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DIGITALISASI DAN INTEGRASI RANTAI PASOK RAMAH LINGKUNGAN UNTUK MEMBANGUN KETANGGUHAN RANTAI PASOK MENUJU KEUNGGULAN DAYA SAING PERUSAHAAN YANG LEBIH BAIK

TESIS

Diajukan untuk memenuhi persyaratan penyelesaian program S-2
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PROGRAM STUDI MAGISTER MANAJEMEN

SCHOOL OF BUSINESS AND MANAGEMENT
UNIVERSITAS KRISTEN PETRA
SURABAYA
2023

LEMBAR PENGESAHAN

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Surabaya, 28 Februari 2023

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From: Growing Science
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Date: January 25, 2023

Dear **Zeplin Jiwa Husada Tarigan**

I would like to confirm that your paper entitled "**DIGITALIZATION AND GREEN SUPPLY CHAIN INTEGRATION TO BUILD SUPPLY CHAIN RESILIENCE TOWARD BETTER FIRM COMPETITIVE ADVANTAGE**" with Hendry Sugianto Setiawan and Hotlan Siagian has been accepted for publication on Uncertain Supply Chain Management, An international journal.

Sincerely,

Seyed Jafar Sadjadi

Growing Science

Digitalization and Green Supply Chain Integration to Build Supply Chain Resilience Toward Better Firm Competitive Advantage

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Abstract

Organizations rely on information technology to integrate internally and externally to create process efficiency in increasing competitiveness. Information technology can support digitalization in companies to maintain green supply chain management. Manufacturing companies are required to be able to pay attention to the environment by maintaining the balance of nature. The object of this research is manufacturing companies located in East Java. Data were collected from respondents through questionnaires which were distributed using Google form. The results of the questionnaire distribution were obtained from a total of 108 companies analyzed using the partial least squares method. The analysis shows that digitalization affects supply chain integration, green supply chain, and resilience. Digitalization in the supply chain can form a strong integration, energy efficiency, and effectiveness to survive. Supply chain integration affects the green supply chain and supply chain resilience. Integration in the supply chain system, able to overcome environmental problems and optimize resources. A green supply chain affects supply chain resilience. Supply chain integration, green supply chain, and supply chain resilience affect a firm competitive advantage. Practical research contributions for management to allocate budgets with the needs of application development and supply chain systems within the company. Supply chain digitization is a solid foundation for companies to have a competitive advantage against competitors.

Keywords*:* Supply Chain Digitalization; Supply Chain Integration; Green Supply Chain; Supply Chain Resilience; Firm Competitive Advantage

1. Introduction

The growth of information technology (IT) requires rapid adaptation from all parties, including manufacturing companies (Suprapto et al., 2017). The old manufacturing companies that used to rely on human resources only are now forced to keep up with the times by using IT in every process,

starting from procurement of raw materials, production process until the distribution process to remain competitive, facing a challenging business world (Ganbold et al., 2020). IT in companies is advantageous to facilitate the integration of each process from upstream to downstream, from suppliers to customers (Cai et al., 2016; Tarigan et al., 2019). With good integration among the stakeholders, each process will be more effective and efficient (Zadeh et al., 2020). IT, also known as supply chain digitalization, is a tool companies use to achieve integration between departments and accelerate the operational process (Huo et al., 2015; Yu et al., 2021). IT could impact supply chain integration by providing good quality data (Ganbold et al., 2020; Cai et al., 2016; Huo et al., 2015; Han et al., 2017; Yu et al., 2015; Liu et al., 2016). Using modern technology for sustainable production systems impacts efforts to become an environmentally friendly company (Stock et al., 2018; Khan et al., 2020). IT development has significantly impacted efforts to become an environmentally friendly company (Stock et al., 2018). The Internet of Things (IoT) can reduce harmful gas emissions as a form of a green supply chain (Mastos et al., 2020). Ardanza et al. (2019) also stated that technology has a very important role in manufacturing to improve the green environment. The same thing was stated by Weng et al. (2020) technology-based manufacturing can improve green supply chains by reducing inventory levels and improving company performance. IT in companies with applications can link activities between departments to reduce unnecessary physical mobility. Tortorella et al. (2020) show that IT contributes to providing stability for companies, especially in an environment that is not conducive. IT can ensure good communication and collaboration within the company and externally to maintain the company's stability (Verma & Bhattacharyya, 2017). Research from Liu & Lee (2018) shows that companies that use IT can integrate systems to increase the supply chain's resilience.

As a form of business, organizations maintain business goals by paying attention to the environment through a balance of economic, social, and environmental values (Xu et al., 2022; Stock et al., 2018; Novitasari & Tarigan, 2022). Green business needs to involve the company's suppliers and customers to maintain balance and sustainability in the supply chain. Companies can optimize green supply chain management by involving the entire internal company to communicate with upstream and downstream parties (Basana et al., 2022b; Dong et al., 2021). Based on a literature study conducted by Tseng et al. (2019), it was concluded that companies could reduce their production costs by involving their suppliers in several green initiatives, for example, material recycling, green packaging, and efficient energy use. Green company internal factors are also needed to build company competitiveness. According to Çankaya & Sezen (2019), green product development and production processes can improve product quality, reduce production costs, and enhance a good image for the company. Green logistics factors involving customers are also crucial for companies because business processes will become more efficient and quality (Laari et al., 2016; Tarigan et al., 2018). This is

because transportation costs will be reduced, and the product's quality will be in accordance with customer wishes (Abdallah & Al-Ghwayeen, 2019). If green supply chain management is going well, the company can carry out clean technology innovation, one of the focus areas in the Net Zero Industry and Innovation (Dong et al., 2021).

Integration in every supply chain process cannot be done partially, there needs to be comprehensive integration from upstream to downstream, starting from supplier integration, internal integration, and customer integration (Basana et al., 2022b; Tarigan et al., 2019). If the company has limited resources, the company needs to integrate with suppliers to strengthen mutually beneficial relationships between companies and suppliers (Khanuja & Jain, 2021). Siagian et al. (2020) on fast-moving consumer goods companies show that internal integration also plays a role in integrating all functions within the company to have better and faster communication in decision-making. To complete the integration process, companies must have competitive advantages such as lower operating costs, faster delivery times, and better customer satisfaction (Kim & Chai, 2016; Yunus & Tadisina, 2016). Abeysekara et al. (2019) stated that solid supply chain management gives the company a competitive advantage compared to competitors. The competitive advantage is the company's strategy to win the business competition and survive in crises. One example of a competitive advantage that a company must have been the ability and flexibility to estimate and measure supply chain performance (Yu et al., 2021). A resilient supply chain can also result from good integration starting from suppliers, internal, and customers because every activity from upstream to downstream becomes more flexible to the existing situation (Liu et al., 2018). Based on the review of previous studies by the researcher, it was found that no research discussed the variables regarding supply chain digitalization, supply chain integration, green supply chain, supply chain resilience, and firm competitive advantage simultaneously.

2. Literature Review

2.1. Supply Chain Digitalization (SCD)

IT, closely related to digitalization, can help companies gain a sustainable competitive advantage in the supply chain by improving certain asset relationships, facilitating information exchange, and building long-term cooperative relationships as a form of implemented Supply Chain Digitalization (Yu et al., 2021). IT can also indirectly improve company performance by improving SCI by facilitating more efficient and automated information flows (Yu et al., 2017; Zhang et al., 2016). The use of IT strengthens the exchange of information in buyer and supplier relationships through a more efficient process that reduces waiting times (Vanpoucke et al., 2016). Chhabra et al. (2021) show that companies that use the internet to streamline supply chain processes will benefit from reduced

transaction costs, a smoother flow of information, and more responsiveness to requests. The use of IT in supply chain management is closely related to changes that occur from the old system to the new system in the digitalization era (Tarigan et al., 2019). Digitization in the supply chain is an exemplary process for increasing visibility and transparency throughout the supply chain, as it will facilitate the rapid collection and sharing of information for all stakeholders (Culot et al., 2020; Frank et al., 2019). With good visibility and transparency, companies can integrate planning and innovation and provide better service to meet customer needs (Suprapto et al., 2017). Wamba et al. (2018) argue that digitization in the supply chain can make a company's competitive level able to leap forward. In addition, digitizing the supply chain can provide opportunities for companies to increase revenue or innovation rather than reduce costs through operational efficiency (Bjorkdahl, 2020; Tarigan, 2018).

2.2. Supply Chain Integration (SCI)

Supply chain management is a key business process from consumers through suppliers who provide products, services, and information that add value to customers and other stakeholders (Han & Huo, 2020; Jajja et al., 2018). The supply chain is a series of connected activities related to the planning, coordinating, and controlling of materials, spare parts, and finished goods from the raw material stage to the end user (Tseng & Liao, 2015). Supply chain integration is a set of activities related to coordinating product flows between supply chain partners, including transactions, material movement, procedures, customer service, and optimization processes considering information flows (Basana et al., 2022b; Tseng & Liao, 2015). Developing an integrated supply chain usually considers three perspectives: strategic, tactical, and operational (Tarigan et al., 2019). As an effective method for supply chain management, SCI has become the key to improving performance and creating value which is essential for the success of individual companies and the entire supply chain (Yu et al., 2021). SCI refers to how far core producers collaborate strategically with supply chain partners and collaboratively manage processes within and outside the organization (Wong et al., 2015). Supply chain integration can help companies manage supply chain flows and reduce the adverse effects of the bullwhip effect (Vanpoucke et al., 2016). Supply chain integration is an integration that occurs between internal companies together with external companies (Ganbold et al., 2020).

2.3. Green Supply Chain Management (GSC)

Green supply chain management is developing the concept of supply chain management to protect the environment and maintain natural balance (Dong et al., 2021). Green supply chain management can be optimized with the company's internal role balanced with external companies in protecting the environment. The green supply chain can be said to be use of materials needed by the industry that is environmentally friendly and can be used or reprocessed according to organizational needs (Nguyen & Le, 2020). Eco-procurement will establish a system, method, and process with full

consideration of the environmental impact, including selecting and evaluating suppliers, building long-term relationships with them, adopting eco- friendly packaging, reprocessing resources, reducing energy wastage, and so on (Ghosh, 2019). Green manufacturing can be defined as an efficient approach required in design and production activities, especially in developing new products that minimize the environmental impact (Basana et al., 2022a). Green logistics opens up greater opportunities to meet customer needs and generate profits (Liu & Ma, 2022). In line with the opinion of Liu & Ma (2022), environmentally friendly logistics aims to reduce the logistics sector's environmental impact related to the greenhouse effect, noise, and incidents in logistics operations. Several components in green logistics include procurement, production, packaging, transportation, and product circulation until it finally reaches the customer (Liu & Ma, 2022).

2.4. Supply Chain Resilience (SCR)

Supply chain resilience is defined as the ability of a supply chain to survive disturbances and return to its original condition quickly after the disturbance (Saenz et al., 2015). Recovery capacity is the ability of a supply chain to return to its normal operating level after a disturbance to ensure stable supply chain performance (Ali & Golgeci, 2019; Cagliyan et al., 2022). Supply chain resilience can be divided into internal and external. Internal resilience is a company's ability to warn, respond, and adapt quickly and flexibly when disturbances occur (Siagian et al., 2021; Zhou et al., 2022). Meanwhile, external resilience is the continuity of supply and demand between a company and its suppliers and customers (Wamba et al., 2018). The development of alternative suppliers and the rapid flow of information leads to increased supply chain resilience (Baryannis et al., 2019).

2.5. Firm Competitive Advantage (FCA)

The firm competitive advantage is the company's ability to create a defensive position against its competitors (Abeysekara et al., 2019). It is the company's primary key in measuring and differentiating itself from competitors in terms of timely delivery, competitive prices or costs, high quality, appropriate quantities, and flexibility which are essential components in the supply chain (Abeysekara et al., 2019; Tarigan et al., 2018). One strategy to win the business competition is price competition through operational effectiveness that impacts all supply chain processes (Hu et al., 2019; Tarigan, 2018). Another strategy is differentiation which prioritizes quality and name. Many studies have been developed on competitive advantage variables such as cost, growth, reliability, quality, new product launches, order fulfillment rates, order and delivery information, customer service improvement, working capital efficiency, flexibility, and so on (Abeysekara et al., 2019).

2.6. Relations Between Research Concepts

2.6.1. Supply Chain Digitalization and Supply Chain Integration

The company can be considered a resource pool consisting of a series of company resources and capabilities. Among all existing resources, supply chain digitization is considered one of the most important factors for companies (Huo et al., 2015). Supply chain digitalization is also used to build unique capabilities such as supply chain integration (Yu et al., 2021). Rapid changes in digitalization processes, such as the use of the internet, impact production and modes of operation within companies and accelerate supply chain integration. In providing timely, accurate, and correct information for companies, digitalization becomes an inseparable process for supply chain integration (Yu et al., 2021; Tarigan et al., 2019). Supply chain digitalization in business applications can also increase data collection and information processing in a more structured manner, improving planning accuracy.

Previous studies have demonstrated the positive impact of digitalization and supply chain integration (Ganbold et al., 2020; Cai et al., 2016; Huo et al., 2015; Han et al., 2017; Yu et al., 2015; Liu et al., 2016). Ganbold et al. (2020) on large manufacturing companies listed on the Tokyo Stock Exchange, showing that e-business technology positively impacts the integration of product information inside and outside the company. Cai et al. (2016) also surveyed 208 companies in China and demonstrated a positive interaction effect between supply chain digitization capabilities and supply chain collaboration. Yu et al. (2015) surveyed 214 manufacturing companies in China, showing a positive relationship between supply chain digitization and the three dimensions of supply chain integration: customer, internal, and supplier integration. Based on this explanation, the hypothesis can be determined as follows:

H1: Supply chain digitalization affects supply chain integration.

2.6.2. Supply Chain Digitalization and Green Supply Chain

The development of information technology has developed rapidly since the industrial revolution 4.0. The industrial revolution 4.0 refers to integrating modern technology into sustainable production systems. The Internet of Things (IoT) can facilitate green supply chain management by reducing harmful emission gases and increasing response times and resource availability (Mastos et al., 2020). The use of technology can reduce residual production, increase resource use efficiency, and exchange information related to green strategies (Khan et al., 2020). Using advanced technology, the interaction between humans and machines can increase productivity without endangering workers. Weng et al. (2020) stated that Japan's small and medium-sized manufacturing companies demonstrated that technology-based manufacturing could solve inventory problems, reduce remaining production, and improve company performance. Information processing by collecting,

storing, and analyzing data that is useful for more effective and efficient planning, negotiating power, risk management, and supply chain management (Zhang et al., 2017). Technology helps to implement green management (Basana et al., 2022a). Based on this explanation, the hypothesis can be determined as follows:

H2: Supply chain digitalization affects the green supply chain.

2.6.3. Supply Chain Digitalization and Supply Chain Resilience

Technology has shifted not only for the need to increase productivity but is also used to increase interaction with stakeholders. Digital transformation changes things, bringing innovation to production processes using innovative products (Suprapto et al., 2017). In addition, technology transformation improves performance significantly by providing new ideas and techniques in the production process (Tarigan, 2018). The supply chain digitization process provides a solid foundation for companies where they can use technology not only for company activities but also to meet customer demands and existing market changes (Zhou et al., 2022). Research conducted by Tortorella et al. (2020) and Verma & Bhattacharyya (2017) show that supply chain digitization contributes to providing stability for companies, especially in an environment that is not conducive, supply chain digitization is very important to ensure good communication and collaboration between departments within the company and from upstream until downstream to survive and overcome the crisis. Research from Liu & Lee (2018) on 161 logistics companies in Taiwan also shows that companies that use digitalization in their supply chain systems can integrate systems to increase the resilience of their supply chains. Based on this explanation, the hypothesis can be determined as follows:

H3: Supply chain digitalization affects supply chain resilience.

2.6.4. Supply Chain Integration and Green Supply Chain

The company strengthens cooperation with supply chain partners by combining its supply chain management and environmental protection to achieve sustainable performance (Basana et al., 2022b). Supply chain integration emphasizes that the relationship between suppliers, companies, and customers is an optimal combination (Yunus & Tadisina, 2016; Yu et al., 2021; Yu et al., 2017). An integrated approach between green supply chain management and supply chain integration (Lo et al., 2018; Wong et al., 2015). A survey conducted by Lo et al. (2018) against 285 companies in 10 countries shows a significant relationship between the integration of suppliers and customers toward green supply chains. This research also shows the combination and balance of supplier and customer competency development toward green supply chains. In line with a survey conducted by Wong et al. (2015) conducted a literature study of 145 academic articles to determine the framework for integrating supply chains and green supply chains. The study shows how stakeholder and resource theory can be used to explain an integrated approach to green supply chain management.

Green supplier integration means sharing green business goals and visions between companies and suppliers to strengthen cooperation, knowledge exchange, and the development of green initiatives in general (Zhang et al., 2020). Green internal integration is related to interaction, knowledge exchange, collaboration between functions within the company, and communication between departments (Han & Huo, 2020). Finally, green customer integration relates to how companies manage their relationships with customers effectively and efficiently by setting common goals, making joint decisions, and resolving shared environmental problems (Xi et al., 2022). Based on this explanation, the hypothesis can be determined as follows:

H4: Supply chain integration affects the green supply chain.

2.6.5. Supply Chain Integration and Supply Chain Resilience

Supply chain integration is divided into three parts, namely supplier, internal, and customer integration. Supplier integration helps resolve limited resources problems owned by companies by involving suppliers in the company's supply chain activities. Good supplier integration will strengthen mutually beneficial relationships between companies and suppliers (Khanuja & Jain, 2021). Internal integration helps integrate all functions within the company to communicate better and make decisions faster (Siagian et al., 2020). Customer integration is also needed to improve supply chain performance. Companies will better understand customer needs and can serve customers more quickly (Lii & Kuo, 2016). Based on research conducted in Taiwan, internal integration and customers significantly affect supply chain resilience (Liu & Lee., 2018). Liu et al. (2018) also researched shipping companies in Taiwan and found that existing integration in the supply chain system plays a crucial role in the supply chain's resilience. The overall integration of suppliers, internal, and customers will improve communication and increase supply chain resilience to crises. Based on this explanation, the hypothesis can be determined as follows:

H5: Supply chain integration affects supply chain resilience.

2.6.6. Green Supply Chain and Supply Chain Resilience

Reverse logistics as a form of the green supply chain in accommodating consumables and returns from customers can improve economic and environmental performance to increase company sustainability, impacting supply chain resilience (Dev et al., 2021). Green supply chain practices in manufacturing companies in Vietnam can impact company resilience by increasing financial and non-financial performance by maintaining the company's reputation and environmental performance (Nguyen & Le, 2020). The company's ability to build ecologically as a form of commitment to a green supply chain can impact supply chain resilience in USA manufacturing companies (Eltantawy, 2016). Based on this explanation, the hypothesis can be determined as follows:

H6: Green supply chain affects supply chain resilience.

2.6.7. Supply Chain Integration and Firm Competitive Advantage

Several previous studies have concluded that integration has a good impact by restructuring the upstream and downstream parts of the supply chain. Supply chain integration results from the collaboration between parts of the supply chain that makes companies more productive (Jajja et al., 2018). This study divides supply chain integration into three parts: supplier integration, internal integration, and customer integration. Supply chain partners are essential to expanding a company's ability to increase productivity (Shou et al., 2018; Khanuja & Jain, 2021). Good relationships with suppliers will result in production planning capabilities, optimizing the procurement of raw materials, and synchronizing production processes to reduce operational costs and create distinct benefits for the company (Kim & Chai, 2016). Internal integration can also help companies achieve company performance criteria such as waiting time, fulfillment of needs, customer satisfaction, and so on (Yunus & Tadisina, 2016). Lii & Kuo (2016) concluded that integration greatly influences company performance and provides a competitive advantage. The role of customers in providing feedback for companies can also reduce product defects and improve product design & quality (Khanuja & Jain, 2021). Based on this explanation, the hypothesis can be determined as follows:

H7: Supply chain integration affects a firm competitive advantage.

2.6.8. Green Supply Chain and Firm Competitive Advantage

The company's ability to implement green purchasing management is a unique ability to improve company performance (Basana et al., 2022a). Therefore, green supplier management can also be called green purchasing management, which impacts various aspects of company performance (Xu et al., 2022; Famiyeh et al., 2018). For example, companies can reduce production costs by involving their suppliers in several green initiatives, such as material recycling, environmentally friendly packaging, and efficient energy use (Tseng et al., 2019). In addition to production costs, green supplier management also impacts product quality because responsible green suppliers can help companies reduce the number of defective products and increase product reliability and consistency.

Another advantage of green supplier management is that companies are better prepared to deal with market uncertainties by collaborating with suppliers. The company's delivery performance is also affected by the existence of green supply chain management (Novitasari & Tarigan, 2022). The concept of being green has spread to every process in supply chain management, starting from raw materials, production, storage, packaging, shipping, and product distribution. Çankaya & Sezen (2019) stated that green production and innovation processes would increase competitive advantage and provide a good image for the company. Competitive advantages also include the quality of the production process that produces green products (Siagian et al., 2022). By implementing a green

production process, companies can reduce costs and improve performance for the production process and the entire supply chain process (Siagian et al., 2022).

Green logistics management is inseparable from the customer. Based on the theory, green customer management can also be considered a company's unique ability to obtain superior performance (Laari et al., 2016). Companies can obtain feedback from customers and involve them in developing green products, innovating green manufacturing processes, and reprocessing existing materials (Xu et al., 2022). Collaboration with customers will reduce fuel usage, improving the company's performance (Abdallah & Al-Ghwayeen, 2019). Based on this explanation, the hypothesis can be determined as follows:

H8: Green supply chain affects a firm competitive advantage.

2.6.9. Supply Chain Resilience and Firm Competitive Advantage

Several existing studies show that a resilient company can be seen from its growth indicators, for example, the financial and robustness of the company (Siagian et al., 2022). These various studies emphasize that it is essential to have a strong supply chain to measure a company's competitive advantage (Cagliyan et al., 2022; Abeysekara et al., 2019). A company with high supply chain resilience will become strong and grow significantly in the face of a crisis, thereby minimizing losses (Zhou et al., 2022; Liu et al., 2018; Eltantawy, 2016). Furthermore, continuous innovation in business operations will help companies win the competition through productivity and profits (Behl, 2022). Therefore, companies with good supply chain resilience will have competitive advantages, so they can grow faster and win the competition from their competitors (Cagliyan et al., 2022). Research conducted by Abeysekara et al. (2019) show that supply chain resilience affects companies' performance and competitive advantage. Based on this explanation, the hypothesis can be determined as follows:

H9: Supply chain resilience affects a firm competitive advantage.

3. Research Methods

Quantitative research is a research method based on the positivism philosophy used to examine specific populations or samples. The population used in this study are manufacturing companies in East Java with a medium and large scale with a category of at least 20 employees. The collection of data used in this study is through the distribution of questionnaires. The questionnaire is a data collection technique in which respondents fill out questions or statements that the researcher has prepared, then return them to the researcher when they have been filled in completely. The results obtained from the questionnaire will be processed to measure the relationship between the research variables and test the existing hypotheses. The questionnaire in this study uses a Likert scale, where the Likert scale can be used to measure attitudes, opinions, and perceptions of a person or group of people about existing social phenomena.

Supply chain digitalization is a system that promises to increase visibility and transparency throughout the supply chain because it will facilitate the collection and sharing of information in a short time for all stakeholders by using applications as one of the media used (Culot et al., 2020; Frank et al. al., 2019). The indicators used in supply chain digitalization variables were adapted from research by Yu et al. (2021), Zadeh et al. (2020), and Ganbold et al. (2020): electronic applications for coordinating with internal stakeholders, electronic applications for coordinating with external stakeholders, electronic applications for processing administrative activities, electronic applications used are real-time, electronic applications used are accurate, and electronic applications used are reliable.

Supply chain integration is an integration that occurs between internal companies together with external companies (Ganbold et al., 2020). The indicators used in the variable supply chain integration were adapted from research by Ganbold et al. (2020) and Yu et al. (2021): an integrated system between internal stakeholders, internal company stakeholders collaborating in determining the company's strategic plan, sharing demand forecast information with external stakeholders, sharing production planning information with external stakeholders, and sharing delivery schedule information with external stakeholders.

Green supply chain management is the development of the concept of supply chain management to protect the environment and maintain natural balance (Dong et al., 2021). The indicators used in green supply chain variables were adapted from research by Xi et al. (2022) and Cankaya & Sezen (2019): the company has an appropriate system related to green issues, the company plans to purchase green raw materials, the company implements green production process, the company uses green distribution system, and the company and external (suppliers and customers) jointly addressing environmental issues.

Supply chain resilience is defined as the ability of a supply chain to survive disturbances and return to its original condition quickly after the disturbance (Saenz et al., 2015). The indicators used in supply chain resilience variables were adapted from research by Zhou et al. (2022), Liu & Lee (2018), and Siagian et al. (2021): companies have systems that can quickly warn of supply chain disruptions, companies have systems that can quickly respond or adapt to supply chain disruptions, companies have systems that can restore operational conditions to normal after any supply chain disruptions quickly, and companies have sufficient resources to deal with supply chain disruptions. Firm competitive advantage is the company's ability to create a defensive position against its competitors to win the business competition (Abeysekara et al., 2019). The indicators used in the firm competitive advantage variable: lower production costs than competitors, lower distribution costs than competitors, lower selling prices than competitors, better quality reputation than competitors,

product uniqueness from a customer perspective, loyal customers to products compared to competitors, and better delivery accuracy than competitors (Abeysekara et al., 2019; Behl, 2022; Tarigan et al., 2018).

Data analysis is grouping data based on variables and types of respondents, tabulating data based on variables from all respondents, presenting data for each variable studied, and performing calculations to answer the formulated problems or hypotheses. This study uses the Structural Equation Modeling (SEM) data analysis method with Smart Partial Least Square (SmartPLS) software for data processing and analysis.

4. Results and Discussion

Researchers spread the Google Form link via email and WhatsApp to employees who work in manufacturing companies. The results of the distribution of respondents, which were shared via email and WhatsApp, got as many as 108 manufacturing companies as respondents. The characteristics of the respondents were determined based on position, length of service, department, number of employees, and type of company. The characteristics of research respondents were divided into four positions: top management, manager, supervisor, and senior staff. Respondents with top management positions amounted to 9 respondents (8.33%), manager positions amounted to 26 respondents (24.07%), supervisor positions amounted to 45 respondents (41.67%), and senior staff positions amounted to 28 respondents (25.93%). This shows that most respondents are in supervisory positions and are considered to know the company's condition both from a technical and strategic perspective. Characteristics of respondents based on the length of work in the company divided as follows: 2-4 years are 26 respondents (24.07%), 4-6 years are 22 respondents (20.37%), 6-8 years are 20 respondents (18.52%), and more than eight years are 40 respondents (37.04%). This shows that most respondents have worked for a long time and are considered to have a good understanding of the company's condition. Characteristics of respondents based on the number of employees in the company are as follows: medium-scale companies (20-100 employees) amounted to 79 companies (73.15%), while large-scale companies (more than 100 employees) amounted to 29 companies (26.85%). This shows that the majority of the respondents studied came from medium-scale manufacturing companies that were considered to have a fairly good operational system. Respondent characteristics by the department are shown in Table 1.

Measurement items for the five variables consisting of supply chain digitalization, supply chain integration, green supply chain, supply chain resilience, and firm competitive advantage are described in Table 2.

Table 1

Respondent Characteristics by Department

Department	Qty	Percentage
Accounting/Finance	7	6.48%
Operational/Production	17	15.74%
Purchasing/Export-Import	8	7.41%
Engineering	2	1.85%
Planning Production Inventory Control	18	16.67%
Warehouse	16	14.81%
Sales & Marketing	40	37.04%
Total	108	100%

Table 2 shows the loading value on the supply chain digitalization variable, the lowest value is obtained on the indicator of using electronic applications to process administrative activities (SCD3) at 0.691, and the value is above 0.5; so it can be said that all measurements items in the digitalization supply chain variable have met the validity requirements and are acceptable. The second variable, namely supply chain integration, obtained the lowest score on the item measuring companies sharing production planning information with external stakeholders (SCI4) at 0.587 and the value was above 0.5; so it can be said that all measurement items in the supply chain integration variables have met the requirements and are acceptable. The third is the green supply chain variable, which has the lowest value on the company measurement item using a green distribution system (GSC4) at 0.825, and the value is above 0.5; so it can be said that all measurement items on the green supply chain variable have met the requirements and are acceptable. The fourth variable, supply chain resilience, obtained the lowest value on the indicator that the company has a system that can restore operational conditions to normal after a rapid supply chain disruption (SCR3) at 0.890 and the value is above 0.5; so it can be said that all measurement items on supply chain resilience variables have met the validity requirements and are acceptable. The fifth variable is firm competitive advantage, the lowest score is obtained on the company indicator that has product uniqueness from a customer perspective (FCA5) at 0.520, and the value is above 0.5; so that it can be said that all measurement items on firm competitive advantage variables have met the validity requirements and are acceptable.

The results of data processing to answer the research hypothesis are shown in the t-statistical value or p-value, and if the t- statistical hypothesis testing value is above 1.96 or the significance value (p-value) is below 0.05 (5%), it is stated that the hypothesis alternative accepted. The results of tests carried out with partial least squares (PLS) were obtained for the path coefficient or inner model values, as shown in Fig. 1, and the results of the research hypothesis testing are shown in Table 3.

Table 2

Item Measurement Goodness of Fit

Measurement Items	Loading Factor	Reliability	Cronbach Alpha	Mean
Supply Chain Digitalization		0.892	0.854	4.125
Electronic applications for coordinating with internal stakeholders (SCD1)	0.797			4.157
Electronic applications for coordinating with external stakeholders (SCD2)	0.764			3.972
Electronic applications for processing administrative activities (SCD3)	0.691			3.907
Electronic applications used are real-time (SCD4)	0.715			4.157
Electronic applications used are accurate (SCD5)	0.787			4.315
Electronic applications used are reliable (SCD6)	0.804			4.241
Supply Chain Integration		0.851	0.787	4.015
An integrated system between internal stakeholders (SCI1)	0.806			4.167
Internal company stakeholders collaborating in determining the company's strategic plan (SCI2)	0.850			4.056
Sharing demand forecast information with external stakeholders (SCI3)	0.681			3.898
Sharing production planning information with external stakeholders (SCI4)	0.587			3.639
Sharing delivery schedule information with external stakeholders (SCI5)	0.713			4.315
Green Supply Chain		0.944	0.926	4.115
The company has an appropriate system related to green issues (GSC1)	0.885			4.185
The company plans to purchase green raw materials (GSC2)	0.884			4.130
The company implements a green production process (GSC3)	0.891			4.120
The company uses a green distribution system (GSC4)	0.825			4.065
The company and external (suppliers and customers) jointly addressing environmental issues (GSC5)	0.908			4.074
Supply Chain Resilience		0.945	0.922	3.995
Companies have systems that can quickly warn of supply chain disruptions (SCR1)	0.907			3.861
Companies have systems that can quickly respond or adapt to supply chain disruptions (SCR2)	0.898			4.009
Companies have systems that can restore operational conditions to normal after any supply chain disruptions quickly (SCR3)	0.890			4.019
Companies have sufficient resources to deal with supply chain disruptions (SCR4)	0.905			4.093
Firm Competitive Advantage		0.884	0.848	4.197
Lower production costs than competitors (FCA1)	0.733			4.176
Lower distribution costs than competitors (FCA2)	0.719			3.991
Lower selling prices than competitors (FCA3)	0.676			4.083
Better quality reputation than competitors (FCA4)	0.752			4.417
Product uniqueness from a customer perspective (FCA5)	0.520			3.963
Loyal customers to products compared to competitors (FCA6)	0.778			4.333
Better delivery accuracy than competitors (FCA7)	0.850			4.417

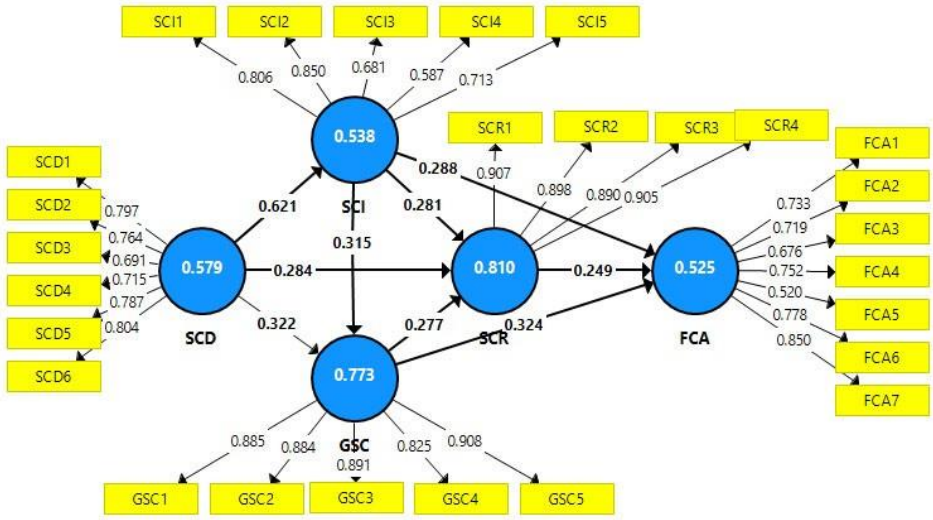

Figure 1. Path Coefficient Test Result

Table 3

Direct Effect Hypothesis Test Result

Direct Coefficient	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
SCD → SCI	0.621	0.629	0.061	10.170	0.000
SCD → GSC	0.322	0.314	0.123	2.619	0.009
SCD → SCR	0.284	0.274	0.093	3.065	0.002
SCI → GSC	0.315	0.326	0.123	2.553	0.011
SCI → SCR	0.281	0.288	0.099	2.845	0.005
GSC → SCR	0.277	0.282	0.090	3.065	0.002
SCI → FCA	0.288	0.284	0.097	2.973	0.003
GSC → FCA	0.324	0.332	0.108	3.001	0.003
SCR → FCA	0.249	0.250	0.085	2.946	0.003

Based on Fig. 1. and Table 3, it was found that the first hypothesis testing on the path coefficient value of the influence of supply chain digitalization on supply chain integration at 0.621, which has a t-statistic of 10.170 exceeds the t-statistic at 1.96 and has P-value at 0.000 is below 0.05. Based on this information, it can be concluded that there is a significant influence between supply chain digitalization and supply chain integration in manufacturing companies in East Java, with a significant level of 5%. Supply chain digitalization, illustrated by two indicators with the highest loading factor, namely, the electronic applications used by companies are reliable at 0.804, and the use of electronic applications to coordinate with internal stakeholders at 0.797, can have an impact on supply chain integration. Companies with good supply chain integration can form internal stakeholders to collaborate in determining the company's strategic plan at 0.850 and have an integrated system with internal stakeholders at 0.806. This condition indicates that digitalization in the supply chain can increase integration in the supply chain system to build better company competitiveness. Digitalization

in the supply chain can form a strong integration between internal and external companies to make effective and efficient decisions. For example, sharing information related to demand planning, production planning, and delivery schedules through applications can improve integration between internal and external parties of the company. This research is in line with research that states that supply chain digitalization affect supply chain integration (Ganbold et al., 2020; Cai et al., 2016; Huo et al., 2015; Han et al., 2017; Yu et al., 2015; Liu et al., 2016).

In the second hypothesis testing, the path coefficient value of the influence of supply chain digitalization on the green supply chain was 0.322, which has a t-statistic of 2.619, exceeding the t-statistic of 1.96, and a P-value at 0.009 below 0.05. Based on this information, it can be concluded that there is a significant influence between supply chain digitalization on green supply chains in manufacturing companies in East Java with a significant level of 5%. Digitalization in the supply chain system can make the company's goal to create a green supply chain system will be achieved more quickly. In addition, digitalization in the supply chain through applications shared internally and externally with the company will increase energy use efficiency and supply chain effectiveness. This research is in line with research that states that supply chain digitalization affect green supply chains (Stock et al., 2018; Mastos et al., 2020; Weng et al., 2020).

In the third hypothesis testing, the path coefficient value of the effect of supply chain digitalization on supply chain resilience was 0.284, which has a t-statistic of 3.065, exceeding the t-statistic of 1.96, and a P-value at 0.002 below 0.05. Based on this information, it can be concluded that there is a significant influence between supply chain digitalization and supply chain resilience in manufacturing companies in East Java, with a significant level of 5%. Digitalization in the supply chain system can make the company more resilient if there is a supply chain disruption. The use of electronic applications that are real- time, reliable, and accurate to coordinate both internally and externally makes the company more quickly get a warning if there is a disruption to the supply chain. By getting a quicker warning, the company will be better prepared to deal with supply chain disruptions by preparing resources well. This research is in line with research that states that digitalization affects supply chain resilience (Zhou et al., 2022; Tortorella et al., 2020; Verma & Bhattacharyya, 2017; Liu & Lee, 2018).

In the fourth hypothesis testing, the path coefficient value of the influence of supply chain integration on the green supply chain is 0.315, which has a t-statistic of 2.553, exceeding the t-statistic of 1.96, and has a P-value at 0.011, which is below 0.05. Based on this information, it can be concluded that there is a significant influence between supply chain integration on the green supply chain in manufacturing companies in East Java with a significant level of 5%. Integration in the supply chain system, a common goal between internal and external companies to address environmental problems,

will be achieved more quickly. All of the company's internal stakeholders collaborate in determining a strategic plan at 0.850, and the company has an integrated system between internal stakeholders at 0.806, which can influence the green supply chain. While the green supply chain makes companies and external (suppliers and customers) jointly address environmental problems at 0.908, one of which is by implementing green production processes at 0.891. This condition indicates that with integration in the supply chain system, a common goal between internal and external companies to address environmental problems will be achieved more quickly. Good integration of supply chain systems will enable companies to better plan demand, production schedules, and delivery plans to optimize existing resources to make them more efficient and environmentally friendly. This research is in line with research that states that supply chain integration affect supply chain resilience (Xi et al., 2022; Zhang et al., 2020; Wong et al., 2015; Han & Huo, 2020; Lo et al., 2018).

In the fifth hypothesis testing, the path coefficient value of the influence of supply chain integration on supply chain resilience is 0.281, which has a t-statistic of 2.845, exceeding the t-statistic of 1.96, and has a P-value at 0.005, which is below 0.05. Based on this information, it can be concluded that there is a significant influence between supply chain integration and supply chain resilience in manufacturing companies in East Java, with a significant level of 5%. With integration in the supply chain system, coordination between departments will be better to assist companies in making strategic plans. Especially when there is a disruption to the supply chain, the company will be quicker in anticipating problems and can prepare resources better. This research is in line with research that states that supply chain integration affect supply chain resilience (Lii & Kuo, 2016; Liu et al., 2018; Khanuja & Jain, 2021; Siagian et al., 2020).

In the sixth hypothesis testing, the path coefficient value of the influence of the green supply chain on supply chain resilience is 0.277, which has a t-statistic of 3.065, exceeding the t-statistic of 1.96, and has a P-value of 0.002, which is below 0.05. Based on this information, it can be concluded that there is a significant effect of a green supply chain on supply chain resilience in manufacturing companies in East Java with a significant level of 5%. Cooperation between companies, suppliers, and customers to address environmental problems will go well with an excellent green supply chain system. In addition, companies can get warnings quickly through information from suppliers or customers in the event of a supply chain disruption. Companies that have implemented green supply chains also have high efficiency, especially in the use of resources, so that in the event of a supply chain disruption, the company will have adequate resources and can survive a crisis. This research is in line with research that states green supply chain affects supply chain resilience (Dev et al., 2021; Nguyen & Le, 2020; Eltantawy, 2016).

In the seventh hypothesis testing, the path coefficient value of the influence of supply chain integration on firm competitive advantage is 0.288, which has a t-statistic of 2.973, exceeding the t-statistic of 1.96, and has a P-value at 0.003, which is below 0.05. Based on this information, it can be concluded that there is a significant influence between supply chain integration on the firm competitive advantage in manufacturing companies in East Java with a significant level of 5%. Furthermore, two indicators illustrate supply chain integration with the highest loading factor: all the company's internal stakeholders collaborate in determining the company's strategic plan at 0.850, and the company has an integrated system between internal stakeholders at 0.806, which can influence the firm competitive advantage. Furthermore, the company's competitive advantage, such as better delivery accuracy than competitors at 0.850 and customers being loyal to the product compared to competitors at 0.778, is a solid basis for companies to compete. This condition indicates that with integration in the supply chain system, coordination between departments will be better in making strategic plans. In addition, coordination with external parties in the form of demand plans, production schedules, and delivery schedules can improve the accuracy of delivery compared to competitors so that customers become more loyal to the products produced by the company. This research is in line with research that states that supply chain integration affects a firm competitive advantage (Lii & Kuo, 2016; Kim & Chai, 2016; Yunus & Tadisina, 2016; Yu et al., 2021; Jajja et al., 2018; Shou et al., 2018).

In the eighth hypothesis testing, the path coefficient value of the influence of green supply chain on firm competitive advantage is 0.324, which has a t-statistic of 3.001, exceeding the t-statistic of 1.96 and has a P-value at 0.003, which is below 0.05. Based on this information, it can be concluded that there is a significant influence between the green supply chain on the firm competitive advantage in manufacturing companies in East Java with a significant level of 5%. Therefore, the green supply chain described can impact a firm's competitive advantage. Furthermore, the company's competitive advantage, such as having better delivery accuracy than competitors and customers who are loyal to the product compared to competitors, is a strong basis for the company to compete. This condition indicates that with an excellent green supply chain system, environmental problems can be solved jointly by the company, suppliers, or customers. One of them is a green supply chain system that will increase production efficiency so that the time and resources needed will be less. This efficiency can also reduce production and distribution costs, so that product selling prices can be more competitive in the market. In addition, product delivery times will be more precise so that customers will feel happy and customer loyalty will increase. This research is in line with research that states that supply chain integration affect a firm competitive advantage (Xu et al., 2022; Tseng et al., 2019; Cankaya & Sezen, 2019; Abdallah & Al-Ghwayeen, 2020; Famiyeh et al., 2018; Yang et al., 2022; Siagian et al., 2022).

In the ninth hypothesis testing, the path coefficient value of the effect of supply chain resilience on firm competitive advantage is 0.249, which has a t-statistic of 2.946, exceeding the t-statistic of 1.96, and has a P-value of 0.003 which is below 0.05. Based on this information, it can be concluded that supply chain resilience has a significant effect on the firm's competitive advantage in manufacturing companies in East Java, with a significant level of 5%. With a resilient supply chain system, companies will adapt more quickly to supply chain disruptions, so companies can immediately prepare resources to survive and return to normal conditions. This also has a good impact on the company, where product delivery will always be correct in terms of time and quantity even though supply chain disruptions occur, so that customer loyalty to the product and the company can increase. This research is in line with research that states that supply chain resilience affects a firm competitive advantage (Behl, 2022; Cagliyan et al., 2022; Abeysekara et al., 2019).

5. Conclusion

Based on the discussion on research on the importance of digitalization and green supply chain integration to build supply chain resilience towards better firm competitive advantage, conclusions can be drawn as follow: supply chain digitalization affects supply chain integration, green supply chain, and supply chain resilience. This shows that digitalization in the supply chain can increase integration in the supply chain system to build better company competitiveness. Digitalization in the supply chain can form a strong integration within the internal and external companies concerned with making effective and efficient decisions. As a result, a green supply chain system will be achieved more quickly. Digitalization in the supply chain through applications that are shared internally and externally with the company will increase energy use efficiency and supply chain effectiveness. The use of electronic applications that are real-time, reliable, and accurate to coordinate both internally and externally makes the company more quickly get a warning if there is a disruption to the supply chain. By getting a quicker warning, the company will be better prepared to deal with supply chain disruptions by preparing resources well in advance.

Supply chain integration affects the green supply chain and supply chain resilience. This shows that with integration in the supply chain system, a common goal between internal and external companies to address environmental problems will be achieved more quickly. Good integration of supply chain systems will enable companies better to plan requests, production schedules, and delivery plans. They can optimize existing resources so that coordination between departments will be better and assist companies in making strategic plans. Especially when there is a disruption to the supply chain, the company will be quicker in anticipating problems and can prepare resources better.

A green supply chain affects supply chain resilience. This shows that cooperation between companies, suppliers, and customers to address environmental problems will go well through an

excellent green supply chain system. In addition, companies can get warnings quickly through information from suppliers or customers in the event of a supply chain disruption. Supply chain integration, green supply chain, and supply chain resilience affect a firm competitive advantage. Coordination with external parties in the form of demand plans, production schedules, and delivery schedules can improve the accuracy of delivery compared to competitors so that customers become more loyal to the products produced by the company. Environmental problems can be solved jointly by the company and suppliers or customers. This efficiency can also reduce production and distribution costs, so that product selling prices can be more competitive in the market. In addition, product delivery times will be more precise so that customers will feel happy and customer loyalty will increase. Companies will adapt more quickly to disruptions to the supply chain, so companies can immediately prepare resources to survive and return to normal conditions. This also has a good impact on the company, where product delivery will always be correct in terms of time and quantity even though supply chain disruptions occur, so that customer loyalty to the product and the company can increase.

Based on the conclusions from the research results above, several practical contributions can be made. For example, companies need to allocate a budget for application development needs and supply chain systems within the company. This is because supply chain digitalization is a solid foundation for companies to have a competitive advantage against competitors. Companies need to be able to improve their supply chain resilience so that they can survive a crisis and return to their original condition quickly. Finally, companies need to maintain and increase their competitive advantage because most competitors already know the importance of having a competitive advantage in running a business.

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LAMPIRAN

1. Kuesioner (*Google Form*)

Kuesioner Thesis *"IMPORTANCE OF INFORMATION TECHNOLOGY AND GREEN SUPPLY CHAIN INTEGRATION TO BUILD SUPPLY CHAIN RESILIENCE TOWARDS BETTER FIRM COMPETITIVE ADVANTAGE"*

Yth. Bapak/Ibu responden yang saya hormati,
Sebelumnya terima kasih atas kesediannya untuk mengisi kuesioner ini.

Perkenalkan saya adalah mahasiswa S2 Magister Manajemen UK Petra Surabaya dengan peminatan Supply Chain. Saat ini saya sedang dalam proses penulisan thesis dengan judul *"IMPORTANCE OF INFORMATION TECHNOLOGY AND GREEN SUPPLY CHAIN INTEGRATION TO BUILD SUPPLY CHAIN RESILIENCE TOWARDS BETTER FIRM COMPETITIVE ADVANTAGE"* dengan objek penelitian perusahaan manufaktur dengan skala sedang dan besar di Jawa Timur.
Kriteria responden dalam penelitian ini adalah **karyawan dengan jabatan supervisor atau senior staff/analyst yang sudah bekerja minimal selama 2 tahun.**

Saya mengharapkan partisipasi anda dengan mengisi kuesioner penelitian ini dengan cara memilih jawaban sesuai dengan pernyataan yang mencerminkan kondisi perusahaan Bapak/Ibu yang sebenarnya

Masing-masing pernyataan dapat dijawab dengan kriteria sbb:
1 = Sangat Tidak Setuju (STS)
2 = Tidak Setuju (TS)
3 = Netral (N)
4 = Setuju (S)
5 = Sangat Setuju (SS)

Jawaban responden akan diperlakukan sesuai dengan standar profesionalitas dan etika penelitian. Oleh karena itu, peneliti akan menjaga kerahasiaan identitas responden.

Terima kasih atas kesediaan dan partisipasi Bapak/Ibu dalam penelitian ini.

Peneliti,
Hendry Sugianto Setiawan

1. **Nama Perusahaan** *(mohon diisi dengan inisial bi/a confidential)*

_____

2. **Sektor Usaha Perusahaan** *

Mark only one oval.

Makanan & minuman

Kosmetik

Tekstil & garment

Otomotif

Kayu, kulit, kertas

Minyak & gas

Bahan kimia

Other: _____

3. **Estimasi Jumlah Karyawan** *

Mark only one oval.

< 20 orang
Skip to section 10 (Sorry, you have not met the criteria for research respondents Thank you for your participation)

20-100 orang

> 100 orang

4. **Posisi anda bekerja saat ini** *

Mark only one oval.

(=:) Junior Staff/Analyst
Skip to section 10 (Sorry, you have not met the criteria for research respondents Thank you for your participation)

(=:) Senior Staff/Analyst

(=:) Supervisor

(=:) Manager

(=:) General Manager/Direktur

5. **Lama anda bekerja** *

Mark only one oval.

(=:) < 2 tahun
Skip to section 10 (Sorry, you have not met the criteria for research respondents Thank you for your participation)

(=:) 2 sampai kurang dari 4 tahun

(=:) 4 sampai kurang dari 6 tahun

(=:) 6 sampai kurang dari 8 tahun

(=:) >= 8 tahun

6. **Departemen anda bekerja** *

Mark only one oval.

- Production Planning and Inventory Control (PPIC)
- Purchasing & Procurement
- Warehouse
- Research & Development (R&D)
- Information Technology (IT)
- Sales & Marketing
- Accounting
- Human & Resources (HR)
- Other: _____

Information Technology (IT)

Information Technology (IT) merupakan suatu sistem yang menjanjikan peningkatan visibilitas dan transparansi di seluruh rantai pasok karena akan memfasilitasi pengumpulan dan pembagian informasi dalam waktu yang cepat bagi semua pemangku kepentingan dengan menggunakan aplikasi sebagai salah satu media yang digunakan

7. ***IT 1 - Information Technology***
Perusahaan kami telah menggunakan aplikasi elektronik untuk berkoordinasi dengan *internal stakeholders*

8. ***IT 2 - Information Technology***
Perusahaan kami telah menggunakan aplikasi elektronik untuk berkoordinasi dengan *external stakeholders*

9. ***IT 3 - Information Technology***
Perusahaan kami telah menggunakan aplikasi elektronik untuk memproses kegiatan administrasi *(purchase orders, invoices,* dan/atau pembayaran)

10. ***IT 4 - Information Technology***
Aplikasi elektronik yang digunakan oleh perusahaan kami bersifat ***real-time***

11. ***IT 5 - Information Technology***
Aplikasi elektronik yang digunakan oleh perusahaan kami bersifat **akurat**

12. ***IT 6 - Information Technology***
Aplikasi elektronik yang digunakan oleh perusahaan kami bersifat **reliabel**

Supply Chain Integration (SCI)

Supply Chain Integration (SCI) merupakan serangkaian kegiatan yang berkaitan dengan koordinasi aliran produk antara mitra rantai pasok, termasuk transaksi, pergerakan material, prosedur, layanan pelanggan, dan proses optimasi dengan mempertimbangkan aliran informasi

13. ***SCI 1 - Supply Chain Integration***
    Perusahaan kami memiliki sistem yang terintegrasi antar *internal stakeholders*

14. ***SCI 2 - Supply Chain Integration***
    Seluruh *internal stakeholders* perusahaan kami berkolaborasi dalam menentukan rencana strategis perusahaan

15. ***SCI 3 - Supply Chain Integration***
    Perusahaan kami berbagi informasi **rencana permintaan *(demand forecast)*** kepada *external stakeholders*

16. ***SCI 4 - Supply Chain Integration***
    Perusahaan kami berbagi informasi **rencana produksi *(production planning)*** kepada *external stakeholders*

17. ***SCI 5 - Supply Chain Integration***
    Perusahaan kami berbagi informasi **rencana pengiriman *(delivery schedule)*** kepada *external stakeholders*

Green Supply Chain (GSC)

Green Supply Chain (GSC) merupakan pengembangan dari konsep supply chain management untuk memproteksi lingkungan serta menjaga keseimbangan alam. Perusahaan diharapkan tidak hanya berfokus pada mengejar keuntungan, namun juga perlu memikirkan dampak lingkungan yang terjadi

18. ***GSC 1 - Green Supply Chain***
    Perusahaan kami memiliki sistem yang sesuai terkait isu pengelolaan lingkungan

19. ***GSC 2 - Green Supply Chain***
    Perusahaan kami merencanakan pembelian bahan baku yang ramah lingkungan

20. ***GSC 3 - Green Supply Chain***
    Perusahaan kami mengimplementasikan proses produksi yang ramah lingkungan

21. ***GSC 4 - Green Supply Chain***
    Perusahaan kami menggunakan sistem distribusi yang ramah lingkungan

22. ***GSC 5 - Green Supply Chain***
    Perusahaan dan eksternal (pemasok dan pelanggan) secara bersama-sama mengatasi masalah lingkungan

Supply Chain Resilience (SCR)

Supply Chain Resilience (SCR) merupakan kemampuan dari sebuah rantai pasok untuk bertahan dalam gangguan dan kembali pada kondisi semula dengan cepat setelah gangguan tersebut

23. ***SCR 1 - Supply Chain Resilience***
Perusahaan kami memiliki sistem yang dapat memberikan peringatan terhadap adanya gangguan rantai pasok dengan cepat

24. ***SCR 2 - Supply Chain Resilience***
Perusahaan kami memiliki sistem yang dapat memberikan respon atau beradaptasi terhadap adanya gangguan rantai pasok dengan cepat

25. ***SCR 3 - Supply Chain Resilience***
Perusahaan kami memiliki sistem yang dapat mengembalikan kondisi operasional seperti semula setelah adanya gangguan rantai pasok dengan cepat

26. ***SCR 4 - Supply Chain Resilience***
Perusahaan memiliki sumber daya yang memadai untuk mengatasi adanya gangguan rantai pasok

Firm Competitive Advantage (FCA)

Firm Competitive Advantage (FCA) merupakan keuntungan daya saing perusahaan merupakan kemampuan perusahaan untuk membuat sebuah posisi defensif terhadap situasi tertentu dan para kompetitornya agar dapat memenangkan persaingan bisnis

27. ***FCA 1 - Firm Competitive Advantage***
Perusahaan kami memiliki **biaya produksi** yang lebih rendah dibandingkan kompetitor

28. ***FCA 2 - Firm Competitive Advantage***
Perusahaan kami memiliki **biaya distribusi** yang lebih rendah dibandingkan kompetitor

29. ***FCA 3 - Firm Competitive Advantage***
Perusahaan kami memiliki **harga jual** yang lebih rendah dibandingkan kompetitor

30. ***FCA 4 - Firm Competitive Advantage***
Perusahaan kami memiliki **reputasi kualitas** yang lebih baik dibandingkan kompetitor

31. ***FCA 5 - Firm Competitive Advantage***
Perusahaan kami memiliki **keunikan produk** yang lebih baik dibandingkan kompetitor

32. ***FCA 6 - Firm Competitive Advantage***
Perusahaan kami memiliki **pelanggan yang loyal terhadap produk** dibandingkan kompetitor

33. ***FCA 7 - Firm Competitive Advantage***
Perusahaan kami memiliki **ketepatan pengiriman** yang lebih baik dibandingkan kompetitor

2. Hasil Rekap Kuesioner

IT-1	IT-2	IT-3	IT-4	IT-5	IT-6	SCI-1	SCI-2	SCI-3	SCI-4	SCI-5	GSC-1	GSC-2	GSC-3	GSC-4	GSC-5	SCR-1	SCR-2	SCR-3	SCR-4	FCA-1	FCA-2	FCA-3	FCA-4	FCA-5	FCA-6	FCA-7
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IT-1	IT-2	IT-3	IT-4	IT-5	IT-6	SCI-1	SCI-2	SCI-3	SCI-4	SCI-5	GSC-1	GSC-2	GSC-3	GSC-4	GSC-5	SCR-1	SCR-2	SCR-3	SCR-4	FCA-1	FCA-2	FCA-3	FCA-4	FCA-5	FCA-6	FCA-7
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3. Hasil Pengolahan Data PLS

DESCRIPTIVE ANALYSIS

	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
SCD1	1,000	0.000	4,157	4,000	2,000	5,000	0.795	-0.608	-0.517
SCD2	2,000	0.000	3,972	4,000	2,000	5,000	0.700	-0.031	-0.290
SCD3	3,000	0.000	3,907	4,000	2,000	5,000	0.776	-0.286	-0.318
SCD4	4,000	0.000	4,157	4,000	2,000	5,000	0.852	0.467	-0.949
SCD5	5,000	0.000	4,315	4,000	2,000	5,000	0.689	0.870	-0.855
SCD6	6,000	0.000	4,241	4,000	2,000	5,000	0.705	-0.244	-0.544
SCI1	7,000	0.000	4,167	4,000	2,000	5,000	0.764	-0.327	-0.548
SCI2	8,000	0.000	4,056	4,000	2,000	5,000	0.692	-0.332	-0.245
SCI3	9,000	0.000	3,898	4,000	2,000	5,000	0.793	0.246	-0.606
SCI4	10,000	0.000	3,639	4,000	1,000	5,000	0.876	-0.040	-0.476
SCI5	11,000	0.000	4,315	4,000	2,000	5,000	0.648	0.381	-0.627
GSC1	12,000	0.000	4,185	4,000	2,000	5,000	0.747	0.379	-0.724
GSC2	13,000	0.000	4,130	4,000	2,000	5,000	0.721	0.023	-0.503
GSC3	14,000	0.000	4,120	4,000	3,000	5,000	0.634	-0.531	-0.106
GSC4	15,000	0.000	4,065	4,000	2,000	5,000	0.670	-0.110	-0.264
GSC5	16,000	0.000	4,074	4,000	2,000	5,000	0.676	0.476	-0.456
SCR1	17,000	0.000	3,861	4,000	2,000	5,000	0.751	-0.671	-0.029
SCR2	18,000	0.000	4,009	4,000	2,000	5,000	0.751	-0.858	-0.148
SCR3	19,000	0.000	4,019	4,000	2,000	5,000	0.720	-0.614	-0.179
SCR4	20,000	0.000	4,093	4,000	2,000	5,000	0.674	-0.122	-0.298
FCA1	21,000	0.000	4,176	4,000	2,000	5,000	0.636	0.374	-0.388
FCA2	22,000	0.000	3,991	4,000	3,000	5,000	0.601	-0.184	0.004
FCA3	23,000	0.000	4,083	4,000	2,000	5,000	0.709	0.616	-0.597
FCA4	24,000	0.000	4,417	4,000	3,000	5,000	0.625	-0.564	-0.600
FCA5	25,000	0.000	3,963	4,000	2,000	5,000	0.706	-0.551	-0.107
FCA6	26,000	0.000	4,333	4,000	3,000	5,000	0.653	-0.697	-0.473
FCA7	27,000	0.000	4,417	4,000	3,000	5,000	0.610	-0.593	-0.542

DIRECT COEFFICIENT

DIRECT COEFFICIENT	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
GSC -> FCA	0.324	0.332	0.108	3,001	0.003
GSC -> SCR	0.277	0.282	0.090	3,065	0.002
SCD -> GSC	0.322	0.314	0.123	2,619	0.009
SCD -> SCI	0.621	0.629	0.061	10,170	0.000
SCD -> SCR	0.284	0.274	0.093	3,065	0.002
SCI -> FCA	0.288	0.284	0.097	2,973	0.003
SCI -> GSC	0.315	0.326	0.123	2,553	0.011
SCI -> SCR	0.281	0.288	0.099	2,845	0.005
SCR -> FCA	0.249	0.250	0.085	2,946	0.003

INDIRECT

INDIRECT COEFFICIENT	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
SCD -> SCI -> FCA	0.179	0.179	0.066	2,726	0.007
SCD -> SCI -> GSC -> SCR -> FCA	0.014	0.015	0.010	1,292	0.197
SCD -> SCI -> SCR	0.175	0.181	0.066	2,639	0.009
SCD -> SCI -> GSC -> FCA	0.063	0.066	0.034	1,868	0.062
SCI -> SCR -> FCA	0.070	0.073	0.037	1,890	0.059
SCD -> SCI -> GSC -> SCR	0.054	0.058	0.032	1,689	0.092
SCD -> GSC -> FCA	0.104	0.105	0.057	1,821	0.069
GSC -> SCR -> FCA	0.069	0.070	0.034	2,031	0.043
SCD -> SCI -> GSC	0.196	0.206	0.084	2,330	0.020
SCI -> GSC -> FCA	0.102	0.105	0.051	2,004	0.046
SCD -> GSC -> SCR	0.089	0.090	0.048	1,871	0.062
SCI -> GSC -> SCR	0.087	0.092	0.049	1,786	0.075
SCI -> GSC -> SCR -> FCA	0.022	0.024	0.016	1,330	0.184
SCD -> SCI -> SCR -> FCA	0.044	0.046	0.024	1,825	0.069
SCD -> GSC -> SCR -> FCA	0.022	0.022	0.014	1,627	0.104
SCD -> SCR -> FCA	0.071	0.068	0.032	2,197	0.029

DISCRIMINANT VALIDITY (FORNER LARCKER)

	FCA	GSC	SCD	SCI	SCR
FCA	0.724				
GSC	0.614	0.879			
SCD	0.496	0.517	0.761		
SCI	0.605	0.515	0.621	0.733	
SCR	0.607	0.569	0.602	0.600	0.900

RELIABILITY

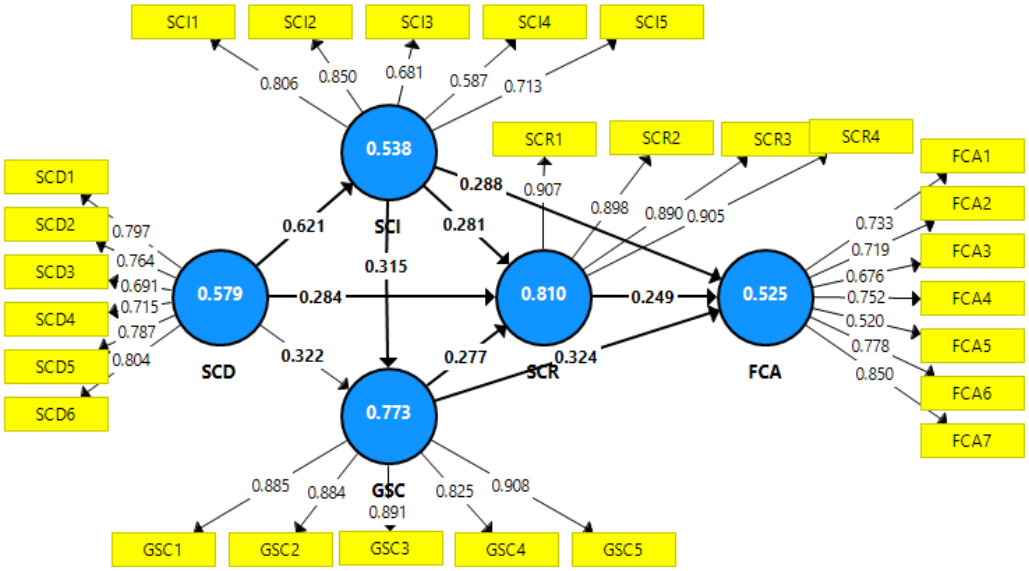
	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
FCA	0.848	0.875	0.884	0.525
GSC	0.926	0.931	0.944	0.773
SCD	0.854	0.857	0.892	0.579
SCI	0.787	0.815	0.851	0.538
SCR	0.922	0.923	0.945	0.810

R SQUARE

	R Square	R Square Adjusted
FCA	0.524	0.511
GSC	0.328	0.315
SCI	0.386	0.380
SCR	0.497	0.483

OUTER LOADING

ITEM	OUTER LOADING
FCA1	0.733
FCA2	0.719
FCA3	0.676
FCA4	0.752
FCA5	0.520
FCA6	0.778
FCA7	0.850
GSC1	0.885
GSC2	0.884
GSC3	0.891
GSC4	0.825
GSC5	0.908
SCD1	0.797
SCD2	0.764
SCD3	0.691
SCD4	0.715
SCD5	0.787
SCD6	0.804
SCI1	0.806
SCI2	0.850
SCI3	0.681
SCI4	0.587
SCI5	0.713
SCR1	0.907
SCR2	0.898
SCR3	0.890
SCR4	0.905


SCI1
SCI2
SCI3
SCI4
SCI5
0.806
0.850
0.681
0.587
0.713
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SCI
SCR1
SCR2
SCR3
SCR4
0.907
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FCA1
FCA2
FCA3
FCA4
FCA5
FCA6
FCA7
0.733
0.719
0.676
0.752
0.520
0.778
0.850
SCD1
SCD2
SCD3
SCD4
SCD5
SCD6
0.797
0.764
0.691
0.715
0.787
0.804
0.621
0.288
0.281
0.315
0.579
SCD
0.284
0.810
SCR
0.249
0.525
FCA
0.322
0.277
0.324
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GSC
0.885
0.884
0.891
0.825
0.908
GSC1
GSC2
GSC3
GSC4
GSC5