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ARTÍCULO

The Effect of Information Sharing, Long-Term Relationships, Cooperation, and Integration Processes on Supply Chain Performance

Moh. Mukhsin[1*], Tulus Suryanto[2]

[1] Faculty of Economics and Business, University Sultan Ageng Tirtayasa, Serang Banten – Indonesia.
Email: moh.mukhsin@untirta.ac.id; ORCID: https://orcid.org/0000-0002-5036-3024
[2] Faculty of Economics and Business Islam, University Islam Negeri Raden Intan Lampung.
Email: tulus@radenintan.ac.id; ORCID: http://orcid.org/0000-0003-4659-6228

**Corresponding author Email: moh.mukhsin@untirta.ac.id; ORCID: https://orcid.org/0000-0002-5036-3024*

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Abstract: It is a fact that MSME plays an important role in the economic development of any nation. In this regard, most previous research has focused on improving the performance of MSMEs. However, this research stream does not investigate the antecedents of the most important element of MSME performance, namely supply chain performance. Consequently, this study aims to examine how the supply chain management factors of information exchange, sustained connections, collaboration, and integration processes impact supply chain performance in the MSME sector. This study employs a quantitative research design with a sample of 100 producers and distributors of rice bran from small and medium-sized enterprises (SMEs) in Banten Province, Indonesia. In this investigation, SmartPLS 3.0 software was used to conduct a Structural Equation Model (SEM) data analysis. Information exchange positively and significantly affects supply chain performance, as do long-term relationships, collaboration, and process integration.

Author Correspondence: moh.mukhsin@untirta.ac.id

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1. Introduction

The performance of the supply chain, which focuses on factors such as product integrity, durability, and order response time, is one method to meet consumer demands regarding how items are delivered to consumers. Supply chain performance is defined by Munir and Dwiyanto (2018) as the effectiveness of processes involving the transmission of goods, information, and capital from suppliers to consumers. According to Kodrat, Sinulingga, Napitupulu, and Hadiguna (2019), performance measurement is essential because it evaluates supply chain performance based on profitability and supply chain systems. According to Zaroni (2017), efficient supply chain management can help businesses obtain a competitive advantage by decreasing production and distribution costs and increasing the precision of their product inventory.

Several factors, including information exchange, long-term partnerships, collaboration, and process integration, can influence the performance of the supply chain, according to (Karuntu, Palandeng, & Rogi, 2021). According to Lee and Whang (2000), information sharing is the extent to which businesses connect with their partners to communicate business strategy information and enable supply chain participants to store and transmit information essential to decision-making. Then, the (Mukhsin, 2021) opinion was supported, which stated that information exchange could also enhance the responsiveness of the supply chain process. This resulted in a more efficient supply chain and decreased storage costs for raw materials and finished products. In addition, Gebisa (2023) asserts that information sharing is essential to the supply chain's operation. By exchanging company information, supply chain members can examine information garnered from other parties to make better decisions.

According to Hilmawati, Samsir, Daulay, and Siregar (2023), long-term relationships are a company's ability to establish long-term relationships with its suppliers based on trust and interdependence to reap benefits. In addition to information sharing, factors that can enhance supply chain performance include long-term relationships. According to Gebisa (2023), long-term partnerships will result in long-term benefits and cooperative relationships. Moreover, Mukhsin (2020) believes the company's supply chain performance can be enhanced through a long-term, mutually beneficial partnership.

Along with long-term relationship factors, cooperation variables contribute to improving supply chain performance relationships. Working with suppliers increases profitability, according to Deng and Liu (2017), Sukati, Hamid, Baharun, and Yusoff (2012), Danese, Molinaro, and Romano (2020), Al-Tit (2017), and Sinaga, Anggraeni, and Slamet (2021). According to Sapa and Awaluddin (2022), collaboration is a process or action in which multiple partners between providers collaborate toward a common objective.

In addition, aspects of process integration increase the supply chain's efficiency (Barber, Garza-Reyes, Kumar, & Abdi, 2017), with supplier integration functioning as one of the primary drivers of performance improvement (Ivanov, 2021). Supplier integration is a component of supply chain integration, a close, long-term relationship between a corporation and its supply chain partners (Prajogo & Olhager, 2012). Participants in supply chain integration share information regarding estimated demand, production, and supply levels and participate in the company's key decision-making processes. Supplier integration is the most effective method for establishing dependable supply chain performance (Ivanov, 2021), which is synonymous with buyer and supplier interaction, supplier engagement, and supplier collaboration.

Micro, Small, and Medium-Sized Enterprises (MSMEs) constitute the greatest sector of the Indonesian economy. In addition, this group has demonstrated its resilience in severe economic crises. Consequently, it is essential to strengthen MSME organizations comprised of various groups. MSMEs contribute significantly to Indonesia's economy. In Indonesia, 99.99% of all business entities include MSMEs, accounting for over 60% of GDP. Construction (1.57%), mining and quarrying (0.53%), electricity, gas, and clean water (0.03%), agriculture, livestock, forestry, and fisheries (48.85%), trade, hotels, and restaurants (28.83%), transportation and communication (6.88%), processing industry (6.41%), and services (4.51%) are all MSME economic sectors.

MSMEs play numerous significant roles in the Indonesian economy, including as the largest provider of employment opportunities, significant contributors to the development of local economic activities and community empowerment, creators of new markets, and sources of innovation. However, SMB actors must still surmount some internal and external obstacles.

Between 2014 and 2016, MSMEs produced more than 57,900,000 units, and it is anticipated that they will produce more than 59,000,000 units by 2017. Moreover, according to RI President Ir. Joko Widodo in 2016, MSMEs with high resiliency will be able to contribute to the nation's economy even during a global crisis. The economies of Indonesia and the ASEAN region are now primarily supported by micro, small, and medium-sized enterprises (MSMEs). The employment rate in ASEAN ranges between 51.7% and 97.2%, whereas the percentage of MSMEs is between 88.8% and 99.9%. In Indonesia, 56.54 million units, or 99.99% of all business actors, are comprised of MSMEs. Cooperation must therefore be emphasized for the growth and resilience of MSMEs.

The MSMEs' share of the gross domestic product increased from 57.84% to 60.3% over the past five years. During the same period, this industry's labor absorption rose from 96.99% to 97.22%. Despite rising indices of its contribution to GDP formation and workforce absorption, the MSME sector has restricted access to global production supply chains. Indonesian MSMEs represent only 0.8% of the worldwide supply chain. Brunei, Laos, Myanmar, and Cambodia have a marginally greater impact on the global supply chain than MSMEs in Indonesia. The contribution of the MSME sector to the worldwide supply chain is the highest at 2.7%.

The vast number of micro, small, and medium-sized enterprises reflects the level of competition among MSME participants. In addition, for MSME actors to have a successful strategy, the level of uncertainty in the environment must be considered. These interactions, based on effective information sharing, long-term relationships, cooperation, and integration processes, can unquestionably prevent one of the problems: performance failure due to raw material constraints that do not match the quality or a sudden price increase. Given the importance of information in sustaining supply chain performance, managers must understand the information gathering and analysis processes (Gunasekaran, Subramanian, & Rahman, 2017). This study was conducted on Indonesian SMEs involved in the production and distribution of rice bran in Banten Province.

A diagram depicting the flow of raw materials from suppliers to the company is known as the raw materials to

PD flow diagram. As a processing company, Simple PD obtains its raw materials from suppliers, namely rice milling MSME companies, who then ship them to large suppliers. After processing the raw materials, Simplicity PD will transfer the production output to major corporations, including PT Cargill Indonesia, PT Agrico International, PT Cheil Jedang Superfeed, PT Sierad Produce, and PT. Bintang Jaya Proteina, among others. In reality, however, there are obstacles to communication, long-term partnerships, collaboration, and process integration between raw material suppliers and businesses, such as delays in supply and contract fulfillment.

Good company management is evidenced by successful company performance, a benchmark for company performance. Customer satisfaction, a component of supply chain performance, is the final result of a process that includes upstream and downstream activities comprising performance measurement. According to Mukhsin and Suryanto (2022), supply chain performance (SCM) is the design and management of the flow of products, information, and cash throughout the supply chain.

The success of leading organizations is largely attributable to the supply chain, the fastest-growing business sector. Due to the present business climate, companies must compete in significantly different ways than they did even a few years ago. According to Karuntu et al. (2021), supply chain management is the extension and development of the concept and meaning of logistics management, which expands customer requirements and regulates the movement of goods between businesses.

The Council of Supply Chain Administration Professionals (CSCMP) defines supply chain as planning and administrating all sourcing, procurement, conversion, and logistics management activities. This entails coordinating and collaborating with channel partners, including suppliers, intermediaries, third-party service providers, and consumers.

Information exchange, long-term connections, collaboration, and integration procedures have a positive and substantial effect on the supply chain performance of small and micro enterprises in Jepara, according to Gebisa (2023). According to research (Hassan & Nasereddin, 2018), information exchange, long-term relationships, collaboration, and integration procedures positively and substantially impact supply chain performance. In contrast to Sapa and Awaluddin (2022), this study demonstrates that information interchange, long-term relationships, and integration procedures have a significant positive impact on the success of a business. The findings of this study indicate that the cooperation variable has no appreciable effect. Consequently, the performance of the supply chain will increase as their relationships strengthen.

2. Literature review

2.1 Supply Chain Management

Purchasing is a component of supply chain management for suppliers and distributors. It entails the transformation of basic materials into semi-finished or finished goods, followed by their delivery to customers via the distribution system. Merlyn Mourah Karuntu argues that companies utilizing supply chain management (SCM) do so to increase competitiveness, which manifests in improved operational performance. According to (Mukhsin, 2020), supply chain management (SCM) coordinates all supply chain activities, commencing with raw materials and concluding with customer satisfaction.

According to (Tyagi & Agarwal, 2014), a supply chain is the method by which a business transfers the goods and services it manufactures to its customers. The primary purpose of this chain, which is also a network or collection of numerous related entities, is to acquire and distribute these items as efficiently as feasible. Supply chain management focuses on integrating and regulating the flow of products, services, and information throughout the supply chain to respond to client requests and reduce overall costs. According to Article 2021, each supply chain section is traditionally managed as a separate company with its own objectives. However, the efforts of each node in the supply chain determine a company's ability to compete in the global market today. For supply chains to be effective, participants must collaborate, communicate, and work closely together. Customers and vendors are required to exchange information. The rapid data exchange between consumers, sellers, distributors, and manufacturers characterizes modern supply chain management. Customers and vendors must have the same goal.

A supply chain includes all stakeholders directly or indirectly fulfilling a consumer request. In addition to manufacturers and suppliers, the supply chain includes transporters, warehouses, retailers, and even consumers. The supply chain in every company, including manufacturers, encompasses acquiring and meeting customer demands. These responsibilities include developing new products, marketing, operations, distribution, finance, and customer service (Agus, 2015).

2.2 Performance of Supply Chain Management

Performance is accomplishing an organization's duties following its vision, goals, and mission. According to Gebisa (2023), the ability of a company to establish customer-desired standards is determined by low production and maintenance costs, enhanced product quality, decreased work-in-progress inventory, lower material handling expenses, and delivery deadlines. All client demand fulfillment activities are quantified as a supply chain performance metric. The results of the company's efforts to fulfill customer requests are conveyed as numbers or percentages.

A performance measurement system is required to monitor and control, communicate organizational goals to supply chain functions, know where an organization stands about competitors and to-be-achieved goals, and identify improvements that can give an organization a competitive advantage (Mukhsin & Suryanto, 2022). A series of activities in the supply chain include integrating activities for procuring materials and services, converting into semi-finished and final products, and delivering them to customers. The approach with suppliers includes purchasing and a holistic approach to develop maximum value. These activities involve procuring and outsourcing and other functions essential to the supplier-distributor relationship. According to Hassan and Nasereddin (2018), managing a successful supply chain.

2.3 Information Sharing

Decisions are based on information sharing, necessitating collecting expeditious, accurate, and high-quality data (Karuntu et al., 2021). Implementation of supply chain processes is based on information. According to Mufadhol, Warsito, Wibowo, Mustafid, and Suryono (2022), for information to be useful in supply chain decision-making, it must possess several characteristics; Accessible when

required, i.e., usable when needed. The information must be properly and correctly accessible to aid in decision-making. The information must accurately describe actual conditions and be reliable to make sound decisions. Specifically, contemplating what information is relevant and required by the business.

Information sharing refers to the willingness and capacity of enterprises to exchange business-related information with partners. Information sharing (Mukhsin, 2021) can reduce industrial constraints by enabling supply chain members to obtain, maintain, and communicate the data necessary for effective decision-making. Sharing information can also strengthen the collaboration's components as a whole.

Information sharing allows supply chain participants to obtain, maintain, and communicate the data required for effective decision-making, thereby reducing industrial constraints (Karuntu et al., 2021). According to research (Abdallah, Obeidat, & Aqqad, 2014), information sharing positively and substantially affects supply chain performance. Other studies have found that exchanging information throughout the supply chain enhances the chain's performance (de Sousa Jabbour, de Oliveira Frascareli, & Jabbour, 2015; Zhao, Xie, & Zhang, 2002).

2.4 Long-Term Relationship

According to Gebisa (2023), a lengthy period exceeds one year. On the other hand, a long-term partnership (Long Term partnership) is defined by Gebisa (2023) as an outlook on the interdependence of buyers and suppliers in the context of products or relationships that are expected to benefit purchasers over the long term. According to Hilmawati et al. (2023), a long-term relationship (Longterm Relationship) refers to a company's ability to establish long-term connections with its suppliers because it believes the ties will be profitable. According to Gebisa (2023), long-term partnerships are necessary for businesses and customers in terms of their respective products and relationships with one another because they have a dependency relationship and will yield long-term benefits. According to Karuntu et al. (2021), the company's relationship with its suppliers is the strongest partnership within a value or supply chain. The supplier must provide the company with the necessary primary materials or inputs. The supplier's performance impacts the quality of the material and the company's ability to distribute it, affecting its overall success. According to Deng and Liu (2017), managing long-term relationships to attain company profitability — which is continuously achieved through mutually beneficial relationships — is expected to produce consistent and sustainable long-term relationships.

2.5 Cooperation

Cooperation is one of the best options for implementing the most effective supply chain management. The rationale is that organizations and businesses involved in the supply chain network must have a trustworthy information system that promotes confidence among those purchasing goods and services. Without effective collaboration, this cannot be accomplished. Cooperation describes a situation where multiple parties work together to achieve mutually beneficial objectives (Wankmüller & Reiner, 2020). Effective collaboration requires a desire to develop relationships that inspire devotion and confidence. Suppliers and businesses must comprehend forming and maintaining partnerships to have a productive, long-term cooperative relationship.

Every enterprise employs cooperative activity as its primary tool for sustaining and enhancing results (Mukhsin, 2021). To achieve a successful outcome, the two parties must collaborate effectively. It is possible to quantify relationship quality using the measurement variables of trust and fairness as the primary factors determining the quality of a cooperative relationship. If a company genuinely believes in its cooperation partners and regards them with integrity, it will view this relationship as a strategic asset and instrument that will enhance its competitiveness. Collaboration with dependable suppliers is expected to result in a comprehensive understanding of each party's needs and requirements. According to Huo (2012), companies will find it difficult to collaborate with supply chain participants if there is no cooperation and integration between the many internal activities of the organization. According to research by Narasimhan and Kim (2002) and Abdallah et al. (2014), internal integration enhances supply chain performance.

2.6 Process Integration

Integration must be achieved by organizations and businesses that are a part of the supply chain management network and the entire procurement chain. Supply chain management seeks to integrate the company's core business processes from upstream and downstream relationships to end users (Tsinopoulos & Mena, 2015).

Integration, the joining of parts or activities to form a whole, can improve relationships along each value chain, facilitate decision-making, enable value creation, and facilitate the transfer of information, knowledge, equipment, and assets from suppliers to final customers. According to Cousineau, Lauer, and Peacock (2004) in (Tsinopoulos & Mena, 2015), supply chain integration is a complex collaboration process between businesses, suppliers, and consumers that, when properly managed, can increase operational efficiency and profits and satisfy all parties. According to Huo (2012), companies will find it difficult to collaborate with supply chain participants if there is no cooperation and integration between the many internal activities of the organization. According to research by Narasimhan and Kim (2002) and Abdallah et al. (2014), internal integration enhances supply chain performance.

2.7 Hypothesis Development

2.7.1 Effect of Information Sharing on Supply Chain Performance

According to Kembro and Selviaridis (2015), the sharing information can increase the responsiveness of the supply chain process, make it more dynamic, and reduce the cost of holding raw materials and finished products. Information sharing also strengthens other aspects of collaboration by facilitating the ability to collect, store, and communicate the data necessary for sound decision-making (Huda, Aminuddin, & Wusko, 2018). Knowledge sharing can help alleviate industrial constraints. According to research (Mufadhol et al., 2022), sharing information enhances the performance of the supply chain. Additionally, research from Harjadi (2022), Gebisa (2023), and Hassan and Nasereddin (2018) confirmed the same conclusion, namely that sharing information enhances supply chain effectiveness. Consequently, the hypothesis proposed in this investigation is as follows:

H1: Information sharing positively and significantly affects supply chain performance.

2.7.2 Effect of long-term relationships on supply chain performance

According to Gebisa (2023), a long-term relationship is a company's capacity to establish profitable partnerships with its suppliers over the long term. According to Lestari, the company's relationship with its suppliers is the most effective form of collaboration in the context of a value chain or supply chain. Suppliers provide the business with products or input materials for use. The supplier's performance impacts the quality of the material and the company's ability to distribute it, affecting its overall success. Theoretically, maximizing business profitability is the end goal of managing long-term relationships.
This is accomplished through long-lasting, mutually beneficial partnerships (Huda et al., 2018) that form stable, enduring relationships. According to Zulfandi and Sakir's (2021) research, long-term relationships have a positive but negligible effect on supply chain effectiveness. Hassan and Nasereddin (2018) say long-term partnerships enhance the supply chain's efficacy. According to Supported by Afriliyani, Sunarko, and Widuri (2019), enduring partnerships enhance supply chain efficiency.
H2: Long-term partnerships favorably and considerably impact supply chain performance. Hence, this is the hypothesis in this study.

2.7.3 The Effect of Cooperation on Supply Chain Performance

Gebisa (2023) asserts that "collaboration between two companies is analogous to a marriage between two people," emphasizing the significance of reflecting on one another's objectives, beliefs, and identities in addition to understanding one another's business models. It is anticipated that working with reliable suppliers will result in a greater understanding of each party's requirements and expectations. In 2017, Arizal. According to Wankmüller and Reiner (2020), cooperation is one of the greatest factors for executing the most effective supply chain management. Cooperation.
The rationale is that organizations and businesses involved in the supply chain network must have a trustworthy information system that promotes confidence among those purchasing goods and services. Without effective collaboration, this cannot be accomplished. Cooperation and information sharing improve supply chain performance, according to the Mukhsin (2021). This study and Gebisa (2023), Effects of Long-Term Relationship, Information Sharing, Trust, and Process Integration on Supply Chain Performance (Studies in the Dipurbalingga Exhaust Industry), demonstrate that cooperation substantially affects supply chain performance.
This study's findings indicate that collaboration improves supply chain performance. In contrast to Sapa and Awaluddin (2022), this study demonstrates that information interchange, long-term relationships, and integration procedures have a significant positive impact on the success of a business. Consequently, the hypothesis proposed in this investigation is as follows:
H3: Cooperation has a positive and significant effect on supply chain performance.

2.7.4 Effect of the integration process on supply chain performance

According to Tsinopoulos and Mena (2015), there is a complex process of collaboration between businesses, suppliers, and customers that, when managed properly, can increase operational efficiency and sales and satisfy everyone. Cooperative integration processes are closely related to end-users or consumers within supplier logistics. This variable can be quantified using distribution, inventory, transport, and material flow.
The company's supply chain integration pattern reflects its operational focus on competitiveness in the business world. During integration, the organization must determine whether its supply chain integration pattern leans inward or outward (towards suppliers, consumers, or both) (Tsinopoulos & Mena, 2015). As a result of the standardization that occurs during integration, integration must be defined as cooperation, collaboration, information sharing, trust, partnership, compatibility, sharing of risks and benefits, commitment to the same vision, dependability, and sharing of key processes.
In the supply-chain management industry, productivity must be increased. According to Cahyaningratri and Naylah (2023), businesses need a solid plan to remain afloat in the market and to be ready to capitalize on both opportunities and threats. In addition to enhancing production and efficiency, businesses must also comprehend and be aware of consumer desires. According to Harjadi (2022), the significance of the roles played by suppliers, manufacturers, distributors, retailers, and customers in producing affordable, high-quality products gave birth to the concept of supply chain management. Based on the preceding description, the following conclusion can be drawn:
H4: Integration Process has a positive effect on supply chain management performance.

2.8 Conceptual Frame

The framework used by researchers is as follows:

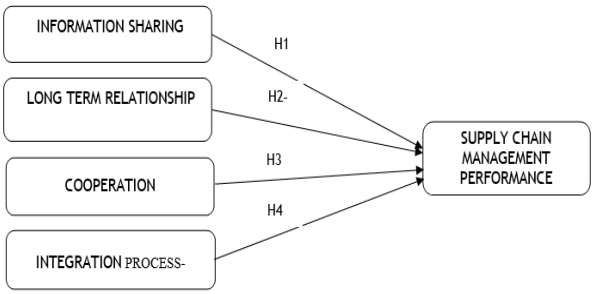

Figure 1. Conceptual Frames

3. Research Methods

3.1 Types of Research

This investigation incorporates quantitative and associative approaches. This type of associative research seeks to establish how the independent variable (X) influences the dependent variable (Y). According to Arifin, Kevin, and Siswanto (2017), this type of study employs a quantitative approach in which researchers construct hypotheses and propositions to discover new concepts and then test them against quantitative data to generate tested hypotheses.

3.2 Research Variables

In this investigation, the independent and dependent variables were evaluated. According to Hassan and Nasereddin (2018), independent variables affect, initiate, or otherwise contribute to the emergence or change of the

dependent variable. The author employs one dependent variable, Y, and four independent variables (X1, X2, and X3 X4).
In this instance, the X1 variable is Information Sharing, measured by 3 indicators. The X2 variable is Long-Term Relationship, which is measured by 4 indicators. The X3 variable is Cooperation, which is measured by 3 indicators. The X4 variable is Integration Process, measured by 3 indicators, and the variable that influences Y, namely Supply Chain Performance, is calculated by 5 indicators.

3.3 Population and Sample

Analyzing data to draw conclusions that lead to significant results is common. To retrieve this information, a population and sample must exist to facilitate data analysis. The population is a collection of all events, objects, or people who share certain characteristics and are the focus of a researcher's attention because they are considered to be part of the same research universe (Mukhsin & Suryanto, 2022). The sample, which consists of several members of the population, is a subset of the population. This subset is chosen because it is frequently difficult for researchers to examine every member of the population; as a result, a sample of the population must be created. The sample selection procedure is statistically representative of the population under investigation. There are typically too many individuals in the population of interest to include them as participants in a particular study. In this investigation, non-probability samples were chosen using simple random sampling (Simple Random Sampling). In this investigation, 100 participants were drawn at random from UMKM rice bran producers and distributors in Banten Province.

3.4 Data Analysis Methods

This study uses descriptive statistical analysis techniques and PLS (Partial Least Square) analysis using SmartPLS 3.0.m3 software.

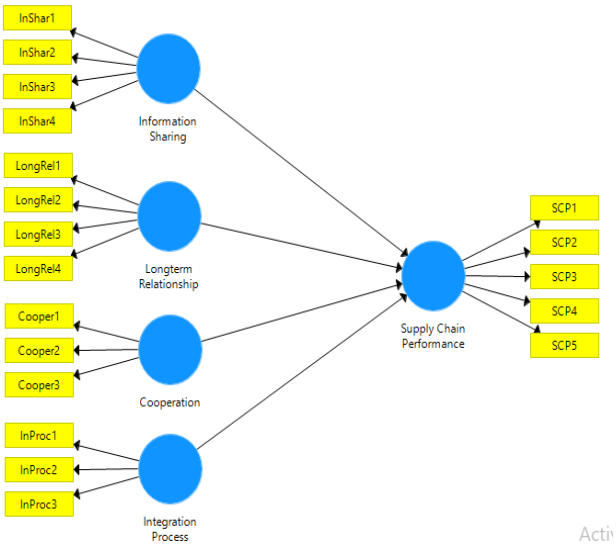

Figure 2. Research Model Path Diagram

3.4.1 Hypothesis Testing

This technique includes a hypothesis test and employs the explanatory research method and PLS as its methodological strategy. The bootstrapping resampling method was used to assess the hypotheses (and) a minimum of 5000 times. By executing the SmartPLS bootstrap algorithm, statistics and probabilities are obtained and used to determine whether or not the proposed hypothesis is accepted since PLS does not use normality and data distribution to determine the t-statistic value in the PLS test. Instead, non-parametric tests are utilized.
Determine the significance level of the path coefficient where the t value results.
With the explanatory research method as a methodological approach with the help of PLS, this method has a hypothesis test. Hypothesis testing (γ and λ) was carried out using the bootstrapping resampling method with a minimum number of bootstrapping of 5000 because PLS does not use normality and data distribution to determine the t-statistic value in the PLS test using a non-parametric test to determine the significance level of the path coefficient where the t value results -Statistics and probabilities are obtained by running the SmartPLS bootstrap algorithm and are used to determine whether or not the proposed hypothesis is accepted.

3.4.2. Data Analysis and Hypothesis Testing

Data analysis serves as a model for combining findings from comparisons, similarities, and differences in the data to be investigated, allowing the analysis's conclusions to be made into a choice that can be made or information that can be used to address issues raised by the research. It is thought important first to analyze the measurement model to confirm indicators and latent variables for further testing before conducting hypothesis testing to forecast the link between latent variables in a structural model. The SmartPLS 3.0.m3 program, which comprises an Outer Model Test and an Inner Model Test, was used for data analysis in this study using a conceptual framework with reflecting indicators throughout the entire model.

4. Test the Measurement Model (Outer Model)

4.1 Convergent validity

Several conditions of the measurement model should be met to establish convergent validity. First, the value of factor loadings of the latent variable or construct should be more than 0.70. However, according to Arifin et al. (2017), a loading value measurement of 0.5 to 0.6 is considered sufficient for early-stage research.

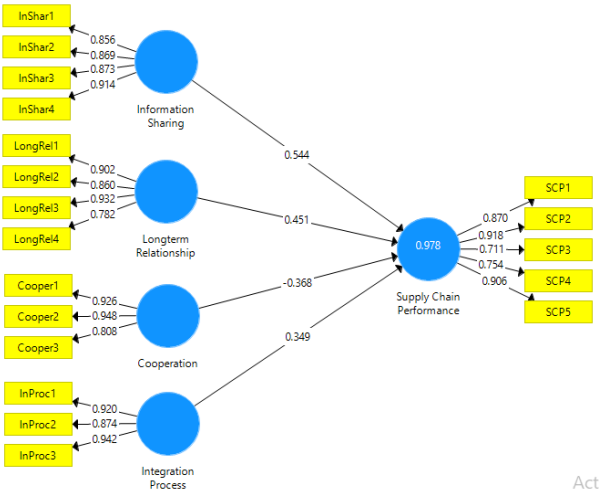

Figure 3: Measurement model output

Based on the outer loading presented in Figure 3 and Table 1, the results show that all indicators have a loading score > 0.50, so no indicators need to be removed from the model.

Table 1: Outer Loading Score

Matrix	Cooperation	Information Sharing	Integration Process	Longterm Relationship	Supply Chain Performance
Cooper1	0.926				
Cooper2	0.948				
Cooper3	0.808				
InProc1			0.920		
InProc2			0.874		
InProc3			0.942		
InShar1		0.856			
InShar2		0.869			
InShar3		0.873			
InShar4		0.914			
LongRel1				0.902	
LongRel2				0.860	
LongRel3				0.932	
LongRel4				0.782	
SCP1					0.870
SCP2					0.918
SCP3					0.711
SCP4					0.754
SCP5					0.906

Source: SmartPLS processed data 3.0.m3, 2023

Notably, all the exogenous variables, i.e., Cooperation, integration process, information exchange, and long-term relationship, account for more than 70% of each indicator based on Figure 3 and Table 1. Similarly, the endogenous variable, i.e., supply chain performance, has a percentage value higher than 70% in each indicator.
Secondly, the Average Variance Extracted (AVE) value should be more than 0.50. In this study, the said criteria are met as all variables have an AVE of more than 0.50 (see Table 2).

Table 2: Convergent validity test results

Construct	Average Variance Extracted (AVE)
Information Sharing	0.832
Longterm Relationship	0.759
Cooperation	0.803
Integration Process	0.771
Supply Chain Performance	0.699

Source: SmartPLS processed data. 3.0.m3, 2023

4.2 Composite reliability

Secondly, the reliability of each indicator in the model is represented by Cronbach's alpha and composite reliability values. The cut-off value of both measures is 0.70 (Ghozali, 2014).

Table 3: Composite reliability values

Construct	Composite reliability
Information Sharing	0.937
Longterm Relationship	0.926
Cooperation	0.924
Integration Process	0.931
Supply Chain Performance	0.920

Source: SmartPLS processed data 3.0.m3, 2023

Based on the data presented in Tables 3 and 4, it can be concluded that each construct has a high level of reliability, as both the composite reliability and Cronbach's alpha values for each construct are greater than 0.70. This suggests that either the four measurement models generate accurate results or that each indicator may measure latent variables accurately. As all convergent validity conditions are met, this research's convergent validity is established.

Table 4: Cronbach alpha values

Construct	Cronbach's alpha
Information Sharing	0.899
Long-term Relationship	0.891
Cooperation	0.877
Integration Process	0.901
Supply Chain Performance	0.888

Source: SmartPLS processed data. 3.0.m3, 2023

4.3 Discriminant Validity

To establish the validity of a construct, it is necessary to show both its discriminant and convergent validity. Using HTMT criteria, the discriminant validity of a model is established. Following HTMT criteria, all HTMT ratios must be less than 0.85. The discriminant validity of the model is demonstrated by the fact that all HTMT ratio values are less than 0.85, as shown in Table 5 below.

4.4 Fitness for purpose Test (interior model)

The R-square value, a model-fitting measurement, is used to evaluate the structural model. According to (Chin, 1998; Ghozali, 2014), the model of the impact of external variables on endogenous variables has an effect of 0.67 (high), 0.33 (moderate), and 0.19 (weak).

Table 5: HTMT Criteria

	Information Sharing	Long-term Relationship	Cooperation	Integration Process	Supply Chain Performance
Information Sharing					
Long-term Relationship	0.74				
Cooperation	0.56	0.68			
Integration Process	0.42	0.36	0.54		
Supply Chain Performance	0.65	0.75	0.25	0.63	

Source: SmartPLS processed data 3.0.m3, 2023

Table 6: R-square values

Construct	R-square values
Supply Chain Performance	0.978

Source: SmartPLS processed data 3.0.m3, 2023

According to Table 6, the model's findings regarding the impact of cooperation, long-term relationships, and information sharing on supply chain performance result in an R-Squere value of 0.978, meaning that the four independent variables of collaboration, integration processes, information sharing, and long-term relationships account for 97.8% (nearly high effect) of the variance in the endogenous variable of supply chain performance. At the same time, other factors explain the remaining 2.2%.

4.5 Hypothesis test

To calculate the significance level of the association in SmartPLS, hypothesis testing is done on the research sample using the bootstrapping approach. The results of the SmartPLS bootstrapping can be used to test hypotheses by examining the t-statistic and path coefficient values. The t-statistic value represents the construct's significance level, and the path coefficient describes the relationship between constructs. The relationship of variables is considered significant if the t-value is > 1.96 (Ghozali, 2014).

In this study, the t-statistical values of the exogenous variables on the endogenous variables presented in Table 7 are considered significant as all the values passed the cut-off value of 1.96.

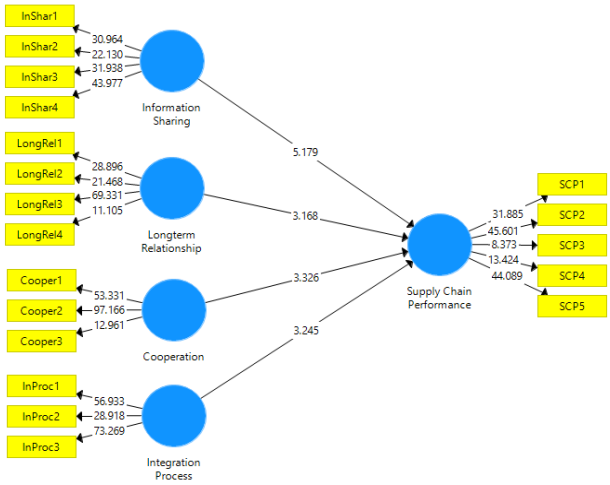

Figure 5: Results of hypothesis testing data (Arifin et al., 2017)

Table 7. Summary of Hypothesis Test Results

Construct	Original Sample	T Statistics	P Value	Description
Information Sharing → Supply Chain Performance	0.544	5.179	0.000	Significant: H_1 Accepted
Longterm Relationship → Supply Chain Performance	0.451	3.168	0.002	Significant: H_2 Accepted
Cooperation → Supply Chain Performance	0.368	3.326	0.001	Significant: H_3 Accepted
Integration Process → Supply Chain Performance	0.349	3.245	0.001	Significant: H_4 Accepted

Source: SmartPLS processed data 3.0.m3, 2023

The following is inferred from the results of hypothesis testing (see Table 8):
The first hypothesis (H1) is adopted; information sharing significantly impacts supply chain performance. This is demonstrated by the t-statistic value being greater than the t-table, specifically by the fact that 5.179 > 1.96.
The second hypothesis (H2) that the long-term relationship significantly impacts supply chain performance is acknowledged. This is demonstrated by the t-statistic value being greater than the t-table, specifically 3.168 > 1.96. The path coefficient is (0.451), and the p-value is (0.002< 0.05).
The third hypothesis (H3) is accepted; collaboration significantly impacts supply chain performance. This hypothesis is supported by a t-statistic with a value greater than the t-table, specifically 3.326 > 1.96.
The fourth hypothesis (H4) is accepted, stating that the integration process significantly impacts supply chain performance. This conclusion is corroborated by a t-statistic value greater than the t-table value, specifically 3.245 > 1.96.

Table 8. Summary of the Results of hypothesis testing

	Hypothesis	Accept/Reject	Findings
Hypothesis 1	Sharing information has a positive effect on supply chain performance	Accepted	Positive influence and significant
Hypothesis 3	Long term relationship positive effect on performance	Accepted	Positive influence and significant
Hypothesis 2	Cooperation has a positive effect on supply chain performance	Accepted	Positive influence and significant
Hypothesis 4	The Integration process has a positive effect on supply chain performance.	Accepted	Positive influence and significant

Source: SmartPLS processed data 3.0.m3, 2023

5. Discussion

5.1 Effect of information sharing on supply chain performance

The results of this study indicate that information sharing has a positive and significant impact on the supply chain performance of MSME actors in the production and distribution of rice bran business actors with a path coefficient value of (0.544) and a p-value of (0.000 0.05), and this is supported by a t-statistic value greater than t-table, specifically with a value of (5.371) > (1.96), and enhanced by an F-squared value of (0.283), indicating Consequently, the initial hypothesis (H1) is regarded

acceptable. This study's findings are consistent with earlier research (Mufadhol et al., 2022) that discovered that sharing information improves supply chain efficiency. In addition, analysis by Hassan and Nasereddin (2018), Harjadi (2022), and Gebisa (2023) confirmed the same conclusion, namely that sharing information enhances supply chain effectiveness.
A successful information-sharing system between supply chain participants and MSME actors in the production and distribution of rice bran in the Province of Banten, Indonesia, will also result in a successful supply chain, according to the findings of this study. Both economically and perpetually assisting supply chain partners are precise product outputs and effective communication.

5.2 Effect of long-term relationships on supply chain performance

With path coefficients of (0.451), p-values of (0.002 0.05), and t-statistic values less than t-table (3.168 > 1.96), the results of this study indicate that information sharing has a positive and insignificant effect on the supply chain performance of MSME actors involved in the production and distribution of rice bran. Consequently, the second hypothesis (H2) is accepted as true. This study's findings are consistent with those of Zulfandi and Sakir (2021) and Harjadi (2022), who found that long-term relationships positively and substantially affect supply chain performance.
Strong long-term relationships characterized by a high level of commitment and trust produce well-functioning supply chains, according to the findings of this study. Based on the results of this study, MSME actors involved in the production and distribution of rice bran in the Indonesian province of Banten should evaluate the relationship between trust and commitment with other MSME actors engaged in these activities. If trust and commitment are executed effectively, the long-term relationship is satisfied, and chain performance is achieved.

5.3 The Effect of Cooperation on supply chain performance

Cooperation in supply chain performance has a positive and significant effect on the supply chain performance of MSME actors in the production and distribution of rice bran business actors, according to the study's findings, where the path coefficients value is (0.368), the t-statistic value is less than the t-table (3.326 > 2.00), and the p-value is (0.001< 0.05). The third hypothesis (H3) is therefore adopted.
This research is consistent with previous research (Harjadi, 2022; Mukhsin, 2021). The findings of the study indicate a positive and significant effect. According to this study, supply chain performance improves as participant cooperation increases. Suppliers of MSME actors in Banten Province, Indonesia, should use the findings of this study to evaluate their cooperative relationships with MSME actors involved in the production and distribution of rice fiber. Objective-based cooperation and long-term partnerships must be satisfied to develop supply chain performance that can accommodate robust sales planning and forecasting.

5.4 The Effect of the integration process on supply chain performance

This investigation confirms the findings of previous research (Mukhsin & Najmudin, 2020; Tsinopoulos & Mena, 2015). The study's findings indicate a positive and significant impact. This study demonstrates that cooperation improves the efficiency of the supply chain. Manufacturers and distributors of rice bran in Banten Province, Indonesia, should use the findings of this study to evaluate their cooperative relationships with MSME businesses. Sustainable relationships and cooperation based on objective criteria are established to improve supply chain performance and facilitate accurate sales planning and forecasting.
The findings of the study demonstrated a positive and significant effect. This study concludes that the efficacy of the supply chain improves proportionally to how well suppliers integrate. According to the study's findings, the providers of MSME actors in the production and distribution of rice bran in Banten Province of Indonesia should evaluate the integration of MSME actors in Banten Province to provide supply chain performance capable of supporting accurate sales planning and forecasting.

6. Conclusion

This study examines methodologies for analyzing the impact of collaboration, long-term relationships, information sharing, and process integration on supply chain performance. The following are the results of this study's SEM (Structural Equation Model) assessment using the SmartPLS test program:
The first hypothesis is accepted because the test of the influence of information sharing on supply chain performance demonstrates that information sharing has a positive and statistically significant impact on supply chain performance. This study's findings are consistent with those of Hassan and Nasereddin (2018) and Harjadi (2022), which found that information sharing significantly enhances supply chain performance. This indicates that when information sharing is effectively communicated from upstream to downstream, supply chain performance will also be high to reduce business partner dissatisfaction and foster cooperative relationships.
The long-term relationship test on supply chain performance supports the second hypothesis, demonstrating that the long-term relationship positively and significantly affects supply chain performance. The findings are consistent with those of Sapa and Awaluddin (2022), who discovered that long-term relationships positively and substantially affect supply chain performance. Long-term relationships have a positive and significant impact on supply chain efficacy, according to Gebisa (2023).
This finding is consistent with those of Mukhsin (2021) and Harjadi (2022), who also found a positive impact.
The fourth hypothesis is adopted due to the integration process test on supply chain performance, which concluded that the integration process has a positive and statistically significant effect on supply chain performance. This investigation's findings concur with those of Moh. According to Mukhsin and Najmudin (2020) and Gebisa (2023), the integration process substantially and favorably impacts supply chain performance. In other words, when the integration process is effectively communicated from upstream to downstream, supply chain performance will also be optimal to reduce business partner dissatisfaction and cultivate cooperative relationships.

References

Abdallah, A. B., Obeidat, B. Y., & Aqqad, N. O. (2014). The impact of supply chain management practices on supply chain performance in Jordan: The moderating effect of competitive intensity. *International Business Research, 7*(3), 13-27. doi: http://dx.doi.org/10.5539/ibr.v7n3p13

Afriliyani, U., Sunarko, B., & Widuri, R. (2019). The Impact of Long Term Relationship, Process Integration, Cooperation On Supply Chain Management Performance And Competitive Advantage. *Journal of Research in Management, 2*(2), 1-6. Retrieved from https://garuda.kemdikbud.go.id/documents/detail/1335813

Agus, A. (2015). Supply Chain Management: The Influence of SCM on Production Performance and Product Quality. *Journal of Economics, Business and Management, 3*(11), 1046-1053. doi: https://doi.org/10.7763/JOEBM.2015.V3.332

Al-Tit, A. A. (2017). Factors affecting the organizational performance of manufacturing firms. *International Journal of Engineering Business Management, 9*, 1-9. doi: https://doi.org/10.1177/1847979017712628

Arifin, A. Z., Kevin, K., & Siswanto, H. P. (2017). The influence of financial knowledge, financial confidence, and income on financial behavior among the workforce in Jakarta. *MIX: Jurnal Ilmiah Manajemen, 7*(1), 154883. doi: https://dx.doi.org/10.22441/jurnal_mix

Barber, K. D., Garza-Reyes, J. A., Kumar, V., & Abdi, M. R. (2017). The effect of supply chain management practices on supply chain and manufacturing firms' performance. *Journal of manufacturing technology management, 28*(5), 577-609. doi: https://doi.org/10.1108/JMTM-11-2016-0154

Cahyaningratri, C., & Naylah, M. (2023). The effect of supply chain operational capabilities in consolidating organizational compatibility of supply chain process integration and business performance. *Uncertain Supply Chain Management, 11*(1), 95-102. doi: http://dx.doi.org/10.5267/j.uscm.2022.11.006

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In *Modern methods for business research* (pp. 295-336). Lawrence Erlbaum Associates Publishers. Retrieved from http://www.researchgate.net/publication/232569511

Cousineau, M., Lauer, T. W., & Peacock, E. (2004). Supplier source integration in a large manufacturing company. *Supply Chain Management: an international journal, 9*(1), 110-117. doi: https://doi.org/10.1108/13598540410517629

Danese, P., Molinaro, M., & Romano, P. (2020). Investigating fit in supply chain integration: A systematic literature review on context, practices, performance links. *Journal of Purchasing and Supply Management, 26*(5), 100634. doi: https://doi.org/10.1016/j.pursup.2020.100634

de Sousa Jabbour, A. B. L., de Oliveira Frascareli, F. C., & Jabbour, C. J. C. (2015). Green supply chain management and firms' performance: Understanding potential relationships and the role of green sourcing and some other green practices. *Resources, Conservation and Recycling, 104*, 366-374. doi: https://doi.org/10.1016/j.resconrec.2015.07.017

Deng, A., & Liu, Q. (2017). Supply Chain Relationship and Cooperation Performance: Literature Review and Research Direction. *World Journal of Innovative Research, 2*(1), 262548. Retrieved from https://www.wjir.org/download_data/WJIR0201009.pdf

Gebisa, D. A. (2023). The Impact of Information Sharing and Inventory Management Practices on Firms' Performance in Supply Chain Practices. *Gadjah Mada International Journal of Business, 25*(2), 199-225. doi: https://doi.org/10.22146/gamaijb.69616

Ghozali, I. (2014). *Alternative Structural Equation Modeling Method with Partial Least Squares (PLS)*. Semarang: Diponegoro University Publishing Agency.

Gunasekaran, A., Subramanian, N., & Rahman, S. (2017). Improving supply chain performance through management capabilities. *Production Planning & Control, 28*(6-8), 473-477. doi: https://doi.org/10.1080/09537287.2017.1309680

Harjadi, D. (2022). Implementation of Supply Chain Management to Improve the Performance of Cirebon Batik SMEs. *Journal of Contemporary Issues in Business and Government, 28*(1), 230-236. doi: https://doi.org/10.47750/cibg.2022.28.01.015

Hassan, A. Y., & Nasereddin, H. H. (2018). Information sharing characteristics in supply chain management. *EPH-International Journal of Business & Management Science, 4*(1), 1-6. doi: https://doi.org/10.53555/eijbms.v4i1.59

Hilmawati, R. S., Samsir, S., Daulay, I. N., & Siregar, P. A. (2023). The Effect of Information Sharing, Knowledge Sharing, and Social Capital on Business Performance Mediated by Innovation (Study on Small Food Industry in Pekanbaru City. *Indonesian Journal of Economics, Social, and Humanities, 5*(1), 65-84. doi: https://doi.org/10.31258/ijesh.5.1.65-84

Huda, M., Aminuddin, A., & Wusko, A. U. (2018). Pengaruh information sharing, long term relationship, cooperation, integration dalam supply chain management terhadap kinerja perusahaan (survei pada IKM pengolahan makanan di Kabupaten Pasuruan). *MALIA: Jurnal Ekonomi Islam, 10*(1), 147-162. doi: https://doi.org/10.35891/ml.v10i1.1258

Huo, B. (2012). The impact of supply chain integration on company performance: an organizational capability perspective. *Supply Chain Management: an international journal, 17*(6), 596-610. doi: https://doi.org/10.1108/13598541211269210

Ivanov, D. (2021). Digital Supply Chain Management and Technology to Enhance Resilience by Building and Using End-to-End Visibility During the COVID-19 Pandemic. In *Ieee Transactions on Engineering Management* (pp. 11-11). IEEE. doi: https://doi.org/10.1109/TEM.2021.3095193

Karuntu, M. M., Palandeng, I. D., & Rogi, M. (2021). Analysis of the Effect of Supply Chain Management on the Competitiveness of Coastal Fisherman Communities in North Minahasa District. *Archives of Business Research, 9*(2), 142-192. doi: https://doi.org/10.14738/abr.92.9683

Kembro, J., & Selviaridis, K. (2015). Exploring information sharing in the extended supply chain: an interdependence perspective. *Supply Chain Management: an international journal, 20*(4), 455-470. doi: https://doi.org/10.1108/SCM-07-2014-0252

Kodrat, K. F., Sinulingga, S., Napitupulu, H., & Hadiguna, R. A. (2019). Analysis of the Effect of Supply Chain on Small and Medium Enterprises Performance in Medan (Case study on Leather Shoes SMEs). *IOP Conference Series: Materials Science and Engineering, 505*(1), 012024. doi: https://doi.org/10.1088/1757-899X/505/1/012024

Lee, H. L., & Whang, S. (2000). Information sharing in a supply chain. *International journal of manufacturing technology and management, 1*(1), 79-93. doi: https://doi.org/10.1504/IJMTM.2000.001329

Mufadhol, M., Warsito, B., Wibowo, A., Mustafid, M., & Suryono, S. (2022). The Impact of Supply Chain Information System on The Digital Economics and logistics transportation. *IOP Conference Series: Earth and Environmental Science, 1083*(1), 012087. doi: https://doi.org/10.1088/1755-1315/1083/1/012087

Mukhsin, M. (2020). The effect of commitment mediation through the relationship betwen confidence and performance supply chain. *Sriwijaya International Journal of Dynamic Economics and Business, 3*(4), 329-340. doi: https://doi.org/10.29259/sijdeb.v3i4.329-340

Mukhsin, M. (2021). Cooperation and Information Sharing Increase Supply Chain Performance Broiler Egg Traders in Regency of Pandeglang Banten. *International Business and Accounting Research Journal, 5*(1), 73-81. doi: http://dx.doi.org/10.35474/ibarj.v5i1.161

Mukhsin, M., & Najmudin, N. (2020). Effect on the Performance of Supply Chain Integration. In *2nd International Seminar on Business, Economics, Social Science and Technology (ISBEST 2019)* (pp. 109-112). Atlantis Press. doi: https://doi.org/10.2991/aebmr.k.200522.022

Mukhsin, M., & Suryanto, T. (2022). The effect of sustainable supply chain management on company performance mediated by competitive advantage. *Sustainability, 14*(2), 818. doi: https://doi.org/10.3390/su14020818

Munir, M. M., & Dwiyanto, B. M. (2018). *Analysis of Factors Affecting Supply Chain Performance in Culinary Micro, Small and Medium Enterprises in Kendal Regency* (Doctoral dissertation, Faculty of Economics and Business). Retrieved from http://eprints.undip.ac.id/66127/1/13_MUNIR.pdf

Narasimhan, R., & Kim, S. W. (2002). Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms. *Journal of operations management, 20*(3), 303-323. doi: https://doi.org/10.1016/S0272-6963(02)00008-6

Prajogo, D., & Olhager, J. (2012). Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. *International Journal of Production Economics, 135*(1), 514-522. doi: https://doi.org/10.1016/j.ijpe.2011.09.001

Sapa, N., & Awaluddin, M. (2022). Effect of Non Performing Financing and Operating Expenses of Operating Income on Profitability of Islamic Commercial Banks. *Adpebi International Journal of Multidisciplinary Sciences, 1*(1), 455-463. doi: https://doi.org/10.54099/aijms.v1i1.291

Sinaga, J., Anggraeni, E., & Slamet, A. S. (2021). The effect of supply chain management practices and information and communication technology on competitive advantage and firm performance (Case study: Smes of processed food in Jakarta). *Indonesian Journal of Business and Entrepreneurship (IJBE), 7*(1), 91. doi: https://doi.org/10.17358/ijbe.7.1.91

Sukati, I., Hamid, A. B., Baharun, R., & Yusoff, R. M. (2012). The study of supply chain management strategy and practices on supply chain performance. *Procedia-Social and Behavioral Sciences, 40*, 225-233. doi: https://doi.org/10.1016/j.sbspro.2012.03.185

Tsinopoulos, C., & Mena, C. (2015). Supply chain integration configurations: process structure and product newness. *International journal of operations & production management, 35*(10), 1437-1459. doi: https://doi.org/10.1108/IJOPM-08-2013-0369

Tyagi, P., & Agarwal, G. (2014). Supply Chain Integration and Logistics Management among BRICS: A Literature Review. *American Journal of Engineering Research (AJER), 3*(5), 284-290. Retrieved from https://www.ajer.org/papers/v3(5)/ZI35284290.pdf

Wankmüller, C., & Reiner, G. (2020). Coordination, cooperation and collaboration in relief supply chain management. *Journal of Business Economics, 90*, 239-276. doi: https://doi.org/10.1007/s11573-019-00945-2

Zaroni, L. (2017). *Supply Chain Basic Concepts of Contemporary Logistics Practice*. Jakarta: Prasetya Mulya Publishing.

Zhao, X., Xie, J., & Zhang, W. (2002). The impact of information sharing and ordering co-ordination on supply chain performance. *Supply Chain Management: an international journal, 7*(1), 24-40. doi: https://doi.org/10.1108/13598540210414364

Zulfandi, N., & Sakir, A. (2021). The Effect of Corprorate Entrepreneurship and Organizational Culture On Supply Chain Management And Its Impact On The Operational Performance Of Logistic Companies In Banda Aceh. *International Journal of Business Management and Economic Review, 4*(4), 78-91. doi: http://doi.org/10.35409/IJBMER.2021.3284