no. 2, pp. 363–372, 2021, doi: https://doi.org/10.5267/j.uscm.2021.2.006.

[17] G. F. Frederico, V. Kumar, and J. A. Garza-Reyes, "Impact of the strategic sourcing process on the supply chain response to the COVID-19 effects," *BPMJ*, vol. 27, no. 6, pp. 1775–1803, Oct. 2021, doi: https://doi.org/10.1108/BPMJ-01-2021-0050.

[18] J. Namdar, X. Li, R. Sawhney, and N. Pradhan, "Supply chain resilience for single and multiple sourcing in the presence of disruption risks," *International Journal of Production Research*, vol. 56, no. 6, pp. 2339–2360, Sep. 2017, doi: https://doi.org/10.1080/00207543.2017.1370149

[19] J. Nenavani and R. K. Jain, "Examining the impact of strategic supplier partnership, customer relationship and supply chain responsiveness on operational performance: the moderating effect of demand uncertainty," *JBIM*, vol. 37, no. 5, pp. 995–1011, Apr. 2022, doi: https://doi.org/10.1108/JBIM-10-2020-0461.

[20] I. Kazancoglu, M. Ozbiltekin-Pala, S. Kumar Mangla, Y. Kazancoglu, and F. Jabeen, "Role of flexibility, agility and responsiveness for sustainable supply chain resilience during COVID-19," *Journal of Cleaner Production*, vol. 362, p. 132431, Aug. 2022, doi: https://doi.org/10.1016/j.jclepro.2022.132431.

[21] M. M. H. Emon, "The mediating role of supply chain responsiveness in the relationship between key supply chain drivers and performance: Evidence from the FMCG industry," *BJOPM*, vol. 22, no. 1, p. 2580, Apr. 2025, doi: https://doi.org/10.14488/BJOPM.2580.2025.

[22] A. Tutuhatunewa, N. E. Maitimu, and L. M. Hukunala, "Integration of SCOR model and AHP to measure the shipyard supply chain performance: A case study," *Jurnal Teknik Industri: Jurnal Keilmuan dan Aplikasi Teknik Industri*, vol. 25, no. 2, pp. 169–178, Dec. 2023, doi: https://doi.org/10.9744/jti.25.2.169-178.

[23] R. K. Singh, "Building sustainable supply chains: Role of supply chain flexibility in leveraging information system flexibility and supply chain capabilities," *Sustainable Futures*, vol. 8, p. 100368, Dec. 2024, doi: https://doi.org/10.1016/j.sftr.2024.100368.

[24] T. Sudan, R. Taggar, P. K. Jena, and D. Sharma, "Supply chain disruption mitigation strategies to advance future research agenda: A systematic literature review," *Journal of Cleaner Production*, vol. 425, p. 138643, Nov. 2023, doi: https://doi.org/10.1016/j.jclepro.2023.138643.

[25] J. Um and N. Han, "Understanding the relationships between global supply chain risk and supply chain resilience: the role of mitigating strategies," *SCM*, vol. 26, no. 2, pp. 240–255, Feb. 2021, doi: https://doi.org/10.1108/SCM-06-2020-0248.

[26] X. Bai, K. Z. Zhou, W. Jiang, Y. Li, and X. Chen, "Smart manufacturing and supply chain resilience: Evidence from an emerging market," *Journal of Business Research*, vol. 196, p. 115421, Jul. 2025, doi: https://doi.org/10.1016/j.jbusres.2025.115421.

[27] E. Kaneberg, W. D. Piotrowicz, L.-M. Jensen, S. Hertz, and D. Kedziora, "Supply chain resilience and critical dynamic capabilities: A balanced scorecard approach," *Production & Manufacturing Research*, vol. 13, no. 1, p. 2523957, Dec. 2025, doi: https://doi.org/10.1080/21693277.2025.2523957.

[28] M. Legg, R. A. Silver, and S. Park, "Weathering the storm: Dynamic Capabilities and supply chain agility in supply chain resilience," *Logistics*, vol. 9, no. 4, p. 136, Sep. 2025, doi: https://doi.org/10.3390/logistics9040136.

[29] R. Banomyong, N. Bhusiri, P. Julagasigorn, and P. Varadejsatitwong, "Assessing supply chain resilience to mitigate disruption: The focus on cross-border suppliers," *Logistics*, vol. 9, no. 1, p. 1, Dec. 2024, doi: https://doi.org/10.3390/logistics9010001.

[30] E. Nikookar, D. Gligor, and I. Russo, "Supply chain resilience: When the recipe is more important than the ingredients for managing supply chain disruptions," *International Journal of Production Economics*, vol. 272, p. 109236, Jun. 2024, doi: https://doi.org/10.1016/j.ijpe.2024.109236.

[31] J. Lin, S. Lin, J. Benitez, X. (Robert) Luo, and A. Ajamieh, "How to build supply chain resilience: The role of fit mechanisms between digitally-driven business capability and supply chain governance," *Information & Management*, vol. 60, no. 2, p. 103747, Mar. 2023, doi: https://doi.org/10.1016/j.im.2022.103747.

[32] S. A. Hosseini Shekarabi, R. Kiani Mavi, and F. Romero Macau, "Supply chain resilience: A Critical review of risk mitigation, robust optimisation, and technological solutions and future research directions," *Glob J Flex Syst Manag*, vol. 26, no. 3, pp. 681–735, Sep. 2025, doi: https://doi.org/10.1007/s40171-025-00458-8.

[33] L. Wu, Z. Zhang, J. Huang, I.-H. Su, and S. Tian, "Digital technologies and supply chain resilience: A resource-action-performance perspective," *Inf Syst Front*, Mar. 2025, doi: https://doi.org/10.1007/s10796-025-10595-1.

[34] M. M. H. Chowdhury, P. Chowdhury, M. Quaddus, K. W. Rahman, and S. Shahriar, "Flexibility in enhancing supply chain resilience: developing a resilience capability portfolio in the event of severe disruption," *Glob J Flex Syst Manag*, vol. 25, no. 2, pp. 395–417, Jun. 2024, doi: https://doi.org/10.1007/s40171-024-00391-2.

[35] I. Ndayisenga, R. Uwimana, and D. Mugisha, "Relationship between supply chain flexibility and supply chain resilience: A review of literature," *JPSCM*, vol. 4, no. 1, pp. 22–40, Apr. 2025, doi: https://doi.org/10.58425/jpscm.v4i1.345.

[36] N. Agrawal, M. Sharma, R. D. Raut, S. K. Mangla, and S. Arisian, "Supply chain flexibility and post-pandemic resilience," *Glob J Flex Syst Manag*, vol. 24, no. S1, pp. 119–138, Dec. 2023, doi: https://doi.org/10.1007/s40171-024-00375-2.

[37] I. A. T. Munikhah, A. Y. Ramdhani, A. Y. Pratama, and R. W. Arini, "Scenario analysis of Indonesian ferronickel supply chain resilience with system dynamics," *Jurnal Teknik Industri: Jurnal Keilmuan dan Aplikasi Teknik Industri*, vol. 24, no. 2, pp. 129–140, Dec. 2022, doi: https://doi.org/10.9744/jti.24.2.129-140.