Exploring the key enabling role of digital technology for enhancing supply chain performance through supply chain collaboration, inventory management and supply chain resilience

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A B S T R A C T

The company always tries to improve competitiveness by improving company performance. Using upgraded digital technology makes it easier for internal and external companies to determine business strategies quickly and precisely. This study surveyed expedition companies in East Java, as many as 104 companies with the criteria of having a transportation fleet. Data collection using questionnaires and dissemination in collaboration with the Association of Express Delivery Service Companies, Post and Logistics Indonesia (ASPERINDO). Research respondents consist of employees or unit leaders who are competent in the substance of the survey. Data analysis uses the partial least square (PLS) method. The results showed that digital technology positively and significantly impacts supply chain collaboration, inventory management, and supply chain resilience. The company's ability to build supply chain collaboration impacts improving inventory management optimization, supply chain resilience, and supply chain performance. Furthermore, inventory management with the ability to control inventory well and on-time delivery does not impact supply chain resilience. However, good inventory management has a positive impact on supply chain performance. Likewise, shipping companies, by increasing supply chain resilience, have an impact on supply chain performance. The results of this study contribute to the theory of supply chain management and resource-based view. The practical contribution enlightens the middle and top management on the importance of digital technology with the suitability of investment and benefits obtained in improving supply chain performance.

1. Introduction

Digital technology has developed rapidly and is essential in helping companies succeed in business competition (Liu et al., 2022; Setiawan et al., 2023). The application of digital technology enables and supports each department to get excellent business results (Alvarenga et al., 2023). Changes made through digital technology adoption enhance long-term profits maintains the sustainability of company performance and reduce unexpected risks such as disrupting the information needed in real time (Hajiheydari et al., 2022; Dev et al., 2021; Martins et al., 2022). Besides, applying appropriate digital technology allows companies to innovate continuously and take advantage of existing business opportunities (Tang et al., 2021; Izadi et al., 2020). Moreover, digital technology can be used as a basis for innovation to make a new product or even a system that is applied much more effectively and efficiently (Chavez et al., 2023; Bejlegaard et al., 2021; Tarigan, 2018). The system or application of technology can be made in several ways, such as applying radio frequency identification which facilitates the classification of goods, blockchain, and the use of the Internet of things that prioritizes integration to increase value added for companies (Mishra et al., 2022; Nakandala et al., 2022; Irfan &; Wang, 2019; Zhou et al., 2022). Technology adoption helps all processes in the company be integrated with external companies (Fernando et al., 2020; Panigrahi et al., 2022; Tarigan et

al., 2021). Other benefits of applying digital technology can be felt in various aspects of life, including in daily activities such as digital payment systems (Fadhilah et al., 2021). Using the right technology can help companies increase profits (Hartono et al., 2023), and it takes effort to suit company conditions to avoid company losses (Indirwan & Aulianisa, 2020). The resulting value is for companies to be able to provide accurate and real-time data for components that use internal and external companies (Tarigan et al., 2020).

The COVID-19 pandemic has impacted Indonesia's transportation and logistics business, and company capabilities need to be upgraded to survive and excel in competition (Ricardianto et al., 2021). The number of companies and consumers requiring freight forwarding services has also increased. The role of digital technology itself helps supply chain activities a lot because many complex components are helped to be more integrated into one unit (Hartono et al., 2023; Siagian & Tarigan, 2021; Basana et al., 2023). Combining the components will provide more value for the company (Lu et al., 2018). Collaboration is a component of the supply chain internally and externally to adequately improve company performance (Chavez et al., 2023; Poberschnigg et al., 2020). Collaboration is a form of interaction between suppliers, consumers, and other resources involved in a single unit to be more integrated (Martins et al., 2022; Lin et al., 2023). Another study indicated that trust in each other in exchanging mutually beneficial information provides more value in the long term (Bloise, 2022; Zhou et al., 2022; Naimi et al., 2021; Osunsanmi et al., 2022). In addition, the collaboration carried out by the company can be adjusted to the needs in terms of time, efficiency, and long-term planning, which provides more value for the company (Esrar et al., 2022).

Meanwhile, collaboration is formed between companies and suppliers in activities to optimize more effective investment management related to goods receipt procedures and efficiency of activity time adjusted to demand (Novijanti et al., 2023; Martins et al., 2022; Fernando et al., 2020). Inventory optimization is essential for companies to be more flexible and practical in anticipating large and unexpected fluctuations in demand (Ivanov, 2022; Jessin et al., 2022). Therefore, data integration between departments within the company is essential since it improves performance (Negi &; Kharde, 2021; Wang et al., 2021; Esrar et al., 2022; Zhu et al., 2021). Besides, the technology can help analyze inventory needs and make appropriate forecasting (Panigrahi et al., 2022). The right combination in implementing each component of the company's supply chain becomes more resilient in facing unexpected situations to make the company more valuable in increasing competitiveness and maintaining business continuity (Dev et al., 2021; Lin et al., 2023; Martins et al., 2022). Several factors influence the company's resilience due to unexpected conditions and situations, so it is necessary to prepare oneself mentally to predict the possibilities that occur and be able to respond to changes that occur quickly and precisely internally (Alvarenga et al., 2023; Ivanov, 2022; Jessin et al., 2022; Naimi et al., 2021). The company's ability to improve resilience well so that it impacts the strength of competitiveness (Nakandala et al., 2022; Indirwan & Aulianisa, 2020; Mishra et al., 2022). Proper, effective, and efficient planning is essential, so companies can deal with unexpected situations and adjust (Poberschnigg et al., 2020; Gani et al., 2022). Planning made in detail, both internal and external companies planned from the beginning, can make the identification of problems accurate and accurate (Osunsanmi et al., 2022; Zhou et al., 2022).

Good integration of supply chain components improves company performance because the synchronization of strategies implemented runs well (Basana et al., 2022) and can increase efficiency to reduce waste and continuous improvement (Chavez et al., 2023). The company's performance can be determined by paying attention to the operational side as the company's achievements, namely communication (Sharma et al., 2021; Lin et al., 2023), cost, and efficiency carried out (Nottbrock et al., 2023; Dev et al., 2021). Then, it will improve the company's ability to respond to external disruptions (Zhou et al., 2022) and meet consumer needs effectively (Panigrahi et al., 2022). Determining the company's performance requires appropriate measuring tools to analyze the developments that can be made by the company (Gani et al., 2022; Chen et al., 2019). Research conducted previously in Bangladesh that examined several industrial sectors assessed the company's ability to achieve good performance because it aligns with one goal of achieving company resilience (Gani et al., 2022). Company performance can be better and stand out because of the company's ability to be responsive to market changes, both predictable and uncertain (Zhou et al., 2022).

The company's resilience in facing the situation requires good inventory management to maximize its performance because it can be more efficient (Panigrahi et al., 2022; Setiawan et al., 2023). Inventory management includes many things, including codification, so the company can implement a more effective system to improve performance (Da Silva et al., 2024). Integrated inventory management into company performance (Li et al., 2022). Utilizing the company's capabilities in conducting inventory management positively impacts company performance (Lu et al., 2018). Inventory management has an impact on improving company performance that has interrelated and aligned elements (Poberschnigg et al., 2020). Collaboration can affect company performance because it is a symbol of success for the effectiveness of cooperation (Tarigan et al., 2020; Basana et al., 2022). After all, there is an exchange of quality and helpful information (Basana et al., 2024). The collaboration carried out by delivery service providers helps improve company performance in dealing with all situations (Sharma et al., 2021; Tarigan, 2018). Relationships between companies as a form of collaboration have a long-term impact on company performance (Bloise, 2022). Improving relations and collaboration with external parties also has an impact on internal collaboration to be more integrated to achieve the same goals and achieve competitive advantage (Irfan &; Wang, 2019). The relationship between good collaboration on inventory management and conducting case studies at the supply chain level (Esrar et al., 2022). Collaboration carried out to achieve proper inventory management needs to be carried out internally and externally for accuracy and speed of information (Irfan & Wang, 2019).

The effectiveness of influential collaboration on inventory management improves how data is managed, and the benefits of added value are provided (Novijanti et al., 2023). Research conducted in Brazil reveals the success of existing automotive companies in facing crises with collaboration so that inventory management control can be carried out in an integrated manner (Poberschnigg et al., 2020). Good collaboration helps companies avoid communication errors that cause delays or errors in stocking goods with proper analysis to optimize inventory (Negi & Kharde, 2021). Collaboration carried out by companies has many benefits because digital technology plays a role in helping (Tarigan et al., 2021). Research conducted in Australia reveals the relationship between the role of technology, which is a tool for companies to transform to improve performance (Chavez et al., 2023). Digital technology also helps business processes be much better and more attractive because traditional business processes need more value (Basana et al., 2023). Based on research conducted using the best-worst method, technology helps collaboration be more effective, especially during a pandemic (Sharma et al., 2021). Research conducted in China, specially manufacturing companies, shows that information technology helps external companies collaborate because there is integrated data (Zhou et al., 2022).

Technology also impacts inventory management because real-time data helps activities (Martins et al., 2022). In India, digital technology is beneficial in forecasting because it is supported by good software and is easy to implement (Panigrahi et al., 2022). In addition to assistance from research software conducted in Malaysia, networking also helps obtain accurate data for inventory management (Fernando et al., 2020). In the food and beverages industry in Pakistan, integrated digital technology relationships also help in managing inventory management more optimally according to its capabilities (Irfan & Wang, 2019). Therefore, companies can codify their data appropriately to be adequately archived, help them deal with unexpected situations, and innovate (Li et al., 2022). A previous study showed that capability improvement occurs when proper inventory management in the company becomes more resilient by facing certain situations (Lu et al., 2018). Therefore, integration from inventory management to company resilience is needed to have a long-term impact (Poberschnigg et al., 2020).

The above description showed that various factors affect companies' supply chain performance. These factors include adopting digital technology, supply chain resilience, inventory management, and collaboration. However, those studies consider only partial relationships, and the inclusion of digital technology adoption in supply chain management is minimal. Hence, this study examines whether digital technology enables supply chain collaboration, inventory management, and resilience to enhance supply chain performance. The inclusion of digital technology in this research is a novelty for this study's novelty. Based on the explanation above, four primary research objectives can be set. First, get the magnitude of the influence of digital technology on inventory management, supply chain collaboration, and supply chain resilience. They were second, getting the magnitude of the impact of supply chain collaboration on inventory management and supply chain resilience. And supply chain performance. Third, get the magnitude of the influence of inventory management on supply chain resilience and performance. Finally, we get the magnitude of the influence of supply chain resilience relationships on supply chain performance.

The rest of the paper is organized as follows. Section two presents the theoretical background for creating the model and developing the hypotheses. While Section three introduces the appropriate research method used. Section four presents the analysis findings and results. The discussion, theoretical, and practical contribution is presented in section five. Finally, section six draws conclusions, limitations, and recommendations for further research.

2. Literature Review

2.1. Digital technology

Digital technology is essential in corporate organizations, especially in building competitive advantages over competitors (Setiawan et al., 2023; Liu et al., 2022). The transformation of digital technology requires social knowledge and codification (Siagian & Tarigan, 2021). The company's sustainability in maintaining good internal and external relations requires digital technology (Hajiheydari et al., 2022). Supporting digital technology in business helps the process continue to innovate and achieve existing opportunities (Tang et al., 2021; Tarigan et al., 2021). The efficient application of technology in companies can help transform and improve companies (Izadi et al., 2020). According to Chavez et al. (2023), technology corresponds to the ability and willingness to use it in making new products. Changes in digital technology can help companies become more effective and efficient (Bejlegaard et al., 2021; Basana et al., 2023). Innovation in digital technology can create new relationships between companies and relationships with other organizations (Nottbrock et al., 2023). According to Martins et al. (2022), digital technology reduces the risk of unexpected events. The application of technology digitally provides the advantage of real-time information (Dev et al., 2021). The application of technology needs to be understood for its use to get more significant benefits (Alvarenga et al., 2023). The application of technology as a foundation for business competitiveness can increase efficiency in the company's business (Nakandala et al., 2022). The use of technology can be in the form of helpful information because it is carried out digitally, which helps integration within the company to process information technology (Irfan & Wang, 2019).

Information technology that is put to good use provides more value to the value provided by the company (Zhou et al., 2022). Technology not only helps part of the supply chain process but almost the entire process is included in inventory management

(Panigrahi et al., 2022). Networking can occur because the technology that helps with proper networking can also help companies manage the necessary operations (Fernando et al., 2020). The impact of digital technology in many sectors is not only on the economy but also on culture, tourism, agriculture, and agrologistics. General changes in community activities continue to grow. One is digital payments due to the growing use of digital technology (Fadhilah et al., 2021; Tarigan et al., 2021). In addition, using appropriate digital technology also benefits companies because it increases productivity (Siagian & Tarigan, 2021). Incorrect use of digital technology can cause failure in implementing technology systems for companies (Indirwan & Aulianisa, 2020).

2.2. Supply chain collaboration

Collaboration within the company must be done internally and externally to improve performance in the supply chain (Novijanti et al., 2023; Chavez et al., 2023). The collaboration involves the relationship between consumers and companies so that changes can occur (Bejlegaard et al., 2021). A relationship change is needed to achieve consistent collaboration between suppliers, manufacturers, distributors, and end users (Sharma et al., 2021). Collaborative relationships form social interactions with suppliers, consumers, and others (Lin et al., 2023; Tarigan et al., 2020). Integration between resources owned in the supply chain process, (Martins et al., 2022). In collaboration, trust, and good information exchange are needed (Naimi et al., 2021). The collaboration will provide more value in a supply chain process and improve economic performance (Bloise, 2022). In addition, collaboration is also carried out to predict the relationship between management and consumers internally and externally (Poberschnigg et al., 2020). Collaboration done by companies on resources outside the company provides more benefits to create company value, so good collaboration and relationships are needed in the long term (Zhou et al., 2022). The activities include networking to exchange information to improve company performance (Osunsanmi et al., 2022; Basana et al., 2022). Several variations of collaboration techniques in the supply chain depend on company needs, such as time, inventory, efficiency, and planning and forecasting (Esrar et al., 2022). Several things are needed to measure the effectiveness of collaboration so that interrelated integration can occur in the entire supply chain process (Tarigan & Siagian, 2021). According to Martins et al. (2022), it requires the ability to understand each element that is needed and interrelated with each other. The necessary elements become the resources to optimize the entire process to become a unified, integrated, and valuable supply chain process.

2.3. Inventory management

All activities in business require inventory management to support business activities and for proper procedures for receiving goods in warehouses. These activities are based on the time of activity in receiving goods on demand (Martins et al., 2022). Reducing excessive inventory also needs to be reconfigured or updated to be more flexible in inventory management (Ivanov, 2022). There is a need for proper inventory management to be able to cope with large and unexpected numbers of requests due to certain situations (Jessin et al., 2022). Inventory can be divided into several types seen from the production stage and must be integrated to process information data more accurately (Negi & Kharde, 2021). In managing inventory, a concept related to costs is needed because the relationship in line with the availability of extensive inventories requires enormous costs (Zhu et al., 2021). Having a clear, streamlined path in the supply chain flow also determines the inventory needed because of the interconnectedness (Wang et al., 2021). Technological assistance is needed to achieve maximum inventory performance, making it easier to analyze data in demand needs and other processes (Panigrahi et al., 2022). In addition, inventory management requires operations that efficiently manage stock and other related activities (Fernando et al., 2020). Inventory can be seen as much as possible to forecast demand appropriately (Esrar et al., 2022).

2.4. Supply chain resilience

Resilience within the company is necessary to deal with unexpected situations in the business environment (Lin et al., 2023). To achieve a resilient supply chain, analysis for competitive advantage and other elements is needed (Martins et al., 2022). A strong attitude is needed in the supply chain process to achieve business continuity (Dev et al., 2021). Resilience in the supply chain is influenced by several uncertain things that can occur at any time (Alvarenga et al., 2023). The company's resilience is synonymous with the ability to predict the possibility of changes or unexpected situations (Ivanov, 2022). Many benefits can be obtained if the supply chain becomes resilient, such as being more dynamic and making it easy to see opportunities (Siagian et al., 2021). Specific focuses must be considered in the supply chain process to achieve the desired point of resilience (Nakandala et al., 2022). According to Gani et al. (2022), it can achieve a competitive advantage through good planning and operations and become a resilient supply chain. The ability to respond to changes is the primary key to a resilient supply chain (Siagian et al., 2022). Capability internally in responding to changing situations in the supply chain (Jessin et al., 2022). Supply chain resilience is often related to risk management and reaction in the face of disruptions in business processes to bounce back (Poberschnigg et al., 2020). Resilience in the company can be divided into internal and external, which are adjusted to the activities carried out to maintain certain parts (Zhou et al., 2022). To become a resilient company, it is necessary to identify problems with disruptions that occur appropriately to be handled effectively (Osunsanmi et al., 2022). Resilience must be built and developed so companies can face unexpected situations and get through them (Siagian et al., 2022). It is being resilient means facing situations in the business economy and aspects of life and being mentally resilient in doing

business (Siagian et al., 2021). Being resilient in facing digital disruption situations is also needed by companies such as cybercrime and others (Indirwan & Aulianisa, 2020).

2.5. Supply chain performance

Company performance can be achieved through business processes with a predetermined strategy (Izadi et al., 2020). Traditional operational performance refers to the efficiency of the company's ability to use resources, which can be improved by reducing waste (Chavez et al., 2023; Basana et al., 2022). Performance can be assessed using six criteria: efficiency, good cooperation, digital application, operations, capabilities, and quality of information and communication (Sharma et al., 2021; Basana et al., 2024). In addition, company performance can be seen from time, cost, quality, flexibility, and efficiency in the use of assets (Nottbrock et al., 2023). Company performance can also be seen from the business processes that occur with the involvement of consumers and the value provided (Lin et al., 2023). The company's performance can be seen using real-time data (Dev et al., 2021). Achieving good performance requires a good analysis of the parts that must be developed (Gani et al., 2022). One of the measuring tools that can be used to measure performance in the supply chain is seen in its operations and business performance, according to Chen et al. (2019). The company's performance can be seen in how responsive it is in responding to disruptions that may occur in the supply chain process (Zhou et al., 2022). The company's ability to distribute to consumers effectively and with quality is one of its good performances (Panigrahi et al., 2022).

2.6. The relationship between research concepts

2.6.1. Digital Technology with inventory management, supply chain collaboration, and supply chain resilience

Digital technology helps process supply chain activities in real-time, especially in inventory (Martins et al., 2022). The application of technology can be in the form of software or systems that facilitate analyzing data related to inventory needs needed by companies in forecasting and others (Panigrahi et al., 2022). Digital technology in networking and integration can help companies better understand operational needs by optimizing inventory management in manufacturing companies (Fernando et al., 2020; Setiawan et al., 2023). The role of technology itself helps companies be able to integrate the data needed better so that inventory management becomes more optimal (Irfan & Wang, 2019). Company orientation refers to individual activities toward technology and helps become a guideline in the transformation process and improve performance (Chavez et al., 2023). The role of digital technology can help companies further improve business processes and attract consumers (Bejlegaard et al., 2021; Basana et al., 2023). Technology can help collaboration be more effective in achieving company performance (Sharma et al., 2021). Information technology created by the company can help external parties understand the data needed so that collaboration can occur to create more value (Zhou et al., 2022). Digital technology can help analyze and make decisions to maintain supply chain resilience (Martins et al., 2022). Using data in real-time from the application of technology can help companies make decisions and become more resilient to changing situations (Dev et al., 2021). Using blockchain to delay changes that may occur globally can plan a more reliable supply chain process (Alvarenga et al., 2023). Applying the right software can help the supply chain process be more resilient (Mishra et al., 2022). Supply chain resilience can be built from a sound technology foundation (Nakandala et al., 2022). Information technology in the company has a vital role in helping collaboration, which causes companies to be more resilient to facing change (Zhou et al., 2022). Based on the relationship between concepts, hypotheses can be established to answer the objectives of the first outline with the three hypotheses (H1, H2 and H3).

H₁: *Digital technology has an impact on improving inventory management.*
H₂: *Digital technology has an impact on improving supply chain collaboration.*
H₃: *Digital technology has an impact on improving supply chain resilience.*

2.6.2. The relationship of supply chain collaboration with inventory management, resilience, and performance

Good collaboration between internal and external companies can help the company's inventory management to be more integrated because it supports each other to reduce non-value added (Esrar et al., 2022). The importance of collaborating internally and externally with the company correctly and appropriately to be able to do proper inventory management because there is supporting data (Irfan &; Wang, 2019). Collaboration within the company also provides more value in managing company inventory and long-term benefits (Poberschnigg et al., 2020). Collaboration is carried out appropriately to avoid communication errors that interfere with managing goods, supplies, and other divisions in the company (Negi & Kharde, 2021). Good collaboration can consistently help the supply chain become more resilient to all situations (Naimi et al., 2021; Siagian et al., 2022). Companies need to know the supply chain process to provide an accurate picture of results (Tarigan, 2018). Supply chain resilience requires internal collaboration (Jessin A. et al., 2022). Collaboration to strengthen company relationships with consumers internally and externally helps companies become more resilient because of good relationships and mechanisms (Poberschnigg et al., 2020; Siagian et al., 2021). Good collaboration performance internally and externally is considered to help companies become more resilient when facing certain conditions because of real-time data that can be used (Zhou et al., 2022). Collaboration activities can help companies recover quickly from adversity and become more resilient during disruption (Osunsanmi et al., 2022). The collaboration carried out by the company also affects the company's performance as effectively as the collaboration that occurs (Lin et al., 2023; Tarigan & Siagian, 2021). One form of collaboration can be exchanging information that is carried out well to achieve better company performance (Sharma et al., 2021). Based on research conducted in the United Kingdom on shipping service companies that use the multi-case study

method with response results that can improve company performance in the face of uncertainty disturbances, the formation of good relationships can make collaboration improve performance in the form of good company sustainability (Bloise, 2022). Collaboration relationships carried out internally and externally by utilizing existing resources also help achieve superior company performance in competition (Irfan &; Wang, 2019). Based on the relationship between concepts, hypotheses can be established to answer the objectives of the first outline with the three hypotheses (H4, H5 and H6).

H4: *Supply chain collaboration has an impact on improving inventory management.*
H5: *Supply chain collaboration has an impact on increasing supply chain resilience.*
H6: *Supply chain collaboration has an impact on increasing supply chain performance.*

2.6.3. The relationship of inventory management with supply chain resilience and supply chain performance

Changes made by companies in rearranging inventory systems using technology can help supply chains become more resilient to situations (Ivanov, 2022). The appropriate use of codification in inventory management systems helps companies be more resilient in facing problems and able to innovate (Li et al., 2022). Maximizing capabilities in managing inventory so that the company becomes more resilient to changes or disruptions that occur so that it becomes a company that can take place (Lu et al., 2018). The integration carried out by the company with an excellent long-term impact helps companies be more resilient to unexpected situations that could occur (Poberschnigg et al., 2020). Good inventory management due to the system that has been run can maximize company performance because it has a good impact on timely production results, costs, and others (Panigrahi et al., 2022). Inventory management is part of codifying, which, if done well, helps the company perform better (Li et al., 2022). With the results of research conducted in Indonesia in several sectors that have experienced the benefits of increasing supply chains, as many as 173 companies, it was found that the capabilities possessed in managing inventory are also needed so that the company's performance can be maximized because it can utilize inventory well (Lu et al., 2018). Integration in managing inventory management helps companies improve performance due to the integration of elements that are carried out continuously (Poberschnigg et al., 2020). Based on the relationship between concepts, a hypothesis can be established to answer the purpose of the third outline with both hypotheses (H7 and H8).

H7: *Inventory management has an impact on improving supply chain resilience.*
H8: *Inventory management has an impact on improving supply chain performance.*

2.6.4. Relationship of supply chain resilience with supply chain performance.

The company's resilience in facing problems is also influenced by business processes that occur so that company performance can be seen (Lin et al., 2023). The company's resilience is influenced by several things to achieve the same goal, namely company performance (Dev et al., 2021). Supply chain resilience in line can also improve supply chain performance (Gani et al., 2022). From the results of research conducted in Bangladesh with a population of small and medium enterprises, it is produced that the ability of resilient companies to deal with unexpected situations can make company performance better because they can adapt quickly (Zhou et al., 2022). Based on the relationship between concepts, a hypothesis can be established to answer the purpose of the fourth outline with a hypothesis (H9).

H9: *Supply chain resilience has an impact on improving supply chain performance.*

A research model can be determined based on the explanation in the introduction, literature review, and the relationship between concepts (Fig. 1).
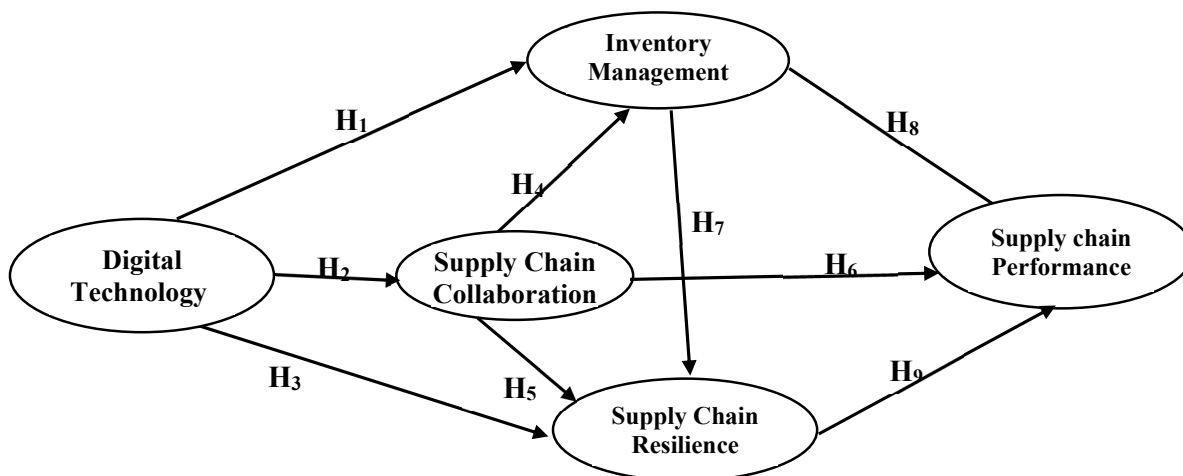

Fig. 1. Research Model

3. Research Methods

The research uses a descriptive quantitative approach by providing an overview by objectively implementing the relationship between constructs. The population of this study is transportation services, defined as logistics services, an integrated process in planning shipping goods to consumers. The population in the study is an expedition company located in Surabaya, based on data registered as an expedition company at the Association of Express Delivery Service Companies, Post and Logistics Indonesia (ASPERINDO), which is an association related to transportation services or expeditions in Surabaya as many as 150 companies. The sample was determined to be a shipping company that has been stable for more than five years. Respondents are employees who have at least a supervisor position and have worked for more than three years. Determination of measurement items set on digital variables of technology as the ability of the company to continue to develop service products using technology by adopting Chavez et al. (2023), namely the company's expedition has a technology system to enter data (DT1), the company uses technology in terms of tracking timeliness (DT21), data in the company has been integrated (DT22), The expedition technology in the company is easy to understand (DT31), the expedition technology is easy to use (DT32), the expedition technology in the company is used following the latest developments (DT4). Supply chain collaboration determined by indicators adopts Martins et al. (2022), Novijanti et al. (2023), Tarigan & Siagian (2021) are information sharing expedition companies (SCC11), companies communicate promptly (SCC12), companies provide reasonable responses to partners (SCC2), companies can provide best practice information to supplier partners (SCC3), companies have transparent procedures in shipping goods (SCC4) and companies share schedules with partners adequately (SCC5). Inventory management used by adopting Ivanov (2022) is that the company uses flexible receiving types of goods (IM1), the company anticipates inventory with good after-sales (IM21), the company uses inventory in solving problems (IM22), the company can reach distant shipments (IM3), the company can provide competitive prices (IM4), the company can serve deliveries on time (IM5). For Supply chain resilience adopted, Gani et al. (2022) used indicators that companies can survive emergencies (SCR11), companies can face crises that occur (SCR12), companies provide exemplary service in emergencies (SCR21), companies provide competitive prices in emergencies (SCR22). The last variable supply chain performance adopting Chen et al. (2019), Novijanti et al. (2023) are the company making adjustments to the type of fleet needed (SCP11), the company can provide competitive prices for new types of goods (SCP12), the company has a good delivery track record (SCP21), the company has a track record in solving problems well (SCP22), the company has adequate goods turnover (SCP31), the company has an adequate/spacious physical warehouse (SCP31) and the company has services tailored to customer demand (SCP4). The research was conducted using data collection techniques using questionnaires that were distributed to respondents who had been selected based on meeting specific criteria. The measurement scale used in the questionnaire is the Likert scale because it is much more helpful in giving limits. This study used the Partial Least Square (PLS) method with the SmartPLS program. Data management with PLS is divided into two models, namely the outer model and the inner model. The outer model test can be done with convergent validity and reliability tests, which aim to measure the correlation with the loading value at a more excellent reliability of 0.7 with a loading factor greater than 0.5 and an average variance extracted >0.5. The inner model is tested through the R^2 value of the construct. The value of R^2 indicates the percentage of an exogenous variable described by the endogenous variable or intervening variable. The inner value of the model can be seen from the value of T-statistics > 1.96 for the accepted hypothesis.

4. Analysis Result

The questionnaires were distributed to expedition transportation companies in East Java that use types of trucks, including pickups, Colt diesel ankles, small Colt diesel double, medium Colt diesel double tronton, trintin, trailer, and wing box. Questionnaires are distributed to respondents who have worked for at least three years and at least at the middle management level. Data on transportation companies was obtained from as many as 104 companies, with the respondents' characteristics in Table 1.

Table 1
Characteristics of research respondents

Item Measurement	Descriptive	Freq.	Percentage
Age	< 24 years old	3	3 %
	25-34 years	17	16 %
	35-44 years	50	48 %
	45-54 years	32	31 %
	> 64 years old	2	2 %
Types of Expedition Companies	Trucking services	88	85 %
	Ship expedition services (EMKL)	3	3 %
	Package services such as JNE, JnT and others	13	12 %
Respondents position	Staff	21	20 %
	Supervisor	27	26 %
	Senior officer	46	44 %
	Owner	10	10 %
Working Experience	3 - ≤ 5 Years	11	11 %
	5 - ≤ 7 Years	14	13 %
	7 - ≤10 Years	26	25 %
	> 10 Years	53	51 %

Based on Table 1, it was found that the age of respondents was at 35-54 years. As many as 82 respondents (79%), the most significant type of shipping company in transportation services using trucks, as many as 88 respondents (85%), the position of respondents in the majority company structure as middle management as many as 73 respondents (70%), and long working in companies that already have adequate experience and skills in respondents who have worked for more than five years in the shipping industry as many as 93 respondents (89%). Tests for PLS for outer models are shown in Table 2.

Table 2
Outer model result

Item of Research	Factor loading	Cronbach Alpha	Composite Reliability	AVE
Digital technology (DT)		0.919	0.922	0.714
The company has a technology system for entering data (DT1)	0.815			
The company uses technology in terms of tracking timeliness (DT21)	0.874			
Data in the company has been integrated (DT22)	0.810			
Technology in the company is easy to understand (DT31)	0.891			
Easy-to-use expedition technology (DT32)	0.788			
Expedition technology in the company is used following the latest developments (DT4).	0.886			
Supply chain collaboration.		0.914	0.919	0.704
Information sharing expedition company (SCC11)	0.688			
Company communicates promptly (SCC12)	0.914			
Company gives good response to partners (SCC2)	0.839			
Company can provide best practice information to supplier partners (SCC3)	0.835			
The company has a straightforward procedure in shipping goods (SCC4)	0.853			
The company shares schedules with partners adequately (SCC5)	0.889			
Inventory management.		0.928	0.931	0.943
Companies use flexible accept types of goods (IM1)	0.852			
The company anticipates inventory with after-sales well (IM21)	0.892			
The company uses inventory to solve problems (IM22)	0.874			
Companies can reach distant shipments (IM3).	0.865			
Companies can provide competitive prices (IM4)	0.780			
The company can serve on-time delivery (IM5)	0.874			
Supply chain resilience.		0.779	0.787	0.858
Companies can survive emergencies (SCR11)	0.747			
The company can deal with crises that occur (SCR12).	0.767			
The company provides good service in emergencies (SCR21)	0.713			
The company provides competitive pricing in emergencies (SCR22).	0.871			
Supply chain performance.		0.864	0.872	0.895
The company adjusted the type of fleet needed (SCP11)	0.622			
The company can provide competitive prices for new types of goods (SCP12)	0.812			
The company has a good track record of delivery (SCP21)	0.731			
The company has a track record of solving problems well (SCP22)	0.682			
The company has adequate goods turnover (SCP31)	0.707			
The company has an adequate/spacious physical warehouse (SCP31)	0.826			
The company has a service tailored to customer demand (SCP4)	0.799			

Based on the results of Table 1, it is found that the goodness of fit for the outer model has met the requirements in testing validity through the loading factor, the AVE (average variance extracted) value has been above 0.5, and the reliability test shown by Cronbach Alpha, composite reliability is above 0.700. Goodness of fit that has been fulfilled so that it can proceed to the following process. The goodness of fit inner model testing is determined by Q-square value = $[(1 - R_1^2) \times (1 - R_2^2) \times (1 - R_3^2) \times (1 - R_4^2)]$ is $Q^2 = 1 - [(1 - 0.543) \times (1 - 0.616) \times (1 - 0.582) \times (1 - 0.707)] = 0.9785$. This result shows that the digital technology model can influence changes by 97.85% in supply chain collaboration, inventory management, supply chain resilience, and supply chain performance.

5. Hypothesis Testing and Discussion

Results of research hypotheses testing obtained from data analysis using partial least squares (PLS are shown in Table 3 and Fig. 2.

Table 3
Test the inner model hypothesis

| Hypothesis	Path Coefficient	T statistics	P values
Digital Technology → Inv. Management (H1)	0.422	4.544	0.000
Digital Technology → Sup. Chain Collab. (H2)	0.737	16.278	0.000
Digital Technology → Supply Chain Resilience (H3)	0.314	3.683	0.000
Sup. Chain Collab. → Inv. Management (H4)	0.420	5.381	0.000
Sup. Chain Collab. → Supply Chain Resilience (H5)	0.536	5.559	0.000
Sup. Chain Collab. → Sup. Chain Perform. (H6)	0.247	2.013	0.044
Inv. Management → Supply Chain Resilience (H7)	-0.044	0.505	0.613
Inv. Management → Sup. Chain Perform. (H8)	0.332	4.433	0.000
Supply Chain Resilience → Sup. Chain Perform. (H9)	0.371	5.208	0.000
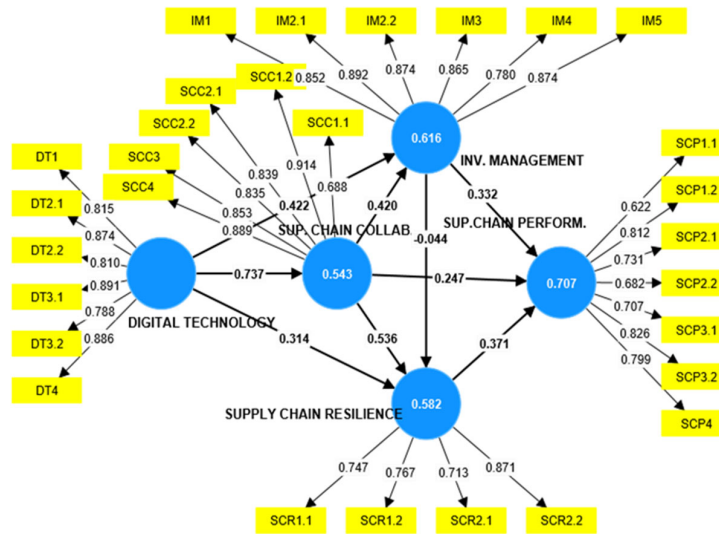
Fig. 2. Analysis of research results

Based on Table 3 and Fig. 2, the first hypothesis (H1) is accepted with a t-statistic value of 4,544 (> 1.96). This condition states that digital technology improves inventory management effectively. The company's ability to integrate data well using digital technology improves inventory management and the ability to receive goods flexibly and anticipate inventory after sales. This study's results support the previous research results, which state that digital technology has an impact on improving inventory management. Similarly, the second hypothesis (H2), that digital technology impacts supply chain collaboration, is acceptable with a t-statistic of 16,278 (>1.96). Digital technology adopted by companies engaged in expedition benefits the company since it is practical and easy to use. Digital technology developments support supply channel collaboration with the emergence of the ability to provide good responses to partners and best practice information. This study confirms that digital technology impacts increasing supply chain collaboration.

Moreover, the third hypothesis (H3), that digital technology affects supply chain resilience is empirically supported with a t-statistic value of 3,683 (> 1.96). Digital technology system that provides data in the expedition network enhances the efficiency of the expedition operation. Besides, digital technology is easy to understand, improving supply chain resilience. It also implies that digital technology improves the expedition companies' resilience, enabling them to survive in emergencies and deal with crises. The results support research that states that digital technology impacts supply chain resilience. As expected, the fourth hypothesis (H4), stating that supply chain collaboration influences inventory management, is supported with a t-statistic of 5,381 (>1.96). This result shows that supply chain collaboration indicated by sharing schedules with partners appropriately and sharing information positively enhances inventory management results. Excellent inventory management can reach distant shipments and serve delivery on time. The results confirm past studies that supply chain collaboration influences inventory management. Besides, supply chain collaboration influences supply chain resilience as the fifth hypothesis (H5) with a t-statistic of 5,559 (>1.96). This condition illustrates that supply chain collaboration, described with companies providing good responses to partners and having clear procedures in shipping goods, can increase supply chain resilience with the ability to deal with crises and provide good service in emergencies. The results confirm previous research that collaboration influences supply chain resilience.

The research sixth hypothesis (H6) result also proved that supply chain collaboration influences supply chain performance with t-statistics 2.013 (>1.96). The company's ability to maintain adequate supply chain collaboration by increasing timely communication and providing suitable responses to partners can improve company performance. This condition is with the creation of the company's ability to adjust the type of fleet needed and have services tailored to customer demand. The study's results support previous studies that state that supply-chain collaboration influences supply-chain performance. Moreover, the seventh hypothesis (H7), inventory management impact supply chain resilience, is not supported in this study since the t-statistics is 0.505 (<1.96). This result shows that inventory management described by the company anticipating inventory with after-sales well and the company being able to serve delivery on time cannot increase supply chain resilience. The well-organized inventory does not directly impact the ability to deal with crises and provides competitive prices in emergencies. The study results differ from research that states inventory management influences supply chain resilience. The eighth hypothesis (H8), inventory management positively improves supply chain performance with a t-statistics value of 4,433 (<1.96). This condition shows that inventory management positively affects supply chain performance. An accurate and effective track record of well-maintained delivery, good problem-solving, and an adequate/spacious physical warehouse place improve the supply chain performance. The results confirm the results of previous studies that state that inventory management of supply chain performance.

The last hypothesis, the ninth hypothesis (H9), which states that supply chain resilience influences supply chain performance, is supported with a t-statistics value of 5.208 (>1.96). This shows that the company can build resilience by dealing with emergencies and crises and providing good emergency services to improve supply chain performance. In addition, companies can improve performance by increasing their ability to adjust the type of fleet needed to provide competitive prices for new types of goods and services tailored to customer demand. The study's results support previous research stating that supply chain resilience affects supply chain performance. The ability of shipping companies to improve and update digital technology that can be applied has an impact on the ability to form supply chain collaboration by sharing information and timely delivery schedules. The company also uses this condition to optimize inventory management with data integration, making it easier for other departments to access data in the warehouse. Established and adequate supply chain collaboration can increase company resilience with partners to produce supply chain performance. Inventory management optimized and supported by supply chain collaboration can improve company performance by forming competitive prices for new goods and services tailored to customer demand. The company's digital technology also impacts optimizing the company's expeditions and collaborating with partners so that they can adjust the type of fleet needed. This research has a practical impact on middle management for expedition company practitioners with the benefits of digital technology to optimize company inventory and control the company's fleet on time. Company managers can also build strategic partners with external parties in adding fleets to meet and adjust customer demand. Company owners are also enlightened in understanding the impact of digital technology investment in building supply chain collaboration and resilience to improve company performance. The theoretical contribution is to enrich the theory of resources-based view in technology used to increase company competitiveness. This research also adds to supply chain theory in building integration with partners and supply chain resilience.

6. Conclusion

The company invests capital in maintaining the continuity of adequate information systems and even maintaining technology implementation to be updated and as needed. Shipping companies apply digital technology to provide data integration between internal functions to monitor and control synergies easily. Digital technology that occurs in shipping companies can be relied on for timely tracking, and it is easy to understand and use, which can increase supply chain collaboration, inventory management optimization, and supply chain resilience. Expedition companies, in improving supply chain collaboration capabilities with the ability to share information, rely on timely communication and provide good responses to partners, which have an impact on improving inventory management optimization, supply chain resilience, and supply chain performance. The company's ability to improve inventory management by anticipating inventory with good after-sales service and the company's ability to serve delivery on time does not increase supply chain resilience but has an impact on improving supply chain performance. Expedition companies improve supply chain resilience by surviving emergencies, dealing with crises, providing good service, and improving supply chain performance. The freight forwarder has a good performance with increasing adjustments to the type of fleet needed, competitive prices, a good delivery track record, good problem-solving skills, adequate inventory turnover, and flexible services according to customer requests. Digital technology can impact supply chain performance through inventory management, collaboration, and resilience of shipping companies. Company owners and top management must update the right technology to increase competitiveness.

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