

THE EFFECT OF SUPPLY CHAIN INTEGRATION, AGILITY, SUSTAINABILITY ON SUPPLY CHAIN PERFORMANCE MEDIATED BY SUPPLY CHAIN ROBUSTNESS AND RESILIENCE IN LOGISTICS COMPANIES IN JAVA ISLAND



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Abstract

Java Island contributes 57.05% to the Indonesian economy, with the logistics sector as one of the main contributors (13.96%) through transportation and warehousing. However, this sector faces challenges in the form of high logistics costs. Logistics performance, as measured by the Logistics Performance Index (LPI), shows a downward trend in Indonesia. This study aims to analyze the influence of integration, agility, robustness, resilience, and sustainability supply chain on supply chain performance. Using a hypothesis testing approach with Structural Equation Modeling (SEM) through the AMOS program, primary data were collected from 289 logistics sector employees in Java Island using the technique of purposive sampling. The results of the study show a positive influence of supply chain integration on agility, resilience, resilience, and sustainability. Agility affects supply chain resilience and performance, while resilience also affects supply chain performance. However, there was no positive influence of resilience on resilience, resilience on performance, or integration on performance through resilience. Sustainability has the strongest influence on supply chain performance (0.834) compared to other factors. This study is limited to the logistics industry in Java Island, and it is recommended that similar studies be conducted in other sectors or regions to broaden insights. This study contributes to the supply chain literature and provides practical implications for logistics companies.

Keywords: Supply Chain Integration, Agility, Robustness, Resilience, Sustainability, Supply Chain Performance, Logistics

INTRODUCTION

Logistics is a strategic part of the supply chain that involves managing raw materials, finished goods, and information to meet customer needs efficiently (Christopher, 2015). Logistics efficiency means accurate order fulfillment, on-time delivery, and minimal costs (Jonker & Alexandra, 2023). Logistics plays a vital role in supporting global business and the movement of goods, helping to reduce costs and improve operational efficiency.

In Indonesia, logistics costs are still high, reaching 14.29% of GDP in 2024, far above the average of developed countries of 8% (Tohir, 2024; Susiwijono, 2023). The target is to reduce this cost to 8% by 2045. Logistics performance is measured using the Logistics Performance Index (LPI) issued by the World Bank, taking into account aspects of infrastructure, logistics services, regulations, and business process efficiency (Setiawan, nd). Reducing logistics costs remains a major challenge for Indonesia to increase global competitiveness. This index aims to provide an overview of logistics efficiency and a country's ability to manage the flow of goods, both for domestic and international needs.

The index is compiled based on 6 assessment components, including input groups consisting of customs, infrastructure, and international shipments, and outcomes groups consisting of logistic competence & quality, tracking & tracing, and timeliness. The LPI can also be a benchmark used to help countries identify the challenges and opportunities they face and what can be done to improve logistics performance. In Indonesia, when measured based on the LPI value, logistics performance is declining (Hoirunnisa, 2023).

Based on the LPI components that have decreased, one of which is the tracking & tracing component, it is necessary to focus on the availability of tracking systems, the level of information accuracy, and the speed of access to tracking data. Through supply chain integration, which is a supply chain process by integrates several aspects within the company, such as internal company integration, supplier integration, and customer integration (Huo et al., 2016). Facilitate coordination in identifying problems, managing risks, and making quick decisions to improve relationships within the company as well as the company's relationships with customers and suppliers to produce accurate information (Vina, 2024; Duong and An, 2021).

Table 1.
LPI Value Components

Component	LPI 2018	LPI 2023
Customs	2.67	2.80
Infrastructure	2.90	2.90
Logistic Competence & Quality	3.10	2.90
International Shipments	3.23	3.00
Tracking & Tracing	3.30	3.00
Timeliness	3.67	3.30

Source: World Bank, 2023.

Based on the LPI value components, in Table 1, improving logistics performance, one of which needs to be focused on the logistics competence & quality component, which means it is necessary to focus on improving indicators such as customer satisfaction, workforce skills, innovation, and cost efficiency. The ability to dynamically align each party involved, the network, and operations to meet varying customer needs requires supply chain agility (Kalkan and Ayd., 2020). Supply chain agility supports the supply chain's ability to respond quickly to changes to adapt to disruptions, market changes, customer desires, improve competitiveness with similar products, and so on (Zhou et al., 2021; Timmermans, 2023). Customer satisfaction and strategic position are the main goals of Supply Chain Agility to realize competitive Supply Chain Performance (Mustafid et al., 2018).

As an effort to reduce the negative impact of the supply chain on economic, environmental, and societal changes, therefore, not only economic benefits, companies must have social, economic, and environmental responsibilities (Elkington, 1998; Zhu et al., 2022; Hidayat, 2024). Supply Chain Sustainability is a supply chain practice that focuses on the process of managing environmentally friendly, sustainable and transparent supply chain operations that have an impact on society, employment, human rights and the economy to achieve the social, environmental and economic goals of an organization to improve the long-term economic performance of the company and its supply chain (David et al., (2018); Ali et al., 2024; Kusumastuti et al, 2021). Business actors must have the ability to address social, environmental and economic issues that can arise from supply chain operations and a sustainable supply chain policy is needed because it has the potential to have a positive impact on the company's supply chain performance (Chowdhury and Quaddus, 2021;

Ibrahim et al., 2022). The implementation of an effective logistics strategy can help companies improve supply chain performance to gain a competitive advantage (Jonker and Alexandra, 2023). Supply chain sustainability, as well as innovation in the company's business and operational processes, is expected to have an impact on company performance.

Therefore, it is important to examine aspects in the supply chain that are expected to improve supply chain performance in logistics companies. The challenges facing economic globalization, especially in the logistics sector, need to be a matter of concern to create a competitive long-term business to help economic growth and sustainable supply chain performance in Indonesia (Amriyah et al, 2024).

Based on the above explanation, this study was conducted to examine and identify various contexts in the supply chain such as Integration, Agility, Robustness, Resilience and Sustainability, to produce information on which context in the supply chain is most influential to be applied in supply chain literature, especially in the logistics sector as a research analysis study that needs to be studied to improve Supply Chain performance. It is important to examine how each aspect of the supply chain influences supply chain performance in maintaining and increasing Indonesia's economic growth. Based on economic growth data in Indonesia, this study was conducted in the logistics sector, especially in Java. Sectors engaged in logistics service providers include those with activities: Operation Logistics and Supply Chain (Warehousing, Distribution Center, and Transportation), Freight Forwarding Company, and/or Shipping (Shipping Line).

Employees working in companies engaged in logistics service providers were selected as samples in this study. The development of updates in this study is by adding integration, robustness, and sustainability variables based on the main research article by Ali et al. (2024), which is further supported to be developed with several scientific works from Hsieh et al. (2023), Dong et al. (2023), Cherian et al. (2022), Zhu et al. (2022), Hendijani and Norouzi (2022), Zhuo et al. (2020), and other supporting articles.

REVIEW OF LITERATURE

Supply Chain Integration

Supply Chain Integration is the management of various activities to connect sustainable business processes, control costs, and supply chains can function better to achieve superior Supply Chain Performance. Supply Chain Integration with suppliers is the most important strategy in achieving reliable performance (Jafari, 2021).

Supply Chain Agility

Dubey et al. (2018) define Supply Chain Agility as the ability of the supply chain to respond to volatile market changes by adjusting operations and strategies to take advantage of opportunities and prevent or mitigate threats. Supply Chain Agility is the ability of a company to adapt and respond quickly to environmental uncertainty and unexpected market changes. Supply Chain Agility maintains competitiveness through flexibility and responsiveness (Dubey et al., 2018).

Supply Chain Robustness

According to Sidhuja et al. (2020), Supply Chain Robustness is the ability of the supply chain to overcome disruptions and repairs and manage risks so that the supply chain operates normally, both internally and externally. Supply Chain Robustness is defined as the ability of the supply chain to continue functioning despite internal or external disruptions (Kitano, 2004; Zhuo et al., 2020).

Supply Chain Resilience

Supply Chain Resilience is defined as the ability of a system to absorb change (Bahrami et al., 2022). Supply Chain Resilience refers to the capability of a supply chain as a process of continuing normal operations for a sufficient time after a disruption occurs. Supply Chain Resilience is a multidimensional concept as a domain to be analyzed from various perspectives.

Supply Chain Sustainability

According to David et al., (2018), Supply Chain Sustainability is defined as a strategic and transparent integration to achieve the social, environmental and economic goals of an organization to improve long-term economic performance in each department of the

company based on supporting aspects, namely risk management, transparency, culture, and organizational strategy.

Supply Chain Performance

Dubey et al. (2018) define Supply Chain Performance as the process of measuring the level of efficiency and effectiveness of an activity/strategy implemented by the industry to measure Supply Chain Performance to create value and gain a competitive advantage. Meanwhile, Ramezankhani et al. (2018) define Supply Chain Performance as the center of an organization to gain and maintain a competitive advantage.

RESEARCH METHOD

The method used in this study is quantitative descriptive analysis. The method used is a cross-sectional data method. Data collection is carried out using a cross-sectional time dimension because the data is collected from different respondents in one time period, and the variables are measured and observed at the same time (one point in time). The type of cross-sectional data in this study was obtained from primary data sources. In this study, a Likert scale was used to make measurements. According to Sugiyono (2016), the definition of a Likert scale is a scale that measures attitudes, opinions, and perceptions of a person or group towards an event.

RESULTS AND DISCUSSION

Structural Model Goodness of Fit Test

The goodness of fit model test is used to assess the suitability of the research model (Jr et al., 2018). Hair et al. (2019) argue that if there is at least one goodness of fit criterion that is met, the research model can be declared feasible or passes the goodness of fit test. Thus, the research model can be declared feasible to continue to the next test, namely the hypothesis test. The results of testing with a structural model using SEM data processing with AMOS software are displayed as follows:

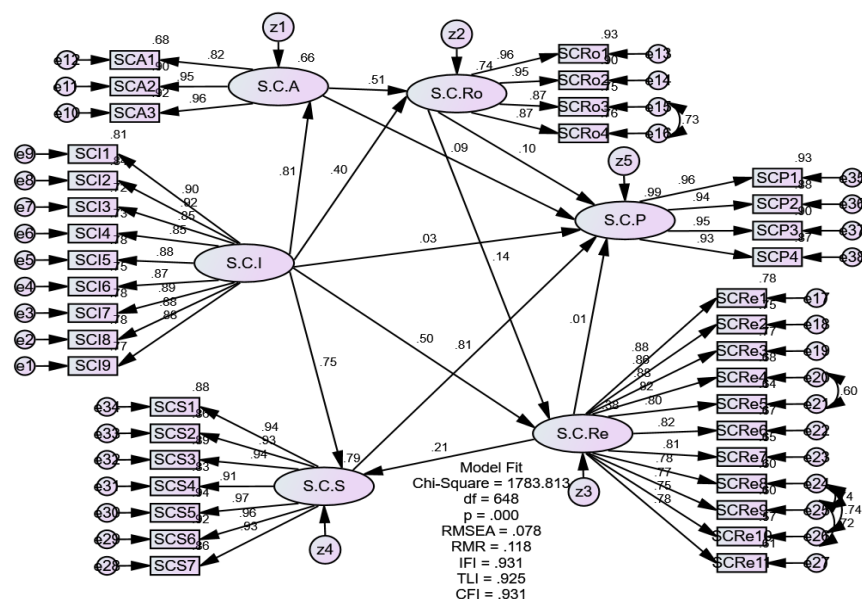


Figure 1.

Goodness of Fit Model

Source: AMOS version 25

Model fit testing for the SEM-AMOS model with processing results is shown in the table below and explained as follows:

Table 2.

Goodness of Fit Model Test Results

Types of Measurement	Goodness of Fit Index	Model Fit Decision	Yield Value	Conclusion
Absolute Fit Measure	Chi-Square	Low Chi Square	1783.813	Poor Fit
	p-value	≥ 0.05	0.000	Poor Fit
	RSMEA	≤ 0.08	0.078	Fit model
Incremental Fit Measurer	GFI	≥ 0.90	0.756	Poor Fit
	NFI	≥ 0.90	0.896	Marginal fit
	IFI	≥ 0.90	0.931	Fit model
	TLI	≥ 0.90	0.925	Fit model
	CFI	≥ 0.90	0.931	Fit model
Parsimonious Fit Measures	CMIN/DF	Between 1 up to 5	2,573	Fit model

Source: AMOS Output Version 25

From Table 2 above, it can be seen that the analysis results show that there are four criteria for the Poor Fit model, namely Chi-Square, p-value, and GFI. One criterion produces a Marginal fit, namely NFI. While five criteria produce a good fit model, namely, RSMEA,

IFI, TLI, CFI, and CMIN/DF. Based on the results of the goodness of fit test, it can be concluded that the model used in this study is feasible and acceptable for research. Furthermore, hypothesis testing can be continued because it has met the requirements for the model feasibility test, and the model is declared goodness of fit.

Hypothesis Testing

The use of the Structural Equation Modeling (SEM) method to see changes in dependent variables related to changes in independent variables (Sekaran and Bouqie, 2018). The error limit tolerance used is p-value (Sig) with a confidence level of 95%, with the following decision-making basis:

1. P-value < 0.05. This means that there is a significant influence, and the hypothesis conclusion is supported.
2. P-value > 0.05. This means that there is no significant influence, and the hypothesis conclusion is not supported.

Hypothesis Test Results (Direct Effect)

Table 3.
Direct Effect Hypothesis Test Results

Hypothesis	Abbreviation	Path	Estimate	P	Conclusion
Hypothesis 1	SCI → SCA	Supply Chain Integration has a positive effect on Supply Chain Agility	0.687	0.000	Supported
Hypothesis 2	SCI → SCRo	Supply Chain Integration has a positive effect on Supply Chain Robustness	0.375	0.000	Supported
Hypothesis 3	SCI → SCRe	Supply Chain Agility has a positive effect on Supply Chain Resilience	0.452	0.000	Supported
Hypothesis 4	SCI → SCS	Supply Chain Integration has a positive impact on Supply Chain Sustainability	0.836	0.000	Supported
Hypothesis 5	SCRe → SCS	Supply Chain Resilience has a positive impact on Supply Chain Sustainability	0.256	0.000	Supported

Hypothesis	Abbreviation	Path	Estimate	P	Conclusion
Hypothesis 6	SCRo → SCRe	Supply Chain Robustness has a positive effect on Supply Chain Resilience	0.132	0.127	Not supported
Hypothesis 7	SCA → SCRo	Supply Chain Agility has a positive effect on Supply Chain Robustness	0.569	0.000	Supported
Hypothesis 8	SCA → SCP	Supply Chain Agility has a positive effect on Supply Chain Performance	0.122	0.002	Supported
Hypothesis 9	SCRo → SCP	Supply Chain Robustness has a positive effect on Supply Chain Performance	0.124	0.000	Supported
Hypothesis 10	SCRe → SCP	Supply Chain Resilience has a positive effect on Supply Chain Performance.	0.016	0.497	Not supported
Hypothesis 11	SCS → SCP	Supply Chain Sustainability has a positive effect on Supply Chain Performance	0.834	0.000	Supported
Hypothesis 12	SCI → SCP	Supply Chain Integration has a positive effect on Supply Chain Performance	0.035	0.417	Not supported

Hypothesis Test Results (Indirect Effect)

The results of the indirect effect hypothesis testing using the SEM method. The results of the hypothesis test can be seen in the following table:

Table 4.
Indirect Effect Hypothesis Test Results

Hypothesis	Abbreviation	Path	Estimate	P	Conclusion
Hypothesis 13	SCI → SCRo → SCP	Supply Chain Integration influences Supply Chain Performance mediated by Supply Chain Robustness	0.047	0.002	Supported

Hypothesis 14	SCI → SCRe → SCP	Supply Chain Integration influences Supply Chain Performance mediated by Supply Chain Resilience	0.007	0.490	Not supported
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The results of the Direct Effect Hypothesis Test in Table 34 show that out of 2 (two) hypotheses, 1 (one) hypothesis is supported because it has a P Value ≤ 0.05 . Meanwhile, there is 1 (one) hypothesis that is not supported because it has a P value ≥ 0.05 .

Discussion of Hypothesis Test Results

Hypothesis 1

Hypothesis 1: There is a positive influence of Supply Chain Integration on Supply Chain Agility

The results of hypothesis test 1 show that the coefficient value (estimate) = 0.687 has a positive value, meaning that there is a positive influence of Supply Chain Integration on Supply Chain Agility with a p-Value = 0.000 < 0.05 , where the strong influence value is 0.687. These results indicate that the hypothesis is supported and there is a positive influence of Supply Chain Integration on Supply Chain Agility.

The results of this study indicate that a well-integrated information system, inter-departmental teamwork in solving problems, supports the improvement of the company's ability in the process of delivering goods/customer orders quickly during disruptions. These findings illustrate that the important role of Supply Chain Integration can improve a well-integrated supply chain system, produce faster responses, be able to identify unexpected risk disruptions, and increase supply chain agility, which has an impact on increasing Supply Chain Performance. The company also uses inter-departmental teams to solve problems, so that the company can meet the growing needs of customers and can respond to changes quickly with good integration between the internal and external of the Company.

Hypothesis 2

Hypothesis 2: There is a positive influence of Supply Chain Integration on Supply Chain Robustness

The results of the hypothesis 2 test show that the coefficient value (estimate) = 0.375 has a positive value, meaning that there is a positive influence of Supply Chain Integration

on Supply Chain Robustness with a p-Value = 0.000 < 0.05, where the influence value is 0.375. These results indicate that the hypothesis is supported, and there is a positive influence of Supply Chain Integration on Supply Chain Robustness, the influence is weak.

These results indicate that the Company's ability to avoid or minimize the occurrence of risks is still not optimal and needs to be improved. Risks can be predicted, one of which is by utilizing inter-departmental functions to build strong relationships with direct customers and collaborating with suppliers. Customers need to provide feedback to the company regarding customer expectations so that the company can avoid risks, and customers become actively involved in the process of developing new products/services.

Hypothesis 3

Hypothesis test 3: There is a positive influence of supply chain integration on supply chain resilience.

The results of hypothesis test 3 show that the coefficient value (estimate) = 0.452 has a positive value, meaning that there is a positive influence of Supply Chain Integration on Supply Chain Resilience with a p-Value = 0.000 < 0.05, where the influence value is 0.452. These results indicate that the hypothesis is supported and there is a positive influence of Supply Chain Integration on Supply Chain Resilience, the influence is moderate.

Increasing Supply Chain Integration increases Supply Chain Resilience. The results of this study indicate that a well-integrated information system, openness between departments in solving problems, and cooperation with suppliers in planning and decision making, so that the Company creates strategic goals through collaboration with supply chain partners for common goals. Integration between departments and collaboration with supply chain partners will increase the company's ability to meet customer needs. So that the Company has two or more sources of supply, it helps the company to produce various products and services to meet customer needs, to increase mutual benefits sustainably.

Hypothesis 4

Hypothesis test 4: There is a positive influence of Supply Chain Integration on Supply Chain Sustainability

The results of the hypothesis 4 test show that the coefficient value (estimate) = 0.836 has a positive value, meaning that there is a positive influence of Supply Chain Integration

on Supply Chain Sustainability with a $p\text{-Value} = 0.000 < 0.05$, where the influence value is 0.836. These results indicate that the hypothesis is supported and there is a positive influence of Supply Chain Integration on Supply Chain Sustainability, a strong influence.

Based on the results of this study, it is indicated that increasing Supply Chain Integration improves Supply Chain Sustainability, especially in the most important aspects, namely a well-integrated information system, cooperation between departments in solving problems, good strategic partnerships with suppliers supporting cooperation in identifying social and environmental problems, as well as increasing the provision of technical assistance and financial assistance in solving social and environmental problems.

Hypothesis 5

Hypothesis test 5: There is a positive influence of supply chain resilience on supply chain sustainability.

The results of hypothesis 5 testing show that the coefficient value (estimate) = 0.256 has a positive value with $p\text{-Values} = 0.000 < 0.05$, where the influence value is 0.256. The results of data processing show that there is a positive influence of Supply Chain Resilience on Supply Chain Sustainability. So it can be concluded that the hypothesis is supported by a weak influence.

Based on the results of this study indicates that Supply Chain Resilience has a positive influence on Supply Chain Sustainability Weak influence on direct relationships. This can happen because, in terms of changing capacity and order delivery deadlines as a reaction to minimize disruptions, it is not easy for companies to do so without having an impact on reducing energy use, and company operations are still limited to replacing raw materials with environmentally friendly ones. But it has an effect even though its influence is weak because supply chain resilience in supply chain operations increases cooperation, which increases supplier involvement, which ultimately leads to long-term sustainability. The weak influence on direct relationships may be able to be increased by utilizing technology to support both, such as energy-efficient disruption prediction systems or green logistics.

Hypothesis 6

Hypothesis test 6: There is a positive influence of supply chain robustness on supply chain resilience.

The results of hypothesis 6 testing show a coefficient value (estimate) = 0.132 with a p-value of $0.127 > 0.05$. The results of data processing indicate that there is no effect of supply chain robustness on supply chain resilience. From these results, it is concluded that the hypothesis is not supported.

The results of the study indicate that supply chain robustness is not a factor that can increase supply chain resilience. This can happen because the company's logistics network capability has not been able to avoid or minimize the risk completely, the company's logistics network capability has not been effective when there are internal/external disruptions such as the ability to change production capacity in response to disruptions and the ability to change the delivery deadline. These results were obtained based on research conducted on logistics companies in Java.

Hypothesis 7

Hypothesis test 7: There is a positive influence of supply chain agility on supply chain robustness.

The results of hypothesis 7 testing show that the coefficient value (estimate) = 0.569 is positive and significant, with p-values = $0.000 < 0.05$. The results of data processing show that there is a positive influence of Supply Chain Agility on Supply Chain Robustness. So it can be concluded that the hypothesis is supported, strong influence.

Based on the results of this study, it can be concluded that Supply Chain Agility has a direct influence on Supply Chain robustness, especially on the most important aspects, namely the ability to send goods/orders quickly during disruptions, being able to meet the needs of customers that continue to grow, being able to respond to changes quickly, supporting the improvement of the company's logistics network capabilities and the company has enough time to consider the most effective actions to be able to meet customer needs at logistics companies in Java.

Hypothesis 8

Hypothesis test 8: There is a positive influence of supply chain agility on supply chain performance.

The results of hypothesis testing 8 show that the coefficient value (estimate) = 0.122 is positive with p-values = $0.000 < 0.05$. The results of data processing show that there is a

positive influence of supply chain agility on Supply Chain performance. So it can be concluded that the hypothesis is supported, and the influence is weak.

Based on the research results, it is known that supply chain agility has a positive influence on Supply Chain performance directly, especially in the most important aspects, namely the ability to send goods/orders quickly during disruptions so that the company's supply chain has a very good record of on-time delivery and the supply chain process time in meeting customer needs is increasingly efficient. This improves supply chain performance so that companies can meet the growing needs of customers with a fast response that has an impact on improving supply chain performance.

Hypothesis 9

Hypothesis test 9: There is a positive influence of supply chain robustness on supply chain performance.

The results of hypothesis testing 9 show that the coefficient value (estimate) = 0.124 is positive, with p-values = 0.000 < 0.05. The results of data processing show that there is a positive influence of supply chain robustness on supply chain performance. So it can be concluded that the hypothesis is supported, and the influence is weak.

The results of the study show that supply chain robustness has a positive influence on supply chain performance directly, especially on the most important aspects, namely the company's logistics network can take the most effective actions in a short time so that it has a positive impact on supply chain performance factors, namely the company's supply chain has a very good on-time delivery record and the supply chain process time is increasingly efficient in logistics companies in Java.

Hypothesis 10

Hypothesis test 10: There is a positive influence of supply chain resilience on supply chain performance.

The results of hypothesis testing 10 show that the coefficient value (estimate) = 0.016 with p-Values = 0.497 > 0.05. These results indicate that the hypothesis is not supported. From these results, it can be concluded that there is no positive influence of supply chain resilience on Supply Chain performance.

This shows that supply chain resilience is not a factor that can improve Supply Chain performance in the supply chain. This can happen because changing production and delivery capacity is not easy to do, as it will impact other operational activities. In this case, the company needs to improve its ability to be able to change production and delivery capacity in response to disruptions to have an impact on improving the company's performance, able to adjust products quickly to meet customer needs.

Hypothesis 11

Hypothesis test 11: There is a positive influence of Supply Chain Sustainability on Supply Chain performance.

The results of hypothesis testing 11 show that the coefficient value (estimate) = 0.834 is positive and significant, with p-values = 0.000 < 0.05. The results of data processing show that there is a positive and significant influence of supply chain sustainability on Supply Chain performance. So it can be concluded that the hypothesis is supported, strong influence.

Based on the results of this study, it indicates that Supply Chain Sustainability has a positive influence on Supply Chain Performance directly, especially in the most important aspects, namely companies working together to identify and respond to social and environmental problems, provide technical and financial assistance and companies have a very good record of on-time delivery.

Hypothesis 12

Hypothesis test 12: There is a positive influence of supply chain integration on supply chain performance.

The results of data processing show that the estimated coefficient value is 0.035, with a p-value of 0.417 > 0.05. These results indicate that the hypothesis is not supported. From these results, it can be concluded that there is no positive influence of supply chain integration on Supply Chain performance.

This shows that supply chain integration is not a factor that can increase supply chain performance in supply chain performance. This can happen because, to get feedback regarding customer expectations, in practice, they still need to be improved and require real action in the form of a response from management. Feedback that customers give to a company helps the company when introducing new products to the market.

Hypothesis 13

Input:		Test statistic:	Std. Error:	p-value:
a	0.375	Sobel test:	3.16329198	0.01469988
b	0.124	Aroian test:	3.13424311	0.01483612
s _a	0.059	Goodman test:	3.19316381	0.01456236
s _b	0.034	Reset all Calculate		

Figure 2.

Sobel Test Hypothesis 13

Hypothesis test 13: Supply Chain Integration has a positive and significant effect on Supply Chain Performance mediated by Supply Chain Robustness

The purpose of hypothesis 13 is to test Supply Chain Robustness as a mediating variable between Supply Chain Integration and Supply Chain Performance. Based on the test results, it show that the p-value is $0.002 < 0.05$, and the coefficient value is 0.047. The results of this Sobel test indicate that there is a positive influence of Supply Chain Robustness mediation on the variables of Supply Chain Integration and Supply Chain Performance, so it can be concluded that the hypothesis is supported, and the influence is very weak. This shows that Supply Chain Integration has a positive indirect effect on Supply Chain Performance mediated by Supply Chain Robustness.

This shows that although the influence is positive, the impact tends to be weak or not too big. the influence is relatively small; this phenomenon is implied in the field of the logistics industry, which can occur because of the imbalance between the focus on integration and resilience in many logistics companies. There is a tendency to focus more on operational efficiency and cost reduction than on building resilience in the face of disruption.

Field implications, although integration can facilitate the flow of information and materials, if companies do not pay enough attention to resilience elements (for example, through contingency planning or flexibility in risk management), then the resilience will not be strong enough to significantly impact performance. For example, companies may integrate IT systems to facilitate delivery, but if they do not have a mature strategy to deal with external disruptions such as natural disasters or supply problems, then the impact on performance remains limited.

Hypothesis 14

Input:		Test statistic:	Std. Error:	p-value:
a	0.452	Sobel test: 0.69004492	0.01048048	0.49016594
b	0.016	Aroian test: 0.67887497	0.01065292	0.49721709
s _a	0.083	Goodman test: 0.70178502	0.01030515	0.48281324
s _b	0.023	Reset all	Calculate	

Figure 3.

Sobel Hypothesis Test 14

Hypothesis testing 14: Supply Chain Integration has a positive and significant effect on Supply Chain Performance mediated by Supply Chain Resilience

The purpose of hypothesis 14 is to test Supply Chain Resilience as a mediating variable between Supply Chain Integration and Supply Chain Performance. The test results from the Sobel test obtained a p-value of $0.490 > 0.05$ and a coefficient value of 0.007. These results indicate that there is no influence from the mediating role of Supply Chain Resilience on Supply Chain Integration and Supply Chain Performance, so it is concluded that the hypothesis is not supported.

Field implications, in logistics companies, even though the integration of systems or communication flows between parts of the supply chain runs smoothly, this does not always mean that the company has sufficient resilience to handle major disruptions. For example, if a logistics company only integrates technology to facilitate shipment tracking but does not have an emergency plan or backup system to deal with disruptions, then supply chain resilience will not be formed optimally, and supply chain performance will not increase. Example: An integration system that facilitates communication between parts may not have a significant impact on performance if there is no resilience to deal with natural disasters or unexpected delays.

CONCLUSION

Based on the results of research conducted on logistics companies on Java Island, the following conclusions were obtained:

1. There is a positive influence of supply chain integration on supply chain agility, supply chain integration on supply chain robustness, supply chain agility on supply chain

resilience, supply chain integration on supply chain sustainability, supply chain resilience on supply chain sustainability, supply chain agility on supply chain robustness. supply chain agility on supply chain performance, supply chain robustness on supply chain performance, supply chain sustainability on supply chain performance. Supply chain integration has a positive effect on Supply Chain Performance through the mediation of supply chain robustness

2. There is no positive influence of supply chain robustness on supply chain resilience, supply chain resilience on supply chain performance, or supply chain integration on supply chain performance. Supply chain integration does not have a positive effect on Supply Chain Performance through the mediation of supply chain resilience.
3. Based on the results of the hypothesis test in the study, it is known that the context of supply chain sustainability has the strongest influence on supply chain performance in logistics companies in Java, with an influence value of 0.834 compared to the influence of the Integration, Agility, Resilience and Robustness contexts in the supply chain. Based on the conditions in logistics companies, this can happen because effective logistics is related to efficiency and cost savings. Supply chain sustainability is a priority because it can integrates cost efficiency, adaptation to regulations, and long-term competitiveness. The implications of supply chain sustainability in logistics companies often involve route optimization, the use of alternative fuels, and investment in environmentally friendly technologies. This not only reduces environmental impact but also increases operational efficiency. For example, electric or hybrid vehicles can reduce fuel costs in the long term, while digitalization allows for more efficient route planning. Higher efficiency helps logistics companies significantly reduce operational costs and increase profit margins, thereby improving logistics performance in operational cost efficiency, which has an impact on increasing company profits.
4. The context of supply chain sustainability has the strongest influence on supply chain performance statistically in this study. Its implications in logistics companies in Java Island, in addition to the third conclusion, are also due to market demand and regulatory pressure. Consumer awareness of sustainable business practices continues to increase. Customers increasingly choose logistics services that are environmentally friendly, energy

efficient, and minimize carbon footprints. Governments in Indonesia and globally are tightening regulations related to sustainability, such as reducing greenhouse gas emissions, waste management, and energy efficiency, which forces logistics companies to be more sustainable. Logistics companies that can meet these demands and regulations will have a competitive advantage, improve their brand image, and attract more customers. Sustainability in logistics companies in Java Island is not just a choice but a necessity to maintain performance and meet market demands and an increasingly dynamic business environment.

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