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The impact of supply chain integration on operational performance with supply chain capability

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Force majeure in Indonesia, especially during pandemics, causes a drastic fluctuation in the market and makes many medicine products related to the pandemic become scarce and stocked out. Major pharmaceutical companies manufactured in Indonesia need solutions for the significant change in demand level and find solutions to balance the supply and demand level. According to the existing literature, by doing internal integration, supplier integration, and customer integration, and supported with supply chain capability, companies can find solutions regarding market fluctuation and increase their competitive performance. This research uses 102 listed Indonesians chosen by the purposive sampling method. Research analysis was conducted using structural equation modeling and SmartPLS 3 software. This research finds that, in general, supply chain capability influences competitive performance. Meanwhile, internal integration by sharing activity information in departments and coordinating integrated planning can positively and significantly affect supplier integration and customer integration. Sharing inventory and information with suppliers and coordinating with suppliers about materials availability significantly influence supply chain capability. Internal integration also has a significant influence on supply chain capability. Customer integration with information sharing with customers and the company involving the customers when demands influence supply chain capability. Supply chain integration (internal, supplier, and customer) does not directly impact operational performance, so supply chain capability is a perfect intervening variable. Supply chain capability can help internal and external integration better affect competitive performance. This research also makes practical contributions to give managers input about how internal integration, supplier and customer integration, and supply chain capability can affect companies' competitive performance.

1. Introduction

Changes and market fluctuations that happen because of predictable or unpredictable causes will force companies to respond and adapt to the condition. Usually, companies will try to respond to the changes by finding information from their suppliers and customers for integrating, collaborating, or just using the data to adjust their internal activity (Li, 2020; Wong et al., 2013). Force majeure like pandemics or natural disasters are some of many causes that can make markets change or fluctuate and make companies face difficulties in the market. Government regulation like lockdown causes many troubles for companies, especially in imports and exports, which will also disturb the flow of companies' supply chain, especially in countries like Indonesia (Riadi et al., 2020). In research conducted by Nadif & Vanany (2021), many healthcare products like vitamins and medicines related to the pandemic become scarce and even stocked out. This also happens because of the 300% increase in demand for healthcare products that cannot be fulfilled by the ability to supply the finished goods or half-finished goods and raw materials to balance the market. Supply chain collaboration between companies and suppliers can provide quality materials according to needs (Teng et al., 2022; Flankegård et al., 2021).

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Supply chain integration is a strategic step that companies can implement to achieve supply chain adoption and company performance by using technology for production (Hartono et al., 2023). Supply chain integration, or SCI, is the process of integrating a business's internal operations with those of its external partners, such as suppliers and customers, to gain the knowledge and insights necessary to understand market conditions better, improve financial and product flows, and manage resources more effectively (Pirmanta et al., 2021). The role of company leadership in building supply chain integration is to utilize adequate technology (Birasnav & Bienstock, 2019). Coordination of information and knowledge regarding demand requires coordination and integration with external parties to the company (Basana et al., 2022; Feizabadi & Alibakhshi, 2021). In addition, adequate integration and capabilities from within the company are also required to utilize everything from external parties, such as knowledge and information (Sacristán-Díaz et al., 2018). Supply chain integration also encourages companies to establish good relationships or integration internally or between managers and externally or with suppliers (Yang et al., 2019; Tarigan et al., 2021). Good relationships and integration will help companies obtain information and better know about external partners (Woo et al., 2016).

Supplier and customer integration can enable companies to build strong relationships by planning improvement and jointly determining decisions to overcome problems (Siagian et al., 2022). It will be essential for companies to know their internal capabilities and how to develop the technology to increase business performance (Chae et al., 2018). By doing internal integration, companies can measure and maximize their internal abilities and use them to improve their ability to do well in the market (Feyissa et al., 2019). Companies' internal integration also determines how well they can integrate with their suppliers and customers (Yuen & Van Thai, 2017). Separating supplier and customer integration is essential because suppliers and customers have different roles in companies' operational activities (Birasnav & Bienstock, 2019; Tarigan & Siagian, 2021). Internal integration will describe the company's ability to develop strategic plans, practices, and procedures to meet existing demands in the market. Especially in information processing, maximizing existing technology, determining required supplies, and operational efficiency for each department involved (Truong et al., 2017; Korompis et al., 2022).

The company's supply chain integration also needs to be adequate supply chain capability with increasing supply chain learning (Willis et al., 2016). Supply chain capability is the company's ability to deliver the products or services being marketed (Somwethee et al., 2023) and help companies integrate well (Chen et al., 2019). It becomes easier for companies to do this planning and forecasting and make decisions regarding who the company will collaborate with (Fernando et al., 2020). The quality of information a company has allows it to build a robust supply chain integration and improve company performance (Pirmanta et al., 2021). Supply chain integration involves coordinating with suppliers in product flow (Setiawan et al., 2023; Feizabadi & Alibakhshi, 2021). The company can respond adequately to inbound and outbound flexibility capabilities to build coordination with external partners (Doetzer & Pflaum, 2021). Flexibility of manufacturing companies needs to receive adequate support from information management capability so that data integration occurs in real-time (Korompis et al., 2022).

Suppliers will affect companies' inputs, such as materials or products to sell, while customers will affect companies' output, such as companies' targets and market conditions (Yu et al., 2021). Tolonen et al. (2017) state that supply chain capability contains many companies' supply chain aspects, such as innovation, the ability to make the right product decisions, and logistic capability. The purpose of supply chain capability is mainly to help companies do their business better, especially in terms of supply chain, to increase effectiveness and efficiency and reduce costs related to production and logistics (Chae et al., 2018; Yu et al., 2018). Selection of products that are more in line with demand and conditions occurring in the market and selection of partners in terms of logistics who can more quickly send products to customers and speed up the company's relationship with suppliers so that the company's logistics process is faster and more effective (Tarigan & Siagian, 2021). Supply chain capability as a company's ability to improve its advantages is determined by supply chain integration to influence the performance of food and hardware manufacturing companies (Rajaguru & Matanda, 2019). Srimarut & Ekhum (2020) stated that supply chain integration determines the amount of supply chain capability in information technology to improve the performance of companies operating in the supermarket retail sector. Apart from that, well-managed supply chain capability and supply chain integration will help companies adapt to the market and influence the company's competitive performance (Irfan & Wang, 2019). Information technology capability that can adjust the company's business processes and integrate quickly and change systems to meet organizational needs (Siagian & Tarigan, 2022). Company performance can be improved by paying attention to the role of the organization's external environment in increasing innovation (Novitasari & Tarigan, 2022). The company maintains sustainable performance to achieve sustainable and agile practices (Geyi et al., 2020).

This research specifically split supply chain integration into three variables: internal integration, supplier integration, and customer integration, and this research also uses supply chain capability in general as a mediating variable. The dependent variable in this research is competitive performance because it's directly related to a company's operational activity and supply chain management. Much previous research used supply chain integration as either a mediating or dependent variable and linked it to a company's performance. The structure of article writing is divided into five broad outlines: first, developing research theories and hypotheses; second, determining research methods; third, analyzing data and research findings; fourth, establishing research discussions and implications; and finally, determining research conclusions.

2. Literature Review

2.1. Supply Chain Integration

Supply chain integration (SCI) is a process by which companies collaborate with supply chain partners, especially suppliers and customers (Pirmanta et al., 2021; Liu & Lee, 2017). Supply chain integration also includes internal company integration, a process within the company to maximize the integration carried out (Sacristán-Díaz et al., 2018). Supply chain integration contains several things, such as operational processes, organizational activities, and information circulation, that can integrate with external parties (Basana et al., 2022; Willis et al., 2016). Supply chain integration also includes the flow of information circulation, financial turnover, and physical goods turnover (Rajaguru & Matanda, 2019). Zadeh et al. (2020) stated that supply chain integration is a process by which companies share information with supply chain partners to gain a competitive advantage and make the company perform better in the market. Supply chain integration is cross-functional and external cross-functional integration used with enterprise resource planning technology (Basana et al., 2023). Supply chain integration is seen as a vital component in a company's supply chain management (Siagian et al., 2022). Yu et al. (2020) stated that SCI is crucial for companies to compete in an increasingly uncertain market environment. The better the supply chain integration a company has, the more it will help the company reduce costs and help the company become more efficient (Hartono et al., 2023). Supply chain integration includes internal and external integration to maintain synergies that provide mutual benefits (Setiawan et al., 2023; Liu & Lee, 2017).

2.2. Internal Integration

Internal integration can be defined as a series of teamwork between departments and organizations in a company to create something called internal capabilities, which is essential to help a company perform better and effectively use and gather information from the market (Basana et al., 2023). Internal integration can also be defined as a process that enables a company to maximize any information it gets from the market and its integration activity with its suppliers and customers (Tarigan & Siagian, 2021). Internal integration is the primary supply chain integration activity because it enables a company to integrate better with its suppliers and customers (Sacristán-Díaz et al., 2018). Companies with good internal integration will have advantages, such as better response to department needs, faster and more accurate information circulation, smoother flow of goods with suppliers and customers, and good collaboration between company departments in supporting operational activities (Freije et al., 2022). Internal integration in the company makes it easier for all departments to get fast and precise information according to their needs (Basana et al., 2022). Internal integration is also the source of a company's internal capabilities, enabling it to plan better and execute collaboration strategies with its partners (Feyissa et al., 2019). In this research, internal integration will be measured using these indicators by Shukor et al. (2020): data integration between departments in the company, internal planning, internal inventory data integration, the ability to access inventory data in real-time, and collaboration between departments.

2.3. Supplier Integration

Supplier integration is a process that a company does to work with its suppliers regarding information sharing and collaborations (Teng et al., 2022; Tarigan et al., 2020). The purposes of this integration are mainly to reduce costs and help a company do better inventory management (Yuen & Van Thai, 2017). The company needs suppliers to help them fulfill any demands in the market efficiently and effectively in terms of cost and time (Rajaguru & Matanda, 2019; Yu et al., 2020). Supplier integration also aims to regulate all activities related to the level of trust the company has with its suppliers, also called upstream integration (Basana et al., 2022). Supplier integration makes things easier for companies regarding the availability of raw materials and production processes (Woo et al., 2016). Collaboration built by companies with suppliers can mutually benefit both parties in solving problems together (Tarigan et al., 2020). Companies and suppliers can build adequate coordination and collaboration (Siagian et al., 2022; Feizabadi & Alibakhshi, 2021). Feyissa et al. (2019) stated that supplier integration is also used to help a company manage its relationship with suppliers. Companies can also use this integration to know their suppliers' capabilities and ability to work together (Basana et al., 2023). Long-term solid relationships are cultivated between suppliers and companies to increase purchasing power (Tarigan & Siagian, 2021; Yang et al., 2019). In this research, supplier integration is measured using these indicators by Tarigan et al. (2021) inventory information and data sharing with suppliers, suppliers directly involved in deciding materials needed in production or sales, forecasting data and good information sharing with suppliers, and the company works together with suppliers to find solutions.

2.4. Customer Integration

Customer integration is an activity that needs to be done by a company to know about customers' demands, preferences, and the company's product performance in the market. Good customer integration will help companies reduce costs (Willis et al., 2016). The main requirement in customer integration is customers' participation, especially in information sharing about their satisfaction and preferences. Companies use customer integration to get feedback regarding the products or services being marketed (Feizabadi & Alibakhshi, 2021). The goal is to increase the company's value in the eyes of customers by adjusting the company's system according to customer requests (Freije et al., 2022). Companies need to carry out environmental

scanning in their markets to facilitate customer integration and make it easier to prepare to face the market (Yu et al., 2019). Customer integration also helps the company in its inventory management. A good information-sharing process will help a company to set better safety stock and re-ordering points. It will also help a company provide products when needed and help do better planning and forecasting (Rajaguru & Matanda, 2019). The company's ability to build integration with downstream integration can benefit the company in knowing customer needs (Basana et al., 2022; Hartono et al., 2023). Measure customer integration, this research uses indicators by Chavez et al. (2015), which are the quality of the company's interaction with customers, the company doing survey or compliance about customer satisfaction, the company trying to forecast customer preferences in the future, the company involved the customers when there are changes in demands, and company and customers exchange good information.

2.5. Supply Chain Capability

Supply chain capability consists of many things about supply chain management, such as resilience, agility, or a company's system and technology (Truong et al., 2017). Supply chain capability is every skill, ability, organization process, and knowledge that creates competitive advantages for a company (Zhang et al., 2014). Employees' capabilities can maintain supply chain capability with the ability to develop communication, understand data integration, and understand cross-functional systems (Basana et al., 2023). Supply chain capability can also be defined as the ability of a company to utilize its internal and external resources and facilitate its supply chain management activity (Rajaguru & Matanda, 2019). Also, how a company can manage its logistic management not only in terms of goods flow but also information flows inside and outside the company (Somwethee et al., 2023). A company's ability to manage these kinds of logistics will reduce the complexity of the supply chain process and make it easier for the company to do so by the company (Tolonen et al., 2017).

Good quality information technology supports companies, especially with the availability of systems in the form of ERP, which can help companies in their production and sales cycles (Basana et al., 2023). Technology or supporting systems will make it easier for companies to integrate better supply chains. Companies can more easily find out supplier capabilities and know customer needs that are monitored by the system (Irfan & Wang, 2019). Companies apply external capability by searching for information, managing the flow of goods, and managing information technology to coordinate with suppliers and customers (Yang et al., 2019). Supply chain capability influences company integration to produce flexibility in the company's supply chain structure related to information and resource flows (Vilkas et al., 2020). Information technology capability can adjust business processes according to company needs (Siagian & Tarigan, 2022). Supply chain capability is the company's ability to organize components in the supply chain to achieve goals more efficiently and effectively (Yu et al., 2018). Flexible supply chain capability within the company can quickly respond to information sharing to maintain company performance (Doetzer & Pflaum, 2021).

In this research, supply chain capability will be measured using these indicators by Rajaguru & Matanda (2019): company frequently communicates with their partners, exchanges good information with partners, building supply chain flexibility with partners, partners involved in innovation making, partners engaged in responding change of demands in the market, and doing good coordination with partners.

2.6. Operational Performance

Operational performance is a performance measurement that consists of production cost, delivery, flexibility, responding to customer requests, and volume demand of a company (Wiengarten et al., 2019; Hartono et al., 2023). It measures how companies manage their product quality, delivery timing, inventory, or product process flexibility and how they do all these things efficiently at a low cost (Vilkas et al., 2020). Geyi et al. (2020) state that operational performance objectives are price, speed, quality, flexibility, reliability, and innovation. An organization's ability to meet customer demands is a performance measurement in service industries such as hotels (Basana et al., 2022). Competitive performance is a way to measure a company’s performance based on operational activities and financial performance (Basana et al., 2023; Willis et al., 2016), especially in terms of quality and efficiency of the company's operational activities (Irfan & Wang, 2019; Yu et al., 2018). Company performance is the company's ability to produce quality products according to the requirements set by customers, delivery flexibility, fulfillment of customer orders, and customer satisfaction (Pirmanta et al., 2021; Truong et al., 2017). Company performance is determined as an indicator of responsive delivery, process flexibility practice, increased productivity, and reduced costs (Siagian & Tarigan, 2022). The company's ability to produce adequate innovation can improve firm performance (Novitasari & Tarigan, 2022). The performance delivered by a company can be used as a reference by comparing the performance of similar companies and expressed as competitive performance (Siagian et al., 2022). Competitive performance is a reference for companies in determining their position compared to competitors (Setiawan et al., 2023). In this research, competitive performance will be measured using these indicators by Irfan & Wang (2019): lead time reduction, flexibility enchantment in product capacity, ability to deliver products in time, doing better customer service, and ability to reduce costs.

2.7. Hypotheses Development

Internal integration determines how well a company can do its supplier and external integration (Pirmanta et al., 2021). With good internal integration, a company can more accurately decide which information and resources it needs from its suppliers. Internal integration will allow companies to use information from suppliers to determine their ability to serve demand in the market. Integration with suppliers will influence the speed of the company's production process, especially regarding the availability of the required raw materials (Paiva et al., 2014). Internal integration will enable companies to execute good collaboration with suppliers.

Additionally, adequate internal integration will help companies determine how far they must collaborate with suppliers. Good integration between the company and suppliers will significantly support the importance of good information and communication with suppliers (Feyissa et al., 2019). Companies need to ensure that internal integration capabilities between departments can carry out supplier integration as well as possible to build cooperation. Good internal integration will also help a company to plan production better and communicate its plans with suppliers as a form of collaboration (Tarigan et al., 2020). A company's internal capability also determines whether it can use the information it gets from the suppliers (Paiva et al., 2014; Feyissa et al., 2019).

A company's internal capability will also determine how well it integrates with its customers and can find an excellent way to gather accurate information about changes in the market (Sutanto & Japutra, 2021). Internal integration will facilitate the formation of innovation that originates from customer integration carried out by the company (Feyissa et al., 2019). The company also must gather information about customers' preferences and build good relations with its customers because market conditions are mostly determined by the customer's preferences (Sutanto & Japutra, 2021). Customer integration aims to help companies understand fluctuations that occur in the market, especially if the company needs information to determine prices and production systems. Customer integration is related to planning, implementation, building relationships, and company performance. The company's information and systems are adjusted to customer needs in the face of market fluctuations. Customers' opinions about the company will also rate its performance; therefore, the company needs to build good relations and maintain its customers' trust (Zhao et al., 2013; Feyissa et al., 2019). Based on the explanation above, the following research hypothesis can be determined:

H_1: *Internal integration affects supplier integration.*
H_2: *Internal integration affects customer integration.*

Good supply chain integration within the company increases the company's supply chain capabilities (Ganbold et al., 2021). Good internal integration creates the company's capability to utilize information external parties provide (Liu & Lee, 2017). The company has good internal integration between departments, which impacts its operations so that they run better (Yu et al., 2018). Companies work with suppliers and customers to increase production capabilities and fulfill demand (Sacristán-Díaz et al., 2018). Supply chain integration affects supply chain capability in generating production capabilities and delivering products efficiently to meet market demand. Supply chain capability determines the company's operations to design systems, carry out production, and create new innovations for its products (Tolonen et al., 2017). Kumar et al. (2017) and Freije et al. (2022) stated that SCI affects supply chain capability, especially the company's production capability, regarding new product development and existing product improvement. A company's internal capability to respond to and treat the information it gets from the market will determine how it should integrate with its supply chain partners (Somwethee et al., 2023). Therefore, it can be said that internal integration and supply chain capability are related to each other in terms of facilitating good supply chain flexibility for the company (Doetzer & Pflaum, 2021).

Supplier integration will affect the company's supply chain capability regarding production capability (Somwethee et al., 2023). This capability is related to the company's coordination in executing its production plans and how a company can be more efficient in production, such as getting materials, managing logistics, and getting or processing information to manage inventory more efficiently (Tolonen et al., 2017). Companies must build integration with suppliers to get faster information about raw materials that can support innovation compared to their competitors (Ellstrom, 2015). Supplier integration will improve a company's sourcing capability by helping it get information about materials availability, logistic conditions, and their supplier's ability to provide materials the company needs (Shukor et al., 2020).

Customer integration is a way for a company to obtain any information about demands it must fulfill, customers' preferences, and market conditions (Ganbold et al., 2021). These things will affect a company's decisions about using its capabilities and resources and making strategies about what it must do in terms of operation and production (Fernando et al., 2020). Customer integration can affect a company's supply chain capability by giving information that can improve a company's purchasing capability, production capability, and logistic capability (Tolonen et al., 2017). Good customer integration will help a company to get any kind of customer data that a company can use to create big data about customers and demands in the market (Irfan & Wang, 2019). Based on the explanation above, the following research hypothesis can be determined:

H3: *Internal integration affects supply chain capability.*
H4: *Supplier integration affects supply chain capability.*
H5: *Customer integration affects supply chain capability*.

External integration, measured by long-term relationships and joint decision-making with partners, can impact company performance, as indicated by product quality and order fulfillment (Pirmanta et al., 2021). Supplier integration will provide information and help the company choose suppliers and collaborate with its suppliers, which can work well together with the company (Yuen & Van Thai, 2017). The primary purposes of supplier integration are to enable a company to do more effective and efficient production and collaborate with its suppliers to gain a competitive advantage against its competitors (Teng et al., 2022; Tarigan & Siagian, 2021). Supplier integration is also used to help a company to do better innovations and have more effective and efficient production activities (Irfan & Wang, 2019; Yu et al., 2021). Supplier integration can impact hotel performance (Basana et al., 2022). Supplier integration impacts competitive advantage so that the company can compete against a major competitor based on low price/cost (Siagian et al., 2022).

Customer integration will be essential for the company if there is a considerable fluctuation in the market, and the company needs to adjust to keep it in good performance (Chen et al., 2019). What the company does will be based on the demands and preferences of the customer, and the company must be able to adjust to the changes related to customers and respond appropriately to customer complaints. This makes customer integration very important for companies, and exemplarily competitive performance is a performance assessment based on customer satisfaction (Yu & Huo, 2018). The customer integration that is formed between the hotel and the customer cannot impact hotel performance because it cannot improve the hotel's image (Basana et al., 2022). Implementing customer integration offers valuable insights into the procurement and manufacturing processes, which can enhance the ability to deliver the type and quantity of products that customers require on schedule (Siagian et al., 2022). Customer integration may impact operational performance (Chavez et al., 2015; Kumar et al., 2017).

Ganbold et al. (2021) state that internal integration can affect the company's performance, but only regarding production costs and inventory level management. These will affect the company's ability to do planning and forecasting. Internal integration is considered to influence company performance because it is a way for companies to maximize the information they get from suppliers and customers (Sabet et al., 2017). So the company can have a shorter lead time. Internal integration that is formed between hotel functions and real-time data integration can have an impact on improving hotel performance (Basana et al., 2022).

H6: *Supplier integration affects operational performance*.
H7: *Customer integration affects operational performance.*
H8: *Internal integration affects operational performance.*

Vilkas et al. (2020) stated that performance requires a company to improve its quality, delivery, flexibility, and cost performance. Supply chain capabilities, which concern a company's ability to have cross-functional integration, include departments in purchasing, logistics, production, and information exchange to accommodate changes in the market (Basana et al., 2023). Information technology capability can continuously improve lean production and increase total productivity maintenance, which impacts company performance (Siagian & Tarigan, 2022). The company also needs adequate capability to use its integration and supply chain agility to improve company performance because supply chain capability includes its ability to respond to changes in the market (Sabet et al., 2017). Adequate information technology capability can create better information flow related to financial performance (Chae et al., 2018). Competitive performance determined by the company is the result of supply chain resilience, which can maintain supply chain capability (Setiawan et al., 2023; Korompis et al., 2022). The company's ability to maintain coordination with external parties will produce mass customization capability in knowledge sharing and innovation (Zhang et al., 2014). A company's ability to build communication capabilities in information sharing correlates with corporate competitiveness (Woo et al., 2016). The company's operational capability to use the same input resources to produce higher output as a transformation process can increase productivity and business performance in automotive companies (Yu et al., 2018).

H9: *Supply chain capability affects operational performance.*

Based on the background and the theories, the research model can be seen in Fig. 1. According to Figure 1, there are mediating hypotheses H10, H11, H12, and H13.

H10: *Internal integration affects operational performance with supplier integration as a mediating variable.*
H11: *Internal integration affects operational performance, with customer integration as a mediating variable.*
H12: *Internal integration affects operational performance with supply chain capability as a mediating variable.*
H13: *Internal integration affects operational performance with supplier integration, customer integration, and supply chain capability as mediating variables*.

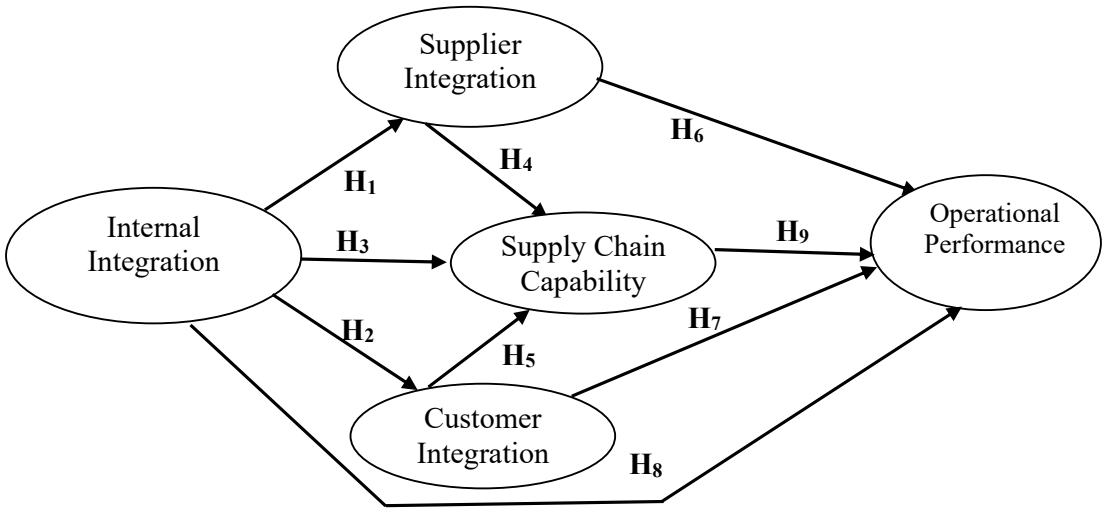

Fig. 1. Research Model Framework

3. Research Method

This research is causal quantitative research using data from numbers and numerical scales. Causal research is research that is conducted to find out about the causal effect between variables (Sekaran & Bougie, 2016). The research will analyze the effect of independent variables on dependent variables and use a mediating variable. This research uses non-probability and judgmental sampling. Non-probability sampling is used because it can provide more accurate or more precise information about the population. Meanwhile, judgmental sampling is used because, in this study, the target sample represents one or more people who have the required information (Sekaran & Bougie, 2016). The population in this research is pharmaceutical distribution companies listed in distribution product manufacturing Indonesia's state medical agency, which is located on Java Island. The population is 133 companies, and researchers distribute questionnaires to the study population. Data was obtained from 115 questionnaire respondents and could be processed further by 102 samples with a response rate of 77%. Data is gathered using questionnaires distributed to the companies and answered by the companies' supervisor or owner or any employees with authority to make decisions about the companies' supply chain. The questionnaires were answered using a Likert Scale of 1 to 5, with one being "very disagree" and five being "very agree." In this research, competitive performance will be used because the research has collected data using operational performance compared with the operational performance of competing companies. The data are analyzed using smartPLS 3 software. Partial Least Square (PLS) is a method that can help the researcher do predictive research (Shiau et al., 2019; Hair et al., 2019).

4. Result and Analysis

Data was collected by distributing questionnaires through social media and by members of the Indonesian Pharmacists Association—the sample required at least 99 samples, and 102 samples were collected. The data were then tested for validity and reliability to be used in research. Respondents were asked to complete a questionnaire regarding internal and external integration, competitive performance, and supply chain capability, according to what the company felt was done. Characteristics of filling in the questionnaire are those with positions equivalent to supervisors, company owners, or employees who have the right to make decisions about the supply chain. Table 1 shows the respondents' profiles based on age and education.

Table 1
Respondents' Profile

Description	Amount	Percentage	Description	Amount	Percentage
AGE			**EDUCATION**		
17-27 years old	9	9%	S1 (Bachelor)	11	11%
28-38 y years old	58	57%	S2 or S3 (Master or	91	89%
39-49 years old	32	31%			
>49 years old	3	3%			
TOTAL	102	100%			

Based on Table 1, most respondents are aged between 28-38 years old, with 57% of the total respondents or 44 respondents, and most of them either have master's degrees or doctorate degrees in their professions, with 89% of total respondents or 66 respondents. The least of respondents are aged more than 49 years old, with 3% of total respondents or 3 respondents, and have an educational level of bachelor with 11% of total respondents or 11 respondents. Using SmartPLS software, the research is conducted using the outer and inner models to test indicators used and latent variables in research (Shiau et al., 2019). In the outer model, validity and reliability were tested for the indicators of each variable's indicators used in the study. In a validity test, an indicator can be categorized as "valid" if it has a loading score ≥ 0,5 (Hair et al., 2019). Based on these criteria,

all variables' indicators in this research are valid because each indicator has a loading score >0,5. Internal integration (X1), which is measured by information sharing between department activity (X1.1), planning coordination between departments (X1.2), inventory data accessibility for all departments (X1.3), ease to access operational data (X1.4), and teams consisting of people from different departments (X1.5), has score loading at least 0,778. Supplier integration (X2), which is measured by the company's activeness in sharing inventory and information with suppliers (X2.1), coordinating with suppliers about materials or products needs and availability (X2.2), forecasting data sharing with suppliers (X2.3), coordinating with suppliers to find a solution (X.2.4), and sharing good quality information with suppliers (X.2.5), has score loading at least 0,764. Customer integration (X3), which is measured by good and frequent information sharing with customers (X3.1), the company does surveys or comply about customer satisfaction (X3.2), the company tries to forecast customer preferences in the future (X3.3), company involved the customers when there are changes in demands (X3.4), company and customers exchange good information (X3.5), has score loading at least 0,734. Supply chain capability (Z1), which is measured by the company frequently communicating with their partners (Z1.1), exchange of good information with partners (Z1.2), building supply chain flexibility with partners (Z1.3), partners involved in innovation making (Z1.4), partners involved in responding to changes of demands in the market (Z1.5), doing good coordination with partners (Z1.6), has score loading at least 0,731. Competitive performance (Y1), which is measured by lead time reduction (Y1.1), flexible capacity of products and production (Y1.2), effective and efficient delivery (Y1.3), good customer service (Y1.4), and low cost (Y1.5), has score loading at least 0,647. For the reliability test, each variable in this research must have Cronbach's Alpha >0.6, composite reliability >0.7, and AVE>0.5. Table 2 shows all variables in this research are reliable.

Table 2
Reliability Test

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Competitive Performance	0.786	0.831	0.848
Customer Integration	0.833	0.834	0.882
Internal Integration	0.853	0.858	0.895
Supplier Integration	0.855	0.856	0.896
Supply Chain Capability	0.876	0.879	0.906

The inner model aims to determine the effect given by each independent variable depending on the hypothesis in the study. Each hypothesis is tested with criteria t-statistic ≥1.96 and p-value ≤0.5 to be accepted.

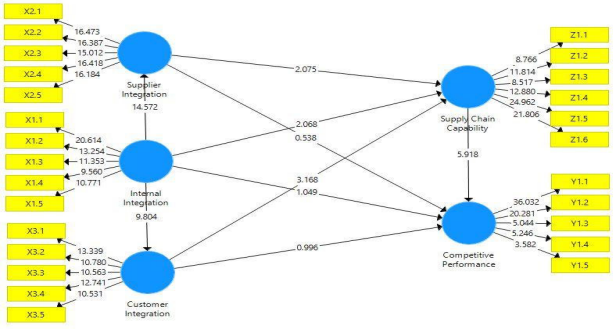

Fig. 2. Path analysis result

Table 3
Direct Effect

Hypothesis		Original Sample	t-statistic	p-value	Result
H1	Internal Integration → Supplier Integration	0.815	14.572	0.000	Accepted
H2	Internal Integration → Customer Integration	0.795	9.804	0.000	Accepted
H3	Internal Integration → Supply Chain Capability	0.227	2.068	0.039	Accepted
H4	Supplier Integration → Supply Chain Capability	0.241	2.075	0.039	Accepted
H5	Customer Integration → Supply Chain Capability	0.443	3.168	0.002	Accepted
H6	Supplier Integration → Competitive Performance	0.081	0.538	0.591	Rejected
H7	Internal Integration → Customer Integration	-0.119	1.049	0.295	Rejected
H8	Customer Integration → Competitive Performance	0.128	0.996	0.320	Rejected
H9	Supply Chain Capability → Competitive Performance	0.764	5.918	0.000	Accepted

Based on Fig. 2. and Table 3, rejected hypotheses are H6, H7, and H8. H6 has a t-statistic of 0.081 and p-value of 0.591, H7 has a t-statistic of 1.049 and p-value of 0.295, and H8 has t-statistic 0,128 and p-value 0,996 which do not meet criteria of t-statistic >=1,96 and p-value <=0,05. H6 is rejected, indicating that pharmaceutical distribution companies need to adjust their planning in production or logistics to shorten lead time. Coordination with suppliers is not enough to help companies shorten lead times. H7 also shows that the company's customer integration is not enough to help improve the company's competitive performance, especially in terms of lead time. Even though the company has information about demand, sometimes it is difficult for the pharmaceutical distribution company to fulfill it within the time requested by the customer. Good coordination

and planning with the company's supply chain partners is needed to help the company use information from customer integration activity to shorten lead times. H8 is rejected, indicating that internal integration does not affect competitive performance. This indicates that without the support of external partners, the company will also find it challenging to increase lead times. Pharmaceutical companies' distribution has a supply chain integration that is not too detailed or complex. Moreover, several pharmaceutical companies carry out customer integration and supplier integration with parent or subsidiary parties to the pharmaceutical company's distribution. Some pharmaceutical distributors have their pharmacies as customers and tend to adjust to the conditions of their suppliers. Marketing and production are regulated by the company's internal by the company's needs.

H1 was accepted with a t-statistic of 14.572 and a p-value of 0.000, which indicates that internal integration will increase the company's ability to perform better supplier integration. H2 accepted with a t-statistic of 9.804 and p-value 0.000, which indicates good internal integration from the company will also increase the company's ability to carry out customer integration. Internal integration will enable the company to have the ability to plan for integration and determine company needs that need to be coordinated with partners. H3 was accepted with a t-statistic of 2.068 and a p-value of 0.039, which shows that internal integration will affect the company's supply chain capability. Cooperation between departments within the company will increase its ability to facilitate good supply chain management and better integration quality with its supply chain partners. H4 was accepted with a t-statistic of 2.075 and p-value 0.039, which shows that supplier integration will increase the company's supply chain capability. It can be interpreted that the circulation of information and good cooperation with suppliers will increase the company's ability to carry out supply chain management better, especially in terms of production and planning to meet demand in the market. H5 is accepted with a t-statistic of 3.168 and p-value of 0.002, showing that customer integration will also increase and improve the company's supply chain capability. This indicates that a well-run customer integration will help the company understand its customers and make the customer know what to do to respond to demand, thus helping the company be more flexible and able to survive in a rapidly changing market.

Table 4
Indirect Effect

Hypothesis		Original Sample	t-statistic	p-value	Result
H_{10}	Internal Integration → Supply Chain Capability → Competitive Performance	0.760	7.056	0.000	Accepted
H_{11}	Supplier Integration → Supply Chain Capability → Competitive Performance	0.184	2.154	0.032	Accepted
H_{12}	Customer Integration → Supply Chain Capability → Competitive Performance	0.338	2.520	0.012	Accepted
H_{13}	Internal Integration → Supply Chain Capability → Supplier Integration → Customer Integration → Competitive Performance	0.549	5.077	0.000	Accepted

Table 4 shows that all indirect effects in this research are accepted because the t-statistic and p-value exceed the criteria. H10, H11, and H12 show that supply chain capability can mediate the influence exerted on competitive performance by internal integration, supplier integration, and customer integration. However, this mediation is partial because supply chain capability directly affects competitive performance. H13 shows that internal integration is mediated by external integration and supply chain capability, affecting competitive performance.

5. Discussion

In manufacturing companies, internal and external integration tend to be less complex. Pharmaceutical companies' distribution is a license allowing a pharmaceutical company to conduct business-to-business transactions. Internal integration influences supplier and customer integration because, in general, internal integration is forming the company's ability to carry out and implement information and data obtained from supplier and customer integration activities. The company's internal ability to coordinate well will help the company plan, select, and get the information needed to respond to any demand changes in the market. System support and company readiness in production and logistics will make collaboration with suppliers and customers more accessible and of higher quality. Overall, internal, supplier, and customer integration affect the company's supply chain capability. In other words, it will affect the company's ability to be more flexible and responsive in responding to changes that occur in the market. Adequate internal coordination will give the company an overview of its capabilities and help it coordinate with its suppliers and customers to plan and forecast better. In addition, supplier and customer integration information will help the company determine the ability of its cooperation with its partners to adapt to market conditions, such as innovation, joint planning, and collaboration in maintaining trust with customers. If studied separately, internal integration, supplier integration, and customer integration do not affect the competitive advantage of pharmaceutical companies' distribution. This is due to several things. One of them is that quite a lot of pharmaceutical companies' distribution have customers in subsidiary pharmacies. This means that customers owned by pharmaceutical companies tend to follow the plans made by pharmaceutical companies' distribution. In addition, the market tends to follow the availability of products rather than asking for new or rare products. The intense competition also makes pharmaceutical companies focus more on finding other product markets they can enter rather than improving competitive performance. Efforts to improve the competitive performance of pharmaceutical companies' distribution are also related to matters outside the supply chain partners, such as

government regulations, environmental conditions, and external parties, such as logistics. Products and materials marketed or manufactured by pharmaceutical companies have strict regulations regarding their licensing and usage. So, even though pharmaceutical companies get information and do good planning, many things need to be reconsidered, such as regulations and logistical conditions. These three integrations are also interrelated and tend to influence competitive performance if combined. Good supplier and customer integration will not be helpful if the internal company does not support it.

In this study, supply chain capability influences competitive performance. This indicates the company's ability to be more flexible, more responsive in the market, and facilitate collaboration with supply chain partners, which will help companies to be more effective and efficient in their operational activities. The company's ability to coordinate well with supply chain partners will help companies to be more flexible and faster in responding to market changes. Planning and forecasting by the company also tend to be better. The company's competitive performance will be even better if coupled with the smoothness of factors such as regulation and logistics.

This research also shows partial mediation of supply chain capability in the influence exerted by internal integration, supplier integration, and customer integration on competitive performance. In other words, the company's ability to coordinate with partners and the market, the company's internal ability to coordinate with each other quickly, exchange quality information, determine the level of customer satisfaction, and the company's internal ability to facilitate the company's supply chain management activities will help the company to it improve competitive performance, especially in terms of lead times. The company will be able to make more accurate planning and forecasting estimates.

6. Conclusion

Based on the research, it can be concluded that internal integration is the basis of supplier and customer integration. Internal integration affects supplier and customer integration, which means the better the internal integration, the more capable the company can be in performing quality integration with its partners. Internal integration, customer integration, and supplier integration cannot affect competitive performance individually. This is because the sample used has factors outside of supply chain integration that must be considered. In addition, the integration carried out by sample companies is not complex. The three integrations affect supply chain capability. This shows that internal integration, supplier integration, and customer integration that are carried out properly will allow the company to detect changes in the market and help companies respond to these changes. Supply chain capability will affect competitive performance because if the company can coordinate well and smoothly with its partners, the company tends to be able to improve its competitive performance, such as shortening lead times and improving quality.

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References

Basana, S. R., Suprapto, W., Andreani, F. & Tarigan, Z.J.H. (2022). The impact of supply chain practice on green hotel performance through internal, upstream, and downstream integration. *Uncertain Supply Chain Management*, *10*(1), 169-180, DOI: 10.5267/j.uscm.2021.9.010

Basana, S.R., Ubud, S., Malelak, M.I. & Tarigan, Z.J.H (2023). The effect of key user capability on supply chain digital and flexibility in improving financial performance. *Uncertain Supply Chain Management*, *11*(1), 267-276, DOI: 10.5267/j.uscm.2022.9.016

Birasnav, M. & Bienstock, J. (2019). Supply chain integration, advanced manufacturing technology, and strategic leadership: An empirical study. *Computers & Industrial Engineering*, *130*,142-157, doi.org/10.1016/j.cie.2019.01.021

Chae, H.-C., Koh, C.E. & Park, K.O. (2018). Information technology capability and firm performance: Role of industry. Information & Management, *55*, 525-546, https://doi.org/10.1016/j.im.2017.10.001

Chavez, R., Yu, W., Gimenez, C., Fynes, B. & Wiengarten, F. (2015). Customer integration and operational performance: The mediating role of information quality. *Decision Support Systems*, *80*, 83–95. https://doi.org/10.1016/j.dss.2015.10.001

Chen, C., Gu, T., Cai, Y. & Yang, Y. (2019). Impact of supply chain information sharing on performance of fashion enterprises: An empirical study using SEM. *Journal of Enterprise Information Management*, *32*(6), 913–935. https://doi.org/10.1108/JEIM-04-2019-0104

Doetzer, M. & Pflaum, A. (2021). The role of digitalized information sharing for flexibility capability utilization: lessons from Germany and Japan. International Journal of Physical Distribution & Logistics Management, *51*(2), 181-203. https://doi.org/10.1108/IJPDLM-01-2020-0030

Feizabadi, J. & Alibakhshi, S. (2021). Synergistic effect of cooperation and coordination to enhance the firm's supply chain adaptability and performance. *Benchmarking*, *29*(1), 136–171. https://doi.org/10.1108/BIJ-11-2020-0589

Fernando, Y., Zainul Abideen, A. & Shaharudin, M. S. (2020). The nexus of information sharing, technology capability and inventory efficiency. *Journal of Global Operations and Strategic Sourcing*, *33*(4), 327–351. https://doi.org/10.1108/JGOSS-02-2020-0011

Feyissa, T. T., Sharma, R. R. K. & Lai, K. K. (2019). The impact of the core company's strategy on the dimensions of supply chain integration. *International Journal of Logistics Management*, *30*(1), 231–260. https://doi.org/10.1108/IJLM-03-2017-0080

Flankegård, F., Granlund, A. & Johansson, G. (2021). Supplier involvement in product development: Challenges and mitigating mechanisms from a supplier perspective. *Journal of Engineering and Technology Management*, *60*, 101628, https://doi.org/10.1016/j.jengtecman.2021.101628

Freije, I., Calle, A. D.L., Ugarte J.V. (2022). Role of supply chain integration in the product innovation capability of servitized manufacturing companies. *Technovation*, *118*, 102216, https://doi.org/10.1016/j.technovation.2020.102216

Ganbold, O., Matsui, Y. & Rotaru, K. (2021). Effect of information technology-enabled supply chain integration on firm's operational performance. *Journal of Enterprise Information Management*, *34*(3), 948–989. https://doi.org/10.1108/JEIM-10-2019-0332

Geyi, D.G., Yusuf, Y., Menhat, M.S., Abubakar, T. & Ogbuke, N.J. (2020). Agile capabilities as necessary conditions for maximising sustainable supply chain performance: An empirical investigation. *International Journal of Production Economics*, *222*, 107501, doi.org/10.1016/j.ijpe.2019.09.022

Hair, J.F., Risher, J.J., Sarstedt, M. & Ringle, C.M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2-24. https://doi.org/10.1108/EBR-11-2018-0203

Hartono, B.Y., Siagian, H. & Tarigan, Z.J.H. (2023). The effect of knowledge management on firm performance, mediating role of production technology, supply chain integration, and green supply chain. *Uncertain Supply Chain Management*, *11*(3), 1133-1148, DOI: 10.5267/j.uscm.2023.4.009

Irfan, M. & Wang, M. (2019). Data-driven capabilities, supply chain integration and competitive performance: Evidence from the food and beverages industry in Pakistan. *British Food Journal*, *121*(11), 2708–2729. https://doi.org/10.1108/BFJ-02-2019-0131

Korompis, J., Tarigan, Z.J.H., & Yuliana, O.Y. (2022). The effect of information management capability, collaboration, and supply chain resilience on company performance. *Petra International Journal of Business Studies*, 5(2), 227-238, DOI: https://doi.org/10.9744/ijbs.5.2.227-238

Kumar, V., Chibuzo, E. N., Garza-Reyes, J. A., Kumari, A., Rocha-Lona, L. & Lopez-Torres, G. C. (2017). The impact of supply chain integration on performance: Evidence from the UK Food Sector. *Procedia Manufacturing*, *11*, 814–821. https://doi.org/10.1016/j.promfg.2017.07.183

Li, G. (2020). The impact of supply chain relationship quality on knowledge sharing and innovation performance: evidence from Chinese manufacturing industry. *Journal of Business and Industrial Marketing*, *36*(5), 834–848. https://doi.org/10.1108/JBIM-02-2020-0109

Liu, C.-L. & Lee, M.-Y. (2017). Integration, supply chain resilience, and service performance in third-party logistics providers. *The International Journal of Logistics Management*, 29(1), 5-21. https://doi.org/10.1108/IJLM-11-2016-0283

Nadif, N. & Vanany, I. (2021a). Analysis of Demand Disruption on Product Availability in the Retail Industry. *PROZIMA (Productivity, Optimization and Manufacturing System Engineering)*, *5*(1), 12–20. https://doi.org/10.21070/prozima.v5i1.1504

Novitasari, M. & Tarigan, Z.J.H. (2022). The role of green innovation in the effect of corporate social responsibility on firm performance. *Economies*, *10*, 5, 117. https://doi.org/10.3390/economies10050117

Paiva, E. L., Teixeira, R., Vieira, L. M. & Finger, A. B. (2014). Supply chain planning and trust: Two sides of the same coin. *Industrial Management and Data Systems*, *114*(3), 405–420. https://doi.org/10.1108/IMDS-07-2013-0324

Pirmanta, P., Tarigan, Z. & Basana, S. (2021). The effect of ERP on firm performance through information quality and supply chain integration in Covid-19 era. *Uncertain Supply Chain Management*, 9(3), 659-666. DOI: 10.5267/j.uscm.2021.5.004

Rajaguru, R. & Matanda, M. J. (2019). Role of compatibility and supply chain process integration in facilitating supply chain capabilities and organizational performance. *Supply Chain Management*, *24*(2), 315–330. https://doi.org/10.1108/SCM-05-2017-0187

Riadi, S., Ahsan Samad, M. & Chaeriah Ahsan, S. (2020). Covid-19 Outbreak and Supply Chain Strategy in Indonesian Government. *International Journal of Supply Chain Management, 9*(5), 1579-1583, DOI: https://doi.org/10.59160/ijscm.v9i5.5617

Srimarut, T. & Mekhum, W. (2020). The impact of compatibility on the process integration of the supply chain in improving firm performance: The mediating effect of information technology capability. *International Journal of Supply Chain Management, 9*(1), 155-167, DOI: https://doi.org/10.59160/ijscm.v9i1.4288

Sabet, E., Yazdani, N. & de Leeuw, S. (2017). Supply chain integration strategies in fast evolving industries. *International Journal of Logistics Management, 28*(1), 29–46, https://doi.org/10.1108/IJLM-01-2015-0013

Sacristán-Díaz, M., Garrido-Vega, P. & Moyano-Fuentes, J. (2018). Mediating and non-linear relationships among supply chain integration dimensions. *International Journal of Physical Distribution and Logistics Management*, *48*(7), 698–723. https://doi.org/10.1108/IJPDLM-06-2017-0213

Sekaran, U. & Bougie, R. (2016). *Research Methods for Business: A Skill Building Approach,* 7th ed. Chichester, John Wiley & Sons.

Setiawan, H.S., Tarigan, Z.J.H. & Siagian, H. (2023). Digitalization and green supply chain integration to build supply chain resilience toward better firm competitive advantage. *Uncertain Supply Chain Management*, *11*(2), 683-696, DOI: 10.5267/j.uscm.2023.1.012

Shiau, W.-L., Sarstedt, M. & Hair, J.F. (2019). Internet research using partial least squares structural equation modeling (PLS-SEM). *Internet Research, 29*(3), 398-406. https://doi.org/10.1108/IntR-10-2018-0447

Siagian, H. & Tarigan, Z.J.H. (2021). The central role of IT capability to improve firm performance through lean production and supply chain practices in the COVID-19 era. *Uncertain Supply Chain Management*, *9*(4), 1005-1016, DOI: 10.5267/j.uscm.2021.6.012

Siagian, H., Tarigan, Z.J.H. & Basana, R.B. (2022). The role of top management commitment in enhancing competitive advantage: The mediating role of green innovation, supplier, and customer integration. *Uncertain Supply Chain Management*, *10*(2), 477-494, DOI: 10.5267/j.uscm.2021.12.003

Somwethee, P., Aujirapongpan, S. & Ru-Zhue, J. (2023). The influence of entrepreneurial capability and innovation capability on sustainable organization performance: Evidence of community enterprise in Thailand. *Journal of Open Innovation: Technology, Market, and Complexity*, *9*, 100082, https://doi.org/10.1016/j.joitmc.2023.100082

Sutanto, J. E. & Japutra, A. (2021). The impact of supply chain integration and trust on supply chain performance: Evidence from Indonesia retail sector. *International Journal of Economics and Business Administration, 9*(1), 211-224, DOI: 10.35808/ijeba/668

Tarigan, Z.J.H. & Siagian, H. (2021). The effects of strategic planning, purchasing strategy and strategic partnership on operational performance. *Uncertain Supply Chain Management*, *9*(2), 363-372, DOI: 10.5267/j.uscm.2021.2.006

Tarigan, Z. J. H., Siagian, H. & Jie, F. (2021). Impact of internal integration, supply chain partnership, supply chain agility, and supply chain resilience on sustainable advantage. *Sustainability*, *13*(10). https://doi.org/10.3390/su13105460

Tarigan, Z.J.H., Tanuwijaya, N.C. & Siagian, H. (2020). Does top management attentiveness affect green performance through green purchasing and supplier collaboration? *Academy of Strategic Management Journal*, *19*(4), 1-10

Teng, T., Tsinopoulos, C. & Tse, Y.K. (2022). IS capabilities, supply chain collaboration and quality performance in services: the moderating effect of environmental dynamism. Industrial Management & Data Systems, *122*(7), 1592-1619. https://doi.org/10.1108/IMDS-08-2021-0496

Tolonen, A., Haapasalo, H., Harkonen, J. & Verrollot, J. (2017). Supply chain capability creation – The creation of the supply chain readiness for a new product during product development process. *International Journal of Production Economics*, *194*, 237–245. https://doi.org/10.1016/j.ijpe.2017.09.007

Truong, H.Q., Sameiro, M., Fernandes, A.C., Sampaio, P., Duong, B.A.T., Duong, H.H. & Vilhenac, E. (2017). Supply chain management practices and firms' operational performance. *International Journal of Quality & Reliability Management*, *34*(2), 176-193, https://doi.org/10.1108/IJQRM-05-2015-0072

Vilkas, M., Stankevice, I. & Rauleckas, R. (2020). Extending cumulative capability models: the role of innovation in the accumulation of competitive performance. *International Journal of Quality and Reliability Management*, *38*(6), 1366–1386. https://doi.org/10.1108/IJQRM-04-2020-0119

Wiengarten, F., Li, H., Singh, P. J. & Fynes, B. (2019). Re-evaluating supply chain integration and firm performance: linking operations strategy to supply chain strategy. *Supply Chain Management*, *24*(4), 540–559. https://doi.org/10.1108/SCM-05-2018-0189

Willis, G., Genchev, S.E. & Chen, H. (2016). Supply chain learning, integration, and flexibility performance: an empirical study in India. *The International Journal of Logistics Management*, *27*(3), 755-769, DOI 10.1108/IJLM-03-2014-0042

Wong, C. W. Y., Wong, C. Y. & Boon-Itt, S. (2013). The combined effects of internal and external supply chain integration on product innovation. *International Journal of Production Economics*, *146*(2), 566–574. https://doi.org/10.1016/j.ijpe.2013.08.004

Woo, C., Kim, M.G., Chung, Y. & Rho, J.J. (2016), Suppliers' communication capability and external green integration for green and financial performance in Korean construction industry. *Journal of Cleaner Production*, *112*, 483-493. doi.org/10.1016/j.jclepro.2015.05.119

Yang, Z., Jiang, Y. & Xie, E. (2019). Buyer-supplier relational strength and buying firm's marketing capability: An outside in perspective. *Industrial Marketing Management*, *82*, 27-37, https://doi.org/10.1016/j.indmarman.2019.03.009.

Yu, Y. & Huo, B. (2018). Supply chain quality integration: relational antecedents and operational consequences. *Supply Chain Management*, *23*(3), 188–206. https://doi.org/10.1108/SCM-08-2017-0280

Yu, W., Ramanathan, R., Wang, X. & Yang, J. (2018). Operations capability, productivity and business performance: The moderating effect of environmental dynamism. *Industrial Management & Data Systems*, *118*(1), 126-143, DOI 10.1108/IMDS-02-2017-0064

Yu, Y., Huo, B. & Zhang, Z. (2021). Impact of information technology on supply chain integration and company performance: evidence from cross-border e-commerce companies in China. *Journal of Enterprise Information Management*, *34*(1), 460–489. https://doi.org/10.1108/JEIM-03-2020-0101

Yuen, K. F. & Van Thai, V. (2017). The influence of supply chain integration on operational performance. *The International Journal of Logistics Management*, *28*(2), 444-463. DOI 10.1108/IJLM-12-2015-0241

Zhang, M., Zhao, X. & Qi, Y. (2014). The effects of organizational flatness, coordination, and product modularity on mass customization capability. *International Journal of Production Economics*, *158*, 145-155, http://dx.doi.org/10.1016/j.ijpe.2014.07.032

Zhao, li, Huo, B., Sun, L. & Zhao, X. (2013). The impact of supply chain risk on supply chain integration and company performance: a global investigation. *Supply Chain Management: An International Journal*, *18*(2), 115–131. https://doi.org/10.1108/13598541311318773