Analysis of the Impact of Information Sharing, Long-Term Relationships, Cooperation, and Integration Processes on Supply Chain Performance

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Abstract: The research was conducted to investigate the impact of supply chain management, specifically information exchange, sustained connections, collaboration, and integration process, on supply chain performance in micro, small, and medium enterprise (MSME). Furthermore, it employed a quantitative associative method with a sample of 100 respondents from MSME producers and distributors of rice bran in Banten Province, Indonesia. Structural Equation Model (SEM) data analysis was carried out using SmartPLS 3.0.m3 software. The result showed that information exchange, long-term relationship, and collaboration had a positive and significant impact on supply chain performance.

Keywords: Information Sharing, Long-term Relationship, Cooperation, Process Integration, and Supply Chain Performance.

1. Introduction

To enhance the performance of the supply chain, it is essential to address consumer expectations regarding the delivery of items. This can be achieved by prioritizing factors such as product integrity, durability, and order response time, which have a considerable impact on customer satisfaction. Munir and Dwiyanto (2019) defined supply chain performance as the efficiency of process involving the transfer of commodities, information, and capital from suppliers to consumers. According to (Hasan, 2019), performance measurement is significant since the concept is used to assess supply chain performance based on profitability and supply chain systems. Furthermore, Zaroni, 2017) stated that efficient supply chain management can help businesses gain a competitive edge by reducing production and distribution costs, as well as improving the accuracy of product inventory.

According to (Karuntu, 2021), several elements, including information exchange, long-term partnerships, collaboration, and process integration, can affect performance of supply chain. (Test et al., n.d.) stated that information sharing represents the extent companies establish connections with their partners to exchange pertinent information regarding business strategies and facilitate the seamless transaction among participants in the supply chain. In addition, (Articles, 2021) explained that information exchange can also improve the responsiveness of supply chain process. This led to a more dynamic supply chain and lower storage costs for both raw materials and finished goods. (Gebisa, 2023) also reported that information sharing plays a crucial role in the functioning of supply chain. Information gathered from parties from members of supply chain can be examined for better decisions.

(Hilmawati, Daulay, & Siregar, 2023) explained that long-term relationship are a company's ability to establish long-term relationship through trust and interdependence with suppliers to enable benefits. The variables can improve supply chain performance in addition to information sharing. Long-term partnerships results in benefits and cooperative ties with one another, according to (Gebisa, 2023) argument. Additionally, (Mukhsin, 2020) stated that company's supply chain performance can be enhanced with long-lasting, mutually beneficial connection.

Cooperation plays a role in enhancing this variable in addition to long-term relationship aspects. According to (Deng & Liu, 2017), (Sukati, Bakar, Baharun, & Yusoff, 2012); (Danese, Molinaro, & Romano, 2020); (Al-Tit, 2017); (Sinaga, Anggraeni, & Slamet, 2021) working with suppliers leads to more reliable requirements and a better understanding of each party's needs to boost profitability. Furthermore, (Sapa & Awaluddin, 2022), asserted that collaboration is a process where multiple partners between providers work toward the same goal.

There are process integration aspects that boost the efficiency of supply chain (Reza, Mar, Ja, & Kumar, 2023), with suppliers integration serving as one of the key drivers of performance improvement (Ivanov, 2021). Suppliers integration is a component of supply chain integration, which can be characterized as a close, long-term cooperative relationship established between a company and its partners (Prajogo & Olhager, 2012). Meanwhile, suppliers who participate in supply chain integration share information about estimated demand, production, and supply levels. The greatest approach to establishing dependable performance is through suppliers integration used as a synonym for suppliers interaction, engagement, and collaboration (Ivanov, 2021).

MSME forms the largest business segment in the Indonesian economy and has shown its ability to withstand severe economic crisis shocks. Therefore, it is crucial to strengthen MSME that includes a variety of groups. In Indonesia, MSME constitutes a staggering 99.99% of all business entities and contributes to more than 60% of the Gross Domestic Product (GDP). The GDP comprises various economic sectors within MSME framework, encompassing construction (1.57%), mining and quarrying (0.53%), electricity, gas, and clean water (0.03%), as well as agriculture, livestock, forestry, and fisheries (48.85%), trade, hotels, and restaurants (28.83%), transportation and communication (6.88%), processing industry (6.41%), and services (4.52%).

MSME in the Indonesian economy assumes vital roles, such as the primary providers of employment opportunities, significant catalysts for local economic growth and community empowerment, facilitators of new market development, and sources of innovation.

Between 2014 and 2016, the number of MSME exceeded 57,900,000 units and was projected to surpass 59,000,000 units by 2017. During a global crisis, MSME with significant resilience, as emphasized by RI President Ir. Joko Widodo in 2016, has the potential to bolster the nation's economy. Currently, the

economies of both Indonesia and the ASEAN region heavily rely on MSME, with employment ranging from 51.7% to 97.2%, and accounting for 88.8% to 99.9% of business entities. The enterprises constitute 56.54 million units, representing 99.99% of all business actors. Therefore, fostering cooperation is imperative to promote the growth and resilience of MSME.

Over the past five years, the contribution of MSME to the GDP has increased from 57.84% to 60.34%, and labor absorption within this sector has risen from 96.99% to 97.22%. Despite these positive trends in the GDP formation and employment, enterprises face challenges in accessing global production supply chain. Indonesian MSME only account for 0.8% of the global supply chain, while Brunei, Laos, Myanmar, and Cambodia within ASEAN have a slightly greater impact. However, the sector's contribution of 2.7% to the global supply chain remains significant.

The huge number of MSME reflects the level of competition among players. For actors to have a successful strategy, the environment's level of uncertainty also needs to be considered. The primary strategy for MSME must also involve interactions with suppliers based on effective information sharing, long-term relationship, cooperation, and integration process to unquestionably prevent the issues of performance due to raw material constraints or a sudden price increase. Managers should also be aware of information gathering and analysis process in supporting supply chain performance (Gunasekaran, Subramanian, & Rahman, 2017). This research was conducted on MSME in the production and distribution of rice bran in Banten Province, Indonesia.

A graphical representation depicting the movement of raw materials from suppliers to the company is referred to as the flow of raw materials to Simple PD. In its capacity as processing enterprise, Simple PD acquires raw materials, specifically, MSME engaged in rice milling, who deliver them to prominent suppliers. Simple PD undertakes processing of these raw materials, after which the resulting products are transferred to major corporations such as PT Cargill Indonesia, PT Agrico International, PT Cheil Jedang Superfeed, PT Sierad Produce, PT. Bintang Jaya Proteina, and others. In practice, there exist hindrances to effective communication, the establishment of long-term partnerships, collaboration, and process integration between raw material suppliers and businesses, including delays in supply of raw materials and inaccuracies in fulfilling contractual obligations, among other issues.

Company performance serves as a high bar for producing good management, which is evident through successful performance. Customer satisfaction is the end outcome of an entire process from upstream to downstream activities forming performance measurement. Supply chain performance (SCM) is the design and management of the flow of goods, information, and cash (Mukhsin & Suryanto, 2022).

The success of top organizations is largely attributed to supply chain, which is the business sector with the quickest growth. Companies must compete in significantly different ways due to the current business climate. Furthermore, (Karuntu, 2021) asserted that supply chain management is the extension and

development of the concept and meaning of logistics, expanding in connection to the needs of customers and playing a role in controlling the movement of goods between businesses.

The Council of Supply Chain Professionals (CSCMP) defined supply chain as an activity that included planning and managing all sourcing, procurement, conversion, and logistics management activities. This includes coordinating and working with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers.

According to (Gebisa, 2023), supply chain performance for small and micro enterprises in Jepara is positively and significantly impacted by information exchange, long-term connections, collaboration, and integration procedures. (Hassan & Nasereddin, 2018) stated that performance of the sector is favorably and significantly impacted by information exchange, long-term connections, collaboration, and integration procedures. In contrast, (Sapa & Awaluddin, 2022) reported that information exchange, long-term connections, and integration procedures have a major positive impact on firm success. The findings on cooperation variable indicated that it has no appreciable impact. Performance of the sector is directly proportional to relationship.

2. Literature Review
2.1 Supply Chain Management

Supply chain management is the coordination and oversight of the purchasing function that is connected to suppliers and distributors. It involves the action of converting raw materials into semi-finished or finished commodities and then delivering products to clients through the distribution system. Merlyn Mourah Karuntu asserted that firms employing supply chain performance aim to boost competitiveness, manifesting in better operational performance. According to (Mukhsin, 2020), supply chain performance refers to the coordination of all supply chain activities, beginning with raw materials and ending with customer satisfaction.

Supply chain is a mechanism that a business uses to transfer products and services to its clients (Tyagi & Agarwal, 2020). The primary objective is to achieve the most efficient acquisition and distribution of items. Supply chain performance focuses on integrating and controlling the flow of goods, services, and information throughout supply chain to be responsive to client demands and minimize overall costs. (Articles, 2021) stated that each section is managed as a distinct (stand-alone) company with its own set of objectives. However, the combined efforts of every link define a company's capacity to compete in the global market. For supply chain to be effective, participants must work closely together, cooperate, and communicate to enhance the exchange of information between customers and suppliers. Furthermore, supply chain performance is characterized by the quick exchange of information between buyers, sellers, distributors, and producers.

In supply chain, all parties directly or indirectly involved in fulfilling a customer's request are included. This involves manufacturers, suppliers, transporters, warehouses, retailers, and customers. Every company, including manufacturers, incorporates the entire process of receiving and meeting client demands within its supply chain. This includes various functions such as new product creation, marketing, operations, distribution, finance, and customer support, among others (Agus, 2015).

2.2 Performance of Supply Chain Management

Performance is an accomplishment in carrying out an organization's tasks under its goals, vision, and mission. According to (Gebisa, 2023), the corporate capacity to establish customer-desired standards is gauged through various indicators, such as reduced production and maintenance expenses, enhanced product quality, decreased work-in-progress inventory, diminished material handling costs, and adherence to delivery schedules. All endeavors related to meeting client demands are evaluated quantitatively, serving as a measure of supply chain performance. The results of the company to fulfill client requests are expressed in numerical values or percentages.

The implementation of performance measurement system is imperative for monitoring, controlling, and effectively communicating organizational objectives to the various functions within supply chain. It facilitates a comprehensive understanding of the current standing concerning competitors and the desired goals to be attained. Moreover, it enables the identification of areas where improvements can be made, granting the organization a competitive edge (Mukhsin & Suryanto, 2022). Managing a successful supply chain entails a series of interconnected activities beyond mere purchasing and encompasses a holistic approach aimed at maximizing value. This approach involves integration of various activities, such as the strategic procurement of materials and services, the conversion of these inputs into semi-finished goods and final products, and the efficient delivery to customers. In addition to purchasing and outsourcing, other crucial functions are also involved, contributing to the overall relationship between suppliers and distributors. Effective management of these activities is vital for achieving supply chain success (Hassan & Nasereddin, 2018).

2.3 Information Sharing

Decisions within supply chain are dependent on sharing of information, emphasizing the need for timely, accurate, and high-quality data to be collected (Karuntu, 2021), while process are implemented based on information. (Mufadhol, Warsito, Wibowo, Mustafid, & Suryono, 2022) asserted that information needs to possess certain qualities to make valuable decisions, such as accessibility, accuracy, and precision. Accessibility ensures availability and usability when needed. Accuracy ensures that it reflects actual conditions and can be trusted. Precision means providing the right and appropriate information needed by the company. Sharing refers to the exchange of relevant information between businesses and their partners, particularly regarding strategies. This collaborative exchange enables alignment,

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coordination, and improved supply chain performance. The existence of information sharing, (Articles, 2021) can reduce industrial bottlenecks by enabling members to obtain, maintain, and communicate information required to ensure effective decision-making. In addition, the concept can strengthen the elements of collaboration as a whole. It also enables supply chain participants to obtain, maintain, and communicate information necessary to ensure effective decision-making (Karuntu, 2021). Information sharing has a favorable and considerable impact on supply chain performance (Abdallah, Obeidat, & Aqqad, 2014) Other research have discovered that the concept can improve performance of supply chain (Zhao, Xie, & Zhang, 2002); (Chin, Hamid, Raslic, & Heng, 2014); (de Sousa Jabbour, Frascareli, & Jabbour, 2015).

2.4 Long-Term Relationship

According to (Gebisa, 2023), long-term period is expected to last more than a year. Meanwhile, long-term partnership is defined by (Gebisa, 2023) as a perspective of the interdependence of buyers and suppliers in the context of both products or relationship anticipated to benefit buyers. According to (Hilmawati et al., 2023), long-term relationship, in the context of a firm's interaction with suppliers, refers to the ability of the company to establish enduring connections based on the belief that these connections will yield profitable outcomes (Longterm Relationship). (Gebisa, 2023) stated that long-term partnerships are necessary for both businesses and customers in the context of their respective products and relationship. This is because of the dependency relationship between them resulting in long-term benefits.

According to (Karuntu, 2021), the company's relationship with its suppliers is the context of a value or supply chain's strongest partnership. The duty of suppliers in this situation is to give the company the raw materials or inputs required. Performance affects the quality of the material and the company's capacity to engage in distribution. According to (Deng & Liu, 2017), managing long-term relationship with the ultimate objective of achieving company profitability, continuously attained through mutually beneficial relationship, is expected to create consistent and sustainable long-term relationship.

2.5 Cooperation

Cooperation is one of the finest options for implementing the best supply chain management. The rationale is that organizations or businesses involved in the network must have a reliable information system, fostering trust among members involved in the purchase of products and services. Lack of effective collaboration renders the achievement of such endeavors unattainable. Furthermore, when multiple entities engage in cooperative efforts to achieve mutually beneficial objectives, the situation is known as cooperation. (Wankmüller & Reiner, 2020) A desire to build relationship that will inspire dedication and trust is necessary for effective cooperation. To have a satisfactory long-term cooperative connection, suppliers and businesses need to understand the concept and maintenance of partnerships.

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Every business uses cooperative activity as its primary instrument to sustain and enhance results. (Articles, 2021) The successful collaboration between the two parties is crucial in attaining optimal performance. By employing measurable variables such as trust and fairness, which serve as primary determinants of cooperative relationship quality, it becomes feasible to quantify the level of relationship excellence. In addition, this relationship is viewed as a strategic asset and tool that fortifies the company's competitive prowess when a corporation genuinely believes in its partners and maintains a sincere approach. Consequently, engaging with reliable suppliers is expected to result in a comprehensive understanding of the needs and demands of both parties involved. According to (Huo, 2012), when there is no cooperation and integration among the many internal activities of the organization, it becomes difficult to work with supply chain participants. Meanwhile, internal integration improves performance (Narasimhan & Kim, 2002), and (Abdallah et al., 2014)

2.6 Process Integration

Organizations or businesses that are a part of supply chain performance network and the full procurement chain must accomplish integration. By providing goods, services, and information that add value for customers and other stakeholders, supply chain performance aims to integrate the company's primary business process from upstream, downstream, and users relationship (Tsinopoulos & Mena, 2015).

Integration can enhance relationship along each value chain, facilitate decision-making, enable value creation, and enable transfer process from suppliers to final customers to physically operate the flow of information, knowledge, equipment, and assets. Cousineau et al. in (Tsinopoulos & Mena, 2015) stated that the concept is an intricate process of collaboration between businesses, suppliers, and customers to boost operational efficiency and profits, as well as satisfy all parties. According to (Huo, 2012), when there is no cooperation and integration among the many internal activities, it becomes difficult to work with supply chain participants. Internal integration improves performance, according to research by (Narasimhan & Kim, 2002), and (Abdallah et al., 2014).

2.7 Hypothesis Development
2.7.1 Effect of Information Sharing on Supply Chain Performance

According to (Kembro & Selviaridis, 2015), sharing information is essential in increasing the responsiveness of supply chain process. It is also capable of making process more dynamic and reducing the cost associated with holding raw materials and finished goods. The ability to gather, keep, and communicate information required to support good decision-making is another benefit, which also serves to strengthen other aspects of collaboration. In addition, sharing knowledge can alleviate industrial bottlenecks (Huda et al. 2018). According to (Mufadhol et al., 2022), information sharing improves supply chain performance. Research from (Harjadi & Arraniri, 2022), (Gebisa,

2023), and (Hassan & Nasereddin, 2018) also confirmed similar results. Therefore, the following is the stated hypothesis in this research:
H1: Information sharing has a positive and significant effect on supply chain performance.

2.7.2 Effect of Long-term Relationship on Supply Chain Performance

Long-term relationship is defined by Indriani (Gebisa, 2023) as a corporation's capacity to develop long-term connections with suppliers. This is because the company views the partnerships as profitable. Lestari stated that in the context of a value or supply chain, relationship with its suppliers is the strongest form of collaboration. Suppliers provide goods or input materials that are used by the business. Furthermore, performance affects the quality of the material and the company's distribution capacity. In theory, achieving business profitability is the ultimate objective of managing long-term relationship.

This is attained by beneficial partnerships that result in the development of a stable, long-lasting relationship (Huda et al., 2018). According to (Sakir & Kuala, 2021), long-term connections have a favorable but negligible impact on supply chain effectiveness. Long-term partnerships improve performance of supply chain, (Hassan & Nasereddin, 2018). In addition, (Afriliyani, Sunarko, & Widuri, 2019) stated that sustained partnerships improve the effectiveness of supply chain.
H2: Long-term partnerships have a favorable and considerable impact on supply chain performance.

2.7.3 The Effect of Cooperation on Supply Chain Performance

(Gebisa, 2023) stated that the "collaboration between two companies bears resemblance to the union of two individuals," underscoring the significance of contemplating goals, beliefs, and identities, alongside a thorough understanding of business models. It is anticipated that working with dependable suppliers leads to a better understanding of the needs and expectations of each party. According to (Wankmüller & Reiner, 2020), cooperation is one of the finest factors for carrying out the best supply chain management.

The rationale is that organizations or businesses involved in the network must have a reliable information system, fostering trust among members in the purchase of products and services. This cannot be achieved without effective collaboration. The journal article titled "Cooperation and Information Sharing Increase Supply Chain Performance" (Articles, 2021) as well as the research conducted by Broiler Egg Traders in the Regency of Pandeglang, Banten, and the research conducted by (Gebisa, 2023) titled "Effects of Long-Term Relationship, Information Sharing, Trust, and Process Integration on Supply Chain Performance: Research in the Dipurbalingga Exhaust Industry" collectively demonstrate that cooperation exerts a noteworthy positive influence on performance of supply chain.

The findings showed that collaboration enhances supply chain performance. In contrast, (Sapa & Awaluddin, 2022) stated that information exchange, long-term connections, and integration procedures have a major positive impact on firm success.

H3: Cooperation has a positive and significant effect on supply chain performance.

2.7.4 Effect of Integration Process on Supply Chain Performance

According to (Tsinopoulos & Mena, 2015), there is an intricate process of collaboration between businesses, encompassing suppliers and customers, which has the potential to enhance operational efficiency, augment sales, and foster satisfaction among all parties involved. Cooperative integration process linked to end-users or customers within the realm of suppliers logistics activities, play a significant role. Parameters such as distribution, inventory, transportation, and material flow can be utilized to quantify this variable.

To remain competitive in the business landscape, the pattern of supply chain integration adopted by an organization reflects its operational focus. During integration process, the organization must make a crucial decision regarding the direction of its pattern (Tsinopoulos & Mena, 2015). Integration must be defined as cooperation, collaboration, information sharing, trust, partnership, compatibility, sharing risks and benefits, commitment to the same vision, dependability, and sharing of key process as a result of standardization during process (Harjadi & Arraniri, 2022).

Productivity needs to be raised in supply-chain management industry. According to (Cahyaningratri & Naylah, 2023), businesses require a good plan to stay afloat in the market and be prepared to take advantage of opportunities and dangers. Businesses must also comprehend and be aware of customer desires along with improving production and efficiency. According to (Harjadi & Arraniri, 2022), the importance of the roles played by suppliers, manufacturers, distributors, retailers, and customers in producing affordable, high-quality products quickly yielded a new idea known as supply chain management. From the description, the following hypothesis can be made:

H4: Process Integration has a positive effect on supply chain management performance.

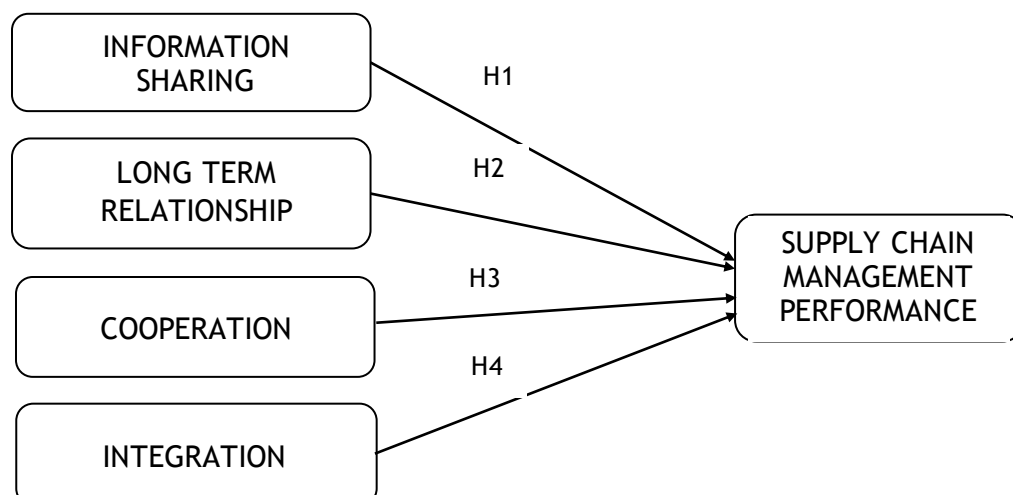### 2.8 Conceptual Frame

The framework used is as follows:

Figure 2. Conceptual Frames
Source: Processed Primary Data, 2023

3. Research Methods
3.1 Types of Research

This research was conducted by combining a quantitative technique with an associative method to ascertain the effects of independent variable (X) on dependent variable (Y). According to (Arifin, Kevin, & Siswanto, 2017), it employed a quantitative strategy in constructing hypotheses and propositions to discover new concepts, and. Subsequently, these concepts were tested against quantitative data to produce hypotheses.

3.2 Research Variables

The independent and dependent variables were both considered in the research. According to (Hassan & Nasereddin, 2018), independent variables contributed to changes in or the emergence of the dependent variable. The research employed a dependent variable (Y), along with four independent variables (X1, X2, and X3 X4).

In this instance, the X1, X2, X3, X4, and X5 variables were information sharing, long-term relationship, cooperation, integration process, and supply chain performance, measured by 3, 4, 3, 3, and 5 indicators, respectively.

3.3 Population and Sample

During process of conducting research, it is customary to thoroughly analyze data to draw meaningful conclusions that can yield significant outcomes. To retrieve this data, a population and sample must exist to make analysis process simpler. The population refers to a comprehensive assemblage of occasions, objects, or individuals who possess specific characteristics and are the primary focus of the inquiry, considered to belong to the same research universe (Mukhsin & Suryanto, 2022). The sample includes several population members that are subset of the population. This subset has been selected due to the inherent difficulty in examining every individual within the population. Consequently, it becomes necessary to establish a sample representing the population. The method employed involves the selection of a statistically representative sample from the population under research. The sheer number of individuals within the population typically renders it impractical to become participants. Meanwhile, simple random sampling was used to select 100 participants from the pool of UMKM producers and distributors of rice bran in Banten Province.

3.4 Data Analysis Methods

This research was conducted using descriptive statistical analysis techniques and PLS (Partial Least Square) analysis through SmartPLS 3.0.m3 software.
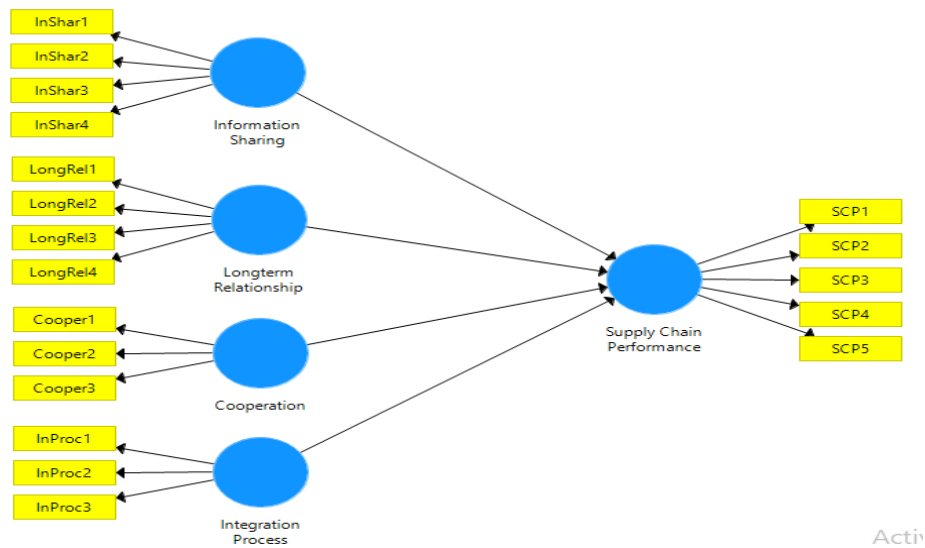

Figure 3. Research Model Path Diagram
Source: Primary data obtained by researchers, 2023

3.4.1 Hypothesis Testing

This method was based on a hypothesis test and utilizes an explanatory approach through PLS. With a minimum of 5000 bootstraps, the resampling approach was used to test the hypotheses. Furthermore, statistics and probabilities were obtained by running the SmartPLS bootstrap algorithm and were used to determine the acceptance of the proposed hypothesis. PLS did not use normality and data distribution to determine the t-statistic value in the test. Instead, a non-parametric test was employed to determine the significance level of the path coefficient where the t value results.

With the explanatory approach with the help of PLS, this method had a hypothesis test. Hypothesis testing (γ and λ) was carried out using the bootstrapping resampling method with a minimum number of 5000. PLS did not rely on normality assumptions or data distribution to calculate the t-statistic value in the test. It employed a non-parametric test to assess the significance level of the path coefficient. The t value obtained through the SmartPLS bootstrap algorithm was used to determine the acceptance or rejection of the proposed hypothesis based on statistics and probabilities.

3.4.2. Data Analysis and Hypothesis Testing

Data analysis was a model used to combine findings from comparisons, similarities, and differences in the analyzed data. This allowed the conclusions to be transformed into information used to address issues. Initially, the measurement model should be analyzed to confirm indicators and latent variables for further testing before conducting the hypothesis. The SmartPLS 3.0.m3 program, which comprised an Outer and Inner Model Test, was used for data analysis with reflecting indicators.

4. Test the Measurement Model (Outer Model)
4.1.1. Convergent Validity

There is a substantial and meaningful connection when the correlation value to be measured exceeds 0.70. According to (Arifin et al., 2017) for early-stage research, a loading value measurement of 0.5 to 0.6 was considered sufficient.
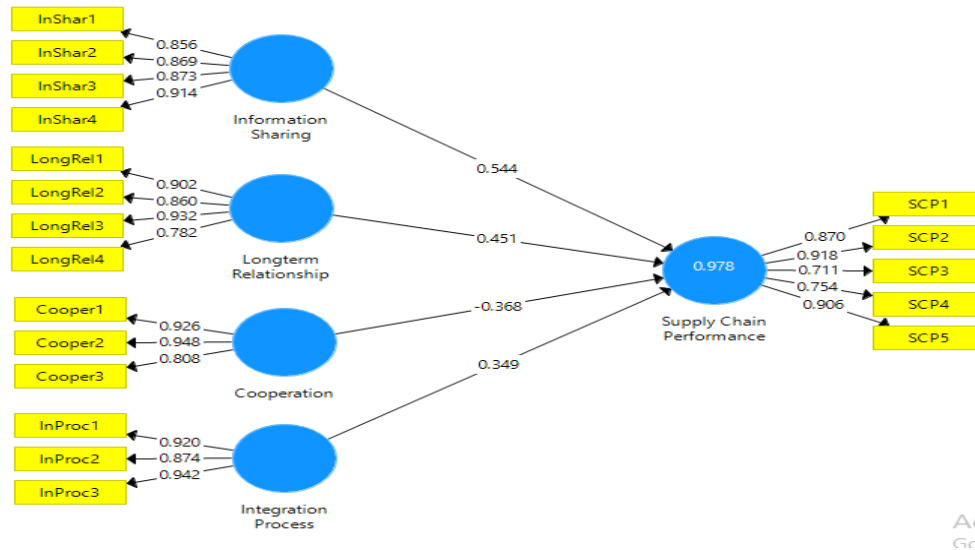

Figure 4: Measurement Model Output
Source: SmartPLS processed data 3.0.m3, 2023

Based on the outer loading, the results show that the indicators have a loading score >0.50. Therefore, there are no indicators to be removed from the model. The following is the result of the outer loading score table below.

Table 1: Outer Loading Score

Matrix	Cooperation	Information Sharing	Integration Process	Longterm Relationship	Supply Chain Performance
Cooper	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

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SCP2					0.918
SCP3					0.711
SCP4					0.754
SCP5					0.906

Source: SmartPLS processed data 3.0.m3, 2023

The latent variables, including Cooperation, integration process, information exchange, and long-term relationship account for more than 70% of each indication based on Figure 3 and Table 1. Similarly, supply chain performance endogenous variables have a percentage value higher than 70% in each indication.

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

Since all factor loading results indicated a value of >0.50, there were no issues with the convergent validity model. The findings showed that they fulfilled convergent validity after removing the indicators.

4.1.2. Composite Reliability

The reliability of each indicator in the model was represented by the composite reliability value with a base number of 0.70. Cronbach Alpha also strengthened the dependability test with a minimum value of 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

Table 3 inferred that each construct had a strong reliability value since the composite reliability was above 0.70. Therefore, the four measurement models produced accurate results and each indicator accurately measured the latent variables.

Table 4: Cronbach Alpha Values

Construct	Cronbach's Alpha
Information Sharing	0.899
Longterm Relationship	0.891
Cooperation	0.877
Integration Process	0.901
Supply Chain Performance	0.888

Source: SmartPLS processed data. 3.0.m3, 2023

The constructions have adequate reliability, as shown by Cronbach's alpha value of the block that measures construct indicators above 0.70. Therefore, the measurement model's composite dependability was good, trustworthy, and reliable.

4.1.3. Structural Model Test (Inner Model)

A goodness-of-fit model test known as the R-square value was used to evaluate the structural model. The model of the impact of external variables on endogenous variables had an effect of 0.67 (high), 0.33 (moderate), and 0.19 (weak) (Chin, 1998 in Ghozali, 2014).

Table 5: R-square Values

Construct	R-square values
Supply Chain Performance	0.978

Source: SmartPLS processed data 3.0.m3, 2023

According to Table 5, the findings regarding the impact of cooperation, long-term relationship, and information sharing on supply chain performance result in an R-Squere value of 0.978. Therefore, four independent variables of cooperation, integration process, information sharing, and long-term relationship account for 97.8% (nearly high effect) of the variance in the endogenous variable of supply chain performance, while the remaining 2.2% is explained by other factors.

4.1.4. Hypothesis Test

To calculate the significance level of the association in SmartPLS, hypothesis testing was conducted on the 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 level of significance, and the path coefficient describes the nature of relationship between constructs. This can be interpreted with an f-square value of 0.02 (weak), 0.15 (moderate), or 0.35 (high) based on the structural level of the data. (Arifin et al., 2017).
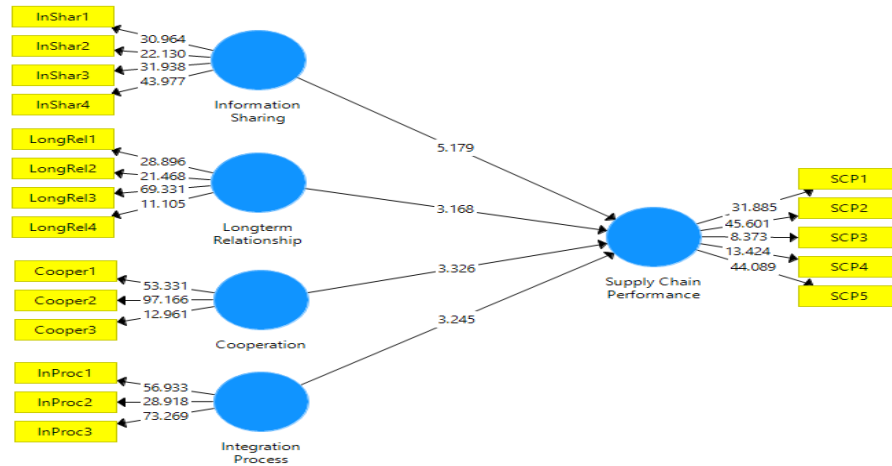

Figure 5: Results of Hypothesis Testing
Source: SmartPLS processed data 3.0.m3, 2023

The t-statistical values of the exogenous variables on the endogenous in the path coefficient table can be used to determine and evaluate the relevance of structural model testing.

Table 6. 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 result of hypothesis testing is stated as follows:
1. The first hypothesis (H1), where information sharing has a considerable impact on supply chain performance, is accepted. This is

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shown by a t-statistic value bigger than the t-table, specifically 5.179>2.00.

2. The second hypothesis (H2), where there is a significant influence of long-term relationship on supply chain performance, is accepted. This is shown by a t-statistic higher than the t-table, specifically with a value of 3.168>2.00. It has a path coefficient of (0.451) and a p-value of (0.002 0.05).
3. The third hypothesis (H3), that collaboration has a considerable impact on supply chain performance, is accepted. This is supported by a t-statistic higher than the t-table, specifically by a value of 3.326>2.00.
4. The fourth hypothesis (H4), where there is a significant impact of integration process on supply chain performance, is accepted. This is supported by a t-statistic value greater than the t-table, specifically by a value of 3.245>2.00.

Table 7. Summary of the Results of Hypothesis Testing

	Hipotesis	Hasil	Explanation
Hypothesis 1	Sharing information has a positive effect on supply chain	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	Accepted	Positive influence and significant
Hypothesis 4	Integration process has a positive effect on supply chain	Accepted	Positive influence and significant

Source: SmartPLS processed data 3.0.m3, 2023

4.2 Discussion
4.2.1 Effect of Information Sharing on Supply Chain Performance

The findings showed that information sharing had a favorable and significant impact on supply chain performance in the production and distribution of rice bran business actors with a path coefficient value (0.544) and a p-value (0.000 0.05). This was supported by a t-statistic higher than t-table, specifically with a value of 5.371>2.00 and enhanced by an F-square of 0.283, indicating the impact of information sharing. Therefore, the initial hypothesis (H1) was deemed to be accepted. The findings were consistent with (Mufadhol et al., 2022), where information sharing enhanced supply chain effectiveness. Additionally, (Hassan & Nasereddin, 2018), (Harjadi & Arraniri, 2022), and (Gebisa, 2023) confirmed that information sharing improved supply chain effectiveness.

The research implied that 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, also resulted in a successful supply chain.

4.2.2 Effect of Long-term Relationship on Supply Chain Performance

Information sharing has a positive and insignificant impact on supply chain performance of MSME actors in the production and distribution of rice bran business actors with path coefficients of (0.451), p-values (0.002>0.05), and t-statistic values less than t-table (1.845 2.00). Therefore, the f-squere's influence at the structural level had a mild effect of 0.152, and the second hypothesis (H2) was correct. The findings were consistent with earlier research by (Sakir & Kuala, 2021), and (Harjadi & Arraniri, 2022) where performance of supply chain was positively and significantly impacted by long-term connections.

Strong long-term relationship characterized by a high degree of commitment and trust produced supply chain with good functioning. Based on the findings, MSME actors engaged in the production and distribution of rice bran should evaluate relationship between trust and commitment. Long-term relationship was fulfilled when the trust and commitment were carried out successfully.

4.2.3 The Effect of Cooperation on Supply Chain Performance

Cooperation had a positive but not significant effect on supply chain performance of MSME actors in the production and distribution of rice bran when the path coefficients value was (0.368), and the t-statistic value was less than the t-table (3.326 2.00), with a p-value of (0.001>0.05). The third hypothesis (H3) was adopted when influence of the f-square on the structural level had an effect of 0.207 (moderate) (Articles, 2021), and (Harjadi & Arraniri, 2022). The results showed a good and significant effect, where supply chain performance was directly proportional to cooperation between participants. This was used to evaluate cooperative relationship with MSME players in the manufacturing and distribution of rice bran. The fulfillment of cooperation grounded in objective conditions, with the establishment of enduring partnerships, was satisfactory in cultivating supply chain performance.

4.2.4 The Effect of Integration Process on Supply Chain Performance

The findings of this investigation supported (Mukhsin & Najmudin, 2020), and (Tsinopoulos & Mena, 2015), and showed a positive and considerable impact. Supply chain operated more with increased cooperation among individuals. The results should be used by the manufacturers and distributors of rice bran to assess their cooperative connections with MSME companies. Sustainable relationship and cooperation based on objective criteria were met to improve supply chain performance and enable accurate sales planning and forecasting.

Furthermore, the results showed a favorable and significant effect, where performance of supply chain was directly proportional to suppliers integration. The providers of MSME actors in the production and distribution of rice bran should evaluate MSME actors to provide supply chain performance capable of supporting accurate sales planning and forecasting.

5. Conclusion

In conclusion, different methods were covered for analyzing the effects of collaboration, long-term relationship, sharing of information, and process integration on supply chain performance. The results of this research, which employed SEM testing using the SmartPLS test program, were as follows:

1. The second hypothesis was valid since the examination of influence of information sharing on supply chain performance showed that information sharing exerts beneficial effects on the variable. The findings were consistent with (Hassan & Nasereddin, 2018) and (Harjadi & Arraniri, 2022), where information sharing improves supply chain performance in a favorable and significant way. Therefore, when information sharing was appropriately communicated from upstream to downstream, supply chain performance reduced business partner disappointment and fostered positive cooperative relationship.

2. The second hypothesis was accepted as a result of long-term relationship test on supply chain performance. Therefore, long-term relationship had a positive and significant impact on supply chain performance. The findings were consistent with (Sapa & Awaluddin, 2022), where long-term relationship had a positive and significant impact on the variable. (Gebisa, 2023) also found that long-term relationship had a positive and significant impact on the variable.

3. The test of cooperation on supply chain performance showed that cooperation had a positive and significant impact on performance of chain. This was consistent with (Articles, 2021), and (Harjadi & Arraniri, 2022), where cooperation had a positive and significant impact.

4. The fourth hypothesis was accepted as a consequence of integration process test on supply chain performance. The results showed that integration process had a positive and significant impact on the variable in line with Moh. According to (Mukhsin & Najmudin, 2020) and (Gebisa, 2023), integration process significantly and favorably affected supply chain performance. Furthermore, when integration process was effectively communicated from upstream to downstream, supply chain performance was operated to reduce business partner disappointment and foster positive cooperative relationship.