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Analysis of the Factors Affecting Performance of Sustainable Supply Chain Management of Garut Arabica Coffee

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Abstract

Research aims: This study aims to analyze the factors influencing the sustainable supply chain management of Garut Arabica Coffee in increasing product competitiveness.

Design/Methodology/Approach: This study used a quantitative approach with an exploratory and causal design to explain how one variable influences or is responsible for changes in other variables. A quantitative approach analyzed the factors influencing the sustainability of Garut Arabica Coffee's supply chain operational performance.

Research findings: Structural Equation Modeling (SEM) analysis revealed that economic, social, and environmental factors positively and significantly impacted the sustainability of the Garut Arabica Coffee supply chain. The SWOT analysis showed that it requires implementing an integrated strategy from all factors with the support of sustainable infrastructure facilities, programs to eradicate farmer poverty, recycling defective products, and monitoring suppliers using the ISO 140001 standard.

Theoretical Contribution/Originality: This study analyzed the factors influencing the Garut Arabica Coffee sustainable supply chain and provides strategies based on supply chain sustainability indicators that can be implemented to overcome the problems faced.

Practitioners/Policy Implications: This study gives beneficial information to stakeholders from farmers, cooperatives, and the government involved in developing the supply chain performance improvement of Garut Arabica Coffee production.

Research Limitations/Implications: This research was still limited to the performance of the supply chain on a micro scale with 100 respondents, so the scope still needs to be expanded to have a bigger impact on society.

Keywords: Garut Arabica Coffee; SEM; SSCM; SWOT

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Introduction

Coffee is one of Indonesia's leading plantation commodities. Indonesia is ranked as the world's fourth-largest coffee bean producer (Direktorat Jenderal Perkebunan Kementerian Pertanian, 2021). Along with the development of coffee commodity production, the volume of coffee production every year tends to increase (Ariva et al., 2020). Smallholder coffee plantations cover more than 95% of coffee land in Indonesia, concentrated in East and Central Java (Zainura et al., 2016).

The high yields of Indonesian coffee production cannot be separated from good supply chain management. The global coffee supply chain has changed dramatically due to deregulation, new consumption patterns, and evolving corporate strategies. This condition implies that the coffee commodity supply chain requires a coherent relationship in input, production, trade, and consumption, so it can lead to a relationship between levels of coordination that results in the formulation of successful production standards (Amiti et al., 2019).

Indonesian coffee production, which small farmers dominate, impacts farmers' welfare because coffee is valued at a low price, so supply chain management is needed to increase coffee farmers' welfare and coffee's value in the international market. In this case, an analysis of the factors influencing sustainable supply chain management of Garut Arabica Coffee needs to be carried out to gain profit, triple bottom line success (financial, social, environmental), and supply chain performance (Blackhurst et al., 2012). Moreover, one of the 17 Sustainable Development Goals (SDGs) is decent work and economic growth. However, the COVID-19 pandemic has significantly impacted the fall of the world economy and has made member countries draw up green recovery steps. Through analysis of factors that significantly influence the supply chain of Garut Arabica Coffee, it can be considered in designing the SDGs green recovery strategy and achieving sustainability.

Garut Regency is one of the national arabica coffee producing areas. These conditions are complemented by the favorable geographic conditions of Garut for Arabica Coffee cultivation (Towaha et al., 2015). The location of coffee cultivation is in the Sunda Hejo Farmers Association, utilizing land owned by Perhutani to plant coffee plants with agroforestry. Garut is also one of the centers for Arabica Coffee development in West Java Province, Indonesia, with the average productivity reaching 951 kg/ha (Sudjarmoko & Randriani, 2019). Sundanese farmer Hejo named his coffee production Classic Beans Cooperative (Klasikbeans, 2021). The marketing flow of Garut Regency coffee begins with farmers at harvest (cheery beans), collectors (peeling, fermenting, and drying coffee beans), sellers (coffee grain), exporters (green beans and roasting coffee), and the final seller to the consumer (ground coffee) (Fauziah & Ihwana, 2015).

Several previous studies have attempted to evaluate the performance factors in sustainable supply chain management. Kot (2018) evaluated sustainable supply chain management and medium enterprise in Poland. Safitriani & Nugraha (2020) assessed the factors affecting the mining industry's supply chain performance. Soepiadhy et al. (2011) investigated the effect of supply chains on the performance of building contractors. Prayoga et al. (2018) examined the performance factors of fresh tuna supply chain management. Jakfar et al. (2015) researched supply chain management and palm oil competitiveness. Apriyani et al. (2018) studied the performance of the organic vegetable supply chain using the supply chain operation reference (score) approach. Ilmiyati and Munawaroh (2016) explored the influence of supply chain management on competitive advantage and company performance. There have been many studies evaluating company performance from supply chain factors. However, these studies did not focus on the concept of a sustainable supply chain. Therefore, the focus of this research on a

sustainable supply chain becomes a research gap. The case study of Arabica Coffee related to the supply chain is also a novelty because previous studies did not explore this case. In addition, the SWOT approach associated with a sustainable supply chain is also a novelty in this research since there is still little SWOT combined with a sustainable supply chain.

Therefore, this study aims to analyze the factors influencing the sustainable supply chain management of Garut Arabica Coffee in increasing product competitiveness using structural equation modeling. The structural equation modeling (SEM) approach was adopted to see how the independent and dependent variables were analyzed for internal and external factors and the influence between these variables on the Arabica Garut supply chain management (Berhitu, 2021). SWOT analysis was also used to evaluate factors to study the preparation of the right strategy for achieving project objectives (Santosa & Herjanto, 2019).

Literature Review and Hypotheses Development

Environmental Dimension

The environment is one of the dimensions that must be considered in a sustainable supply chain. In a sustainable supply chain, the environmental dimension needs to be fulfilled by supply chain members to remain in the supply chain. The environmental dimension is also becoming more prominent in supply chain management operations and research because companies understand the impact of supply chains on the natural environment and society (Carter & Rogers, 2008).

Supply chain sustainability with an environmental dimension in mind is about how the interaction between environmental sustainability and supply chain management emphasizes expansion beyond internal operations and core supply chain practices to include issues related to product design, manufacturing of by-products, and end-of-life products, and other factors which may have a relationship with the natural environment (Linton et al., 2007).

Based on the research that has been done on green supply chain management, the concept can be interpreted as research that integrates environmental thinking in supply chain management, including product design, material sourcing and selection, manufacturing processes, product delivery to consumers, and end-of-life management use the product (Srivastava, 2007). In research conducted by Kot (2018) regarding sustainable supply chain management and medium enterprise, it was found that in Polish SMEs, the environment is one element of SMEs with an essential role in sustainable supply chain management. Based on those supporting theories, this study examined the influence of the environmental aspect on the sustainable supply chain performance of Garut Arabica Coffee with the following hypothesis:

***H_1**: Environment positively influences the sustainable performance of the Garut Arabica Coffee supply chain.*

Social Dimension

Social sustainability enables other sustainability initiatives. Ignoring the social dimension can adversely affect the supply chain (Ahmadi et al., 2017). The scientific community mostly avoids the dimension of social sustainability because it is considered subjective and difficult to evaluate. As a result, there is an urgent to analyze and evaluate the social aspects of supply chains (Bubicz et al., 2019).

The social dimension relates to safety, equality, diversity, governance, human health, labor rights, and justice. Lord Kelvin states that to improve something, one must be able to measure it. However, no consensus exists on the tools and guidelines needed to measure and evaluate social performance (Sutherland et al., 2016). The social dimension also has an essential role in sustainable supply chain management in SMEs (Kot, 2018). Based on those findings, the hypothesis was formed as follows:

***H_2**: Social positively influences the sustainable performance of the Garut Arabica Coffee supply chain.*

Economic Dimension

The economic dimension of sustainability relates to the economic benefits derived by supply chain members, including the communities, regions, and countries in which operations are carried out (Sánchez-Flores et al., 2020). The economic dimension in SSCM is defined as the economic and financial feasibility of the operator. Competitive pricing can negatively affect ongoing business success if prices are too low (Davis-Sramek et al., 2018).

The performance of the economic aspect of SSCM can be measured, among others, through its quality, responsiveness, and efficiency. Quality can be measured by surveying customers, responsiveness can be described by how quickly customer needs and external changes can be responded to by the company, and efficiency is related to cost-cutting, increased use of resources, and reduced processing time (Cetinkaya, 2010). Three indicators of economic aspects are used in SSCM research, including production costs, profit criteria, types of costs, and increased sales (Hisjam, 2019). SSCM requires a broadened approach of SCM and should emphasize economic, ecological, and social aspects of business practices and theory (Svensson, 2007). In addition, the economy is one aspect of creating coordinated supply chains through voluntary integration (Kot, 2018). Based on those theories, the proposed hypothesis is:

***H_3**: The economy positively influences the sustainable performance of the Garut Arabica Coffee supply chain.*

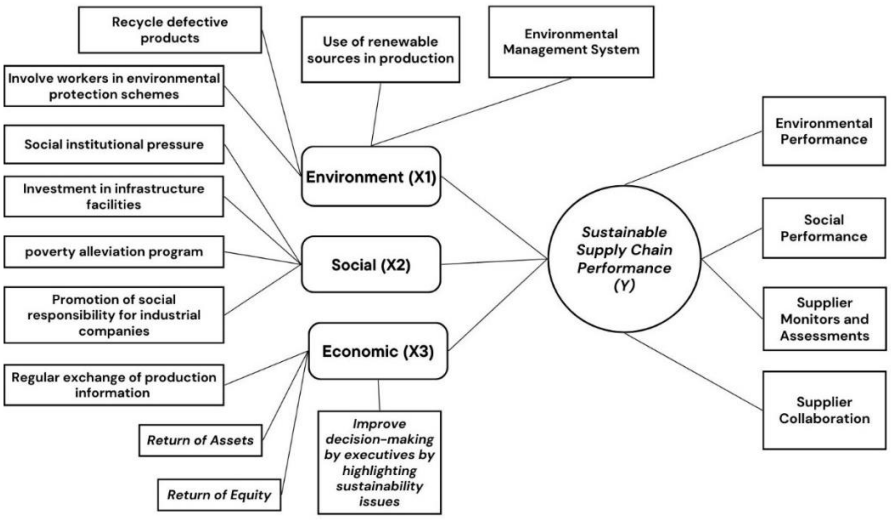

Figure 1 Research hypothesis

Research Methods

This study used a quantitative approach with an exploratory and causal design to explain how one variable influences or is responsible for changes in other variables (Cooper & Schindler, 2014). A quantitative approach analyzed the factors influencing the sustainability of Garut Arabica Coffee's supply chain operational performance.

Sample and Data

The population in this study was farmers from the Sunda Hejo Cooperative and the Garut Coffee Shop. All research samples were farmers who managed the land and had obtained legality for the land they manage in the form of a Social Forestry Forest Utilization Permit and coffee farming as their main livelihood. The sampling technique used in this research was cluster random sampling. The number of respondents was determined based on their involvement in the Garut Arabica Coffee business: farmers, Sundanese Hejo associations (cooperatives), and Garut koi shops. The number of respondents selected was 100. Several questions or statements were asked by respondents based on a Likert scale of 1-4, from strongly disagreeing to strongly agreeing. The samples that could be collected were then analyzed utilizing Smart PLS.

The research was conducted from February 2022 to April 2022. The location of data collection was carried out at the Sunda Hejo Farmers' Cooperative, Leles Sub-district, Garut Regency.

Measures of Variables

Research latent variables included environment (X1), social (X2), economy (X3), and sustainable supply chain performance (Y). Each latent variable had an indicator variable.

Four indicators explained variable X1: using renewable sources in the production process, product recycling, involving workers in environmental protection schemes, and ISO 140001 certification. Variable X2, in this study, was explained by four indicators: investment in infrastructure facilities, investment in poverty alleviation programs, social and institutional pressure, and promotion of social responsibility for industrial companies. Variable X3 was described by indicators of regular exchange of product information regarding sales or discussion of operational plans, ROA, ROE, and improving decision-making by executives by highlighting sustainability issues. Meanwhile, Variable Y comprised environmental and social performance, supplier monitors and assessments, and supplier collaboration. All those four latent variables with each indicator were adapted from literature studies of previous research.

Data Analysis Procedure

This study used SEM and SWOT analysis methods. Data analysis techniques included data instrument testing and hypothesis testing. SEM was employed to interpret the linear relationship between observational variables (indicators) and variables that could not be measured directly (latent variables) simultaneously (Kuntoro et al., 2019). Meanwhile, SWOT analysis was used to formulate the right strategy to achieve project objectives (Santosa & Herjanto, 2019).

Results and Discussion

Demographics

One hundred people participated in this study. All respondents worked at the Sunda Hejo Cooperative Garut. The condition of these respondents influenced the assessment of the upstream to downstream business processes of sustainable supply chain management for Garut Arabica Coffee. The respondent's work location was in the Garut area, so there was representation in this study, namely the Garut Arabica Coffee cultivation site.

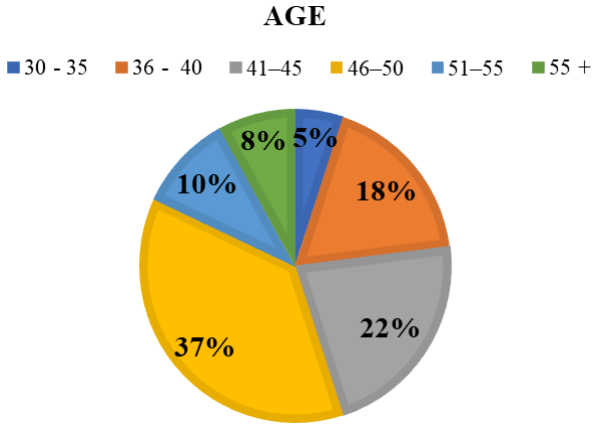

Figure 2 Demographics profile based on age

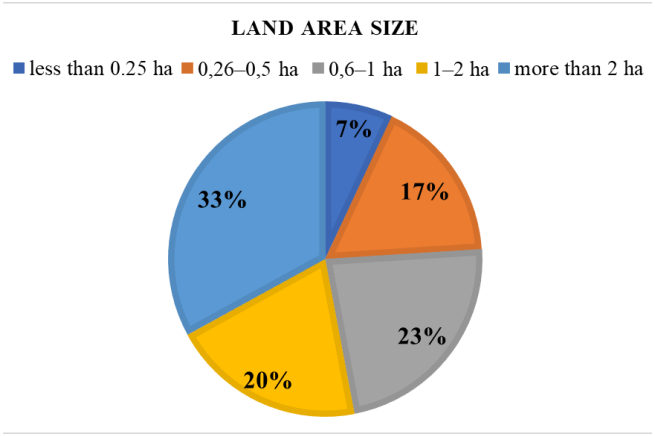

Figure 3 Demographics profile based on land area size

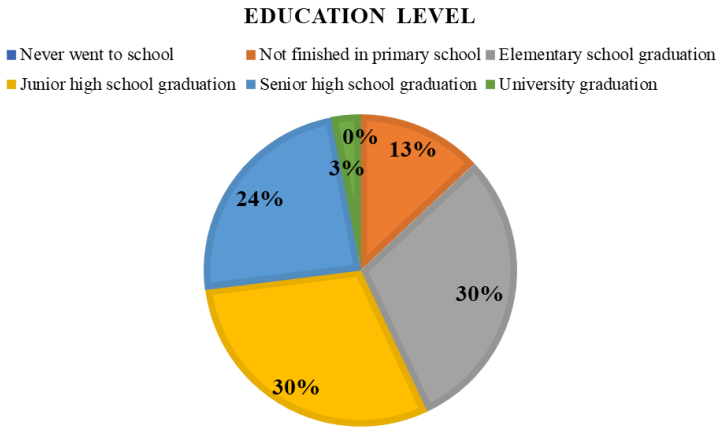

Figure 4 Demographics profile based on the education level

Instrument Data Test

The instrument test used in this study was the validity and reliability test distributed to 100 respondents at the Sunda Hejo Cooperative. The Sunda Hejo Cooperative is a cooperative that handles the upstream to the downstream supply chain of Garut Arabica Coffee. The tests were used to analyze the validity and reliability, and the analysis results were utilized as reference material in obtaining data for further analysis. In addition, factors affecting the performance of a sustainable supply chain included environmental, social, financial, and sustainable supply chain performance as intervening variables analyzed using the Smart PLS analysis tool.

1. Partial Least Square (PLS) Model Scheme

Hypothesis testing used Partial Least Square (PLS) analysis technique with the Smart PLS program. The following is a schematic of the proposed PLS program model:

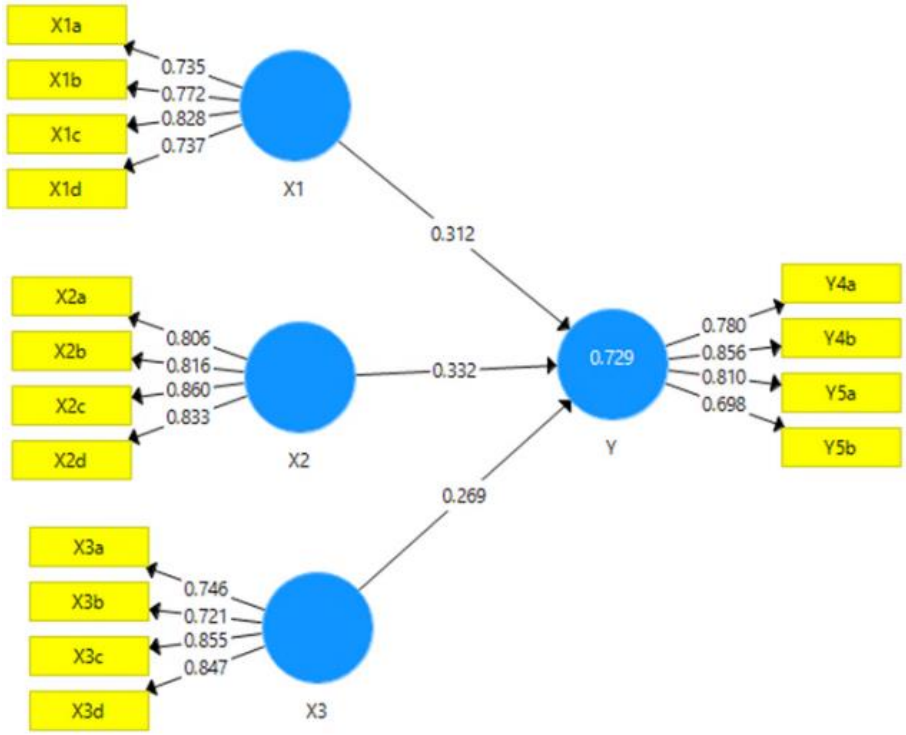

Figure 5 Loading factor

2. Evaluation of Measurement Model (Outer Model)

The outer model depicted how the manifest or observed variables represented the latent variables to be measured. This model analysis specified the relationship between latent variables and their indicators. In this study, conducting validity and reliability tests is as follows:

a. Validity test analysis

This test measured whether each question presented in a questionnaire could represent the variables studied. Using Smart PLS, validity measurement was done in two ways, and the analysis results were obtained.

The value of convergent validity is the value of the loading factor on the latent variable with its indicators. It was used to test the validity of each indicator in a variable. The individual reflexive measure is considered high if it correlates > 0.7 with the construct to be measured, meaning that the indicator is valid for measuring the construct made. However, for the development stage of the measurement scale, the loading value > 0.5 is considered sufficient, which means it meets the requirements.

Table 1 Loading Factor Indicator of Latent Variables

Indicator	Symbol	X_1	X_2	X_3	Y
Use of renewable sources in production	X_{1a}	0.735			
Recycle defective products	X_{1b}	0.772			
Environmental Protection Scheme	X_{1c}	0.828			
ISO 140001 Certification	X_{1d}	0.737			
Infrastructure facility investment	X_{2a}		0.806		
Investing in poverty alleviation programs	X_{2b}		0.816		
Social, institutional pressure	X_{2c}		0.860		
Socially responsible promotion for the industry	X_{2d}		0.833		
Regular exchange of operational production information	X_{3a}			0.746	
Return on Assets	X_{3b}			0.721	
Return on Equity	X_{3c}			085.5	
Improving executive decision-making by highlighting sustainability issues	X_{3d}			0.847	
Environmental performance	Y_{4a}				0.780
Social performance	Y_{4b}				0.856
Supplier monitoring and assessment	Y_{5a}				0.810
Supplier collaboration	Y_{5b}				0.698

It can be seen that the loading value for each indicator was > 0.7, meaning that each had a strong correlation, except for supplier collaboration (Y_{5b}) which was 0.698 < 0.7, but this indicator was considered quite influential because it was > 0.5. Thus, the indicators of each latent variable had a strong correlation. The variables used in this study, such as environmental, social, economic, and sustainable supply chain performance, had a loading factor > 0.6. All variables met the requirements to be studied as an indicator of the latent variables examined.

b. Discriminant validity analysis

Discriminant validity measurements were carried out to determine that the loading factor value of each construct indicator for the variable was the highest compared to the values for other variables. Measurements were made using cross-loading and average variance extracted (AVE) values. The average variance extracted (AVE) test shows that if the AVE value generated by each used variable is more significant than 0.5, it meets the requirements presented.

Table 2 Cross Loading Indicators of Other Latent Variables

Indicator	X1	X2	X3	Y
X1a	0.735	0.584	0.496	0.575
X1b	0.772	0.622	0.561	0.603
X1c	0.828	0.684	0.664	0.674
X1d	0.737	0.680	0.630	0.588
X2a	0.673	0.806	0.682	0.685
X2b	0.672	0.816	0.670	0.644
X2c	0.755	0.860	0.713	0.724
X2d	0.666	0.833	0.687	0.645
X3a	0.552	0.565	0.746	0.583

Table 2 Cross Loading Indicators of Other Latent Variables (cont')

Indicator	X1	X2	X3	Y
X3b	0.633	0.620	0.721	0.587
X3c	0.663	0.774	0.855	0.693
X3d	0.583	0.662	0.847	0.616
Y4a	0.602	0.635	0.607	0.780
Y4b	0.776	0.742	0.672	0.856
Y5a	0.588	0.650	0.623	0.810
Y5b	0.510	0.522	0.562	0.698

Based on the cross-loading, the correlation of each variable's indicator was the strongest and fulfilled discriminant validity. It can be seen in the AVE value of the latent variable as follows:

Table 3 Results of Loading Factor Test Validity

Variable	Average Variance Extracted (AVE)	Validity Result
X_1: Environment	0.591	Valid
X_2: Social	0.687	Valid
X_3: Economy	0.631	Valid
Y: Supply chain	0.621	Valid

The value of average variance extracted (AVE) from each variable revealed environmental (X_1) = 0.591 > 0.5, social (X_2) = 0.687 > 0.5, economic (X_3) = 0.631 > 0 .5, and Y = 0.62 > 0.5. Hence, it can be concluded that the environmental, social, and economic variables were valid variables influencing the model.

c. Composite Reliability

Composite reliability can be seen from the value of Cronbach's Alpha, which assumes that the precision and measurement scale between indicators has differences with values > 0.5. The indicator group that measures a variable has good composite reliability if the composite reliability is greater than or equal to 0.7, although it is not an absolute standard.

Table 4 Results of Loading Factor Validity Test

	Cronbach's Alpha	rho_A	Composite Reliability	
X_1: Environment	0.769	0.774	0.852	Reliable
X_2: Social	0.848	0.850	0.898	Reliable
X_3: Economy	0.803	0.810	0.872	Reliable
Y: Supply chain	0.795	0.810	0.867	Reliable

It was obtained that Cronbach's Alpha value for environmental (X_1) = 0.769 > 0.5, social (X_2) = 0.848 > 0.5, economics (X_3) = 0.803, and supply chain (Y) = 0.795. In addition, the composite reliable value showed environmental (X_1) = 0.852 > 0.7, social (X_2) = 0.898 > 0.7, economic (X_3) = 0.872 > 0.7, and supply chain (Y) > 0.867 > 0.7. With a Cronbach's Alpha value of more than 0.5 and composite reliability of more than 0.7, the environmental, social, and economic variables had precise and consistent measuring

scales so that the indicators and variables could be used for research supporting the model.

3. Structural Model Analysis (Inner Model)

Evaluation of the structural model using R-square is for the dependent construct, path coefficient values, or t-values for each path for the significance level in hypothesis testing. The higher the R-square value, the better the prediction model of the proposed research. This structural model was evaluated by R-square for endogenous variables and by comparing t-count and t-table.

Table 5 R-Square Value, T-Test, and the P-Value of Each Variable

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P-Values
X_1 -> Y	0.312	0.305	0.112	2.785	0.006
X_2 -> Y	0.332	0.336	0.123	2.697	0.007
X_3 -> Y	0.269	0.272	0.117	2.292	0.022

From the factor loading results, it was obtained that the R-square value of each exogenous to endogenous variable between environmental variables (X_1) = 0.312 > 0.25 was moderate, social (X_2) = 0.332 > 0.25 was moderate and economic (X_3) = 0.269 was moderate. Meanwhile, for the t-test for each indicator t-statistics > t-table of 1.67, all indicators strongly influenced latent variables. From the results of Table 8, it was uncovered that t (X1) = 2.785 > 1.67, t (X2) = 2.697 > 1.67, and t (X3) = 2.292 > 1.67. Then, the data from each variable met the requirements in supporting the model.

4. Goodness of Fit (GoF) Test

The data obtained showed that the R2 value in total for all variables was 0.729 or 72.9%. It indicates that the total of all exogenous environmental (X_1), social (X_2), and economic (X_3) variables had a 72.9% influence on supply chain endogenous variables (Y). Meanwhile, the remaining 27.1% might be influenced by other factors not included in the study. A model test was then carried out by looking at the SRMR, NFI, and RMS Theta values with a model reference value of Good of Fit if SRMR < 1.0, NFI > 0.9, and RMS Theta < 0.2. The SEM results obtained are as follows:

Table 6 Goodness and Fit SRMR, NFI

	Saturated Model	Estimated Model
SRMR	0.070	0.070
d ULS	0.671	0.671
d G	0.353	0.353
Chi-Square	187.666	187.666
NFI	0.807	0.807
rms Theta	0.176	

It was shown that SRMR 0.070 < 1.0; NFI value 0.807 < 0.9; RMS Theta 0.176 < 0.2. Although the NFI value < 0.9 regarding the SRMR and RMS Theta values according to the

reference value, the model of this study had a good fit. Thus, it could be continued to the hypothesis test.

Hypothesis Test

The results of the hypothesis testing carried out showed the following results:

Table 7 Hypothesis (T- and P-values)

	T-Statistics (|O/STDEV|)	P-Values	Conclusion
H1: X1 -> Y: Environment > Supply chain	2.785	0.006	H1 is accepted.
H2: X2 -> Y: Social > Supply chain	2.697	0.007	H2 is accepted.
H3: X3 -> Y: Financial > Supply chain	2.292	0.022	H3 is accepted.

From the Table 7, environmental influence (X_1) = 2.785 > 1.67 P = 0.006 < 0.05, social (X_2) = 2697 > 1.67 P = 0.007 < 0.05, and economic (X_3) = 2.292 > 1.67 P = 0.022 < 0.05 on the supply chain indicate that the environmental, social, and economic had a positive influence on the sustainability of the supply chain. Thus, it can be said that to ensure the supply chain process can continue, every environmental, social, and economic variable must be an essential concern.

SWOT Analysis

SEM analysis showed all environmental, social, and environmental variables positively influencing supply chain sustainability. Each indicator on each variable is a factor with a positive impact on supply chain sustainability. Furthermore, a SWOT analysis was carried out from each aspect to develop further strategies to improve supply chain sustainability. In this regard, the SWOT analysis focuses on the influence of each indicator as a supporting factor for the variables affecting the supply chain.

The SWOT analysis steps above compiled a list of factors supporting supply chain sustainability from the SEM test results. The influencing variables can be determined as external and internal, after which it is determined whether these factors include opportunity, threat, strength, or weakness.

The influencing factors were grouped based on external or internal influences, including opportunity, threat, strength, or weakness. After that, scoring was done on all factors according to the influence value of each indicator. Lastly, the SWOT Analysis Matrix was compiled. The SWOT matrix analysis mapping results obtained several strategies for improving the supply chain based on elements affecting the supply chain. The results obtained are as follows:

Table 8 SWOT Strategy Analysis

	Opportunity		Strength
O1	ISO 14001 Certification	S1	Infrastructure facility investment
O2	Environmental protection scheme	S2	Poverty alleviation program's investment
O3	Exchange of operational production information regularly	S3	Return on Assets
Q4	Supplier collaboration	S4	Return on Equity
		S5	Supplier monitoring and assessment
	Threat		**Weakness**
T1	Social, institutional pressure	W1	Improving decision-making by executives by highlighting sustainability issues
T2	Use of renewable resources	W2	Recycle defective products
T3	Environmental performance	W3	Socially responsible promotion for industrial companies
T4	Social performance		

Strategies that can be implemented to support the realization of supply chain sustainability from the SWOT analysis results are as follows:

Aggressive Strategy

- O1S1, O1S2, O1S3, O1S4, O1S5: Developing and implementing poverty alleviation programs, Return on Assets, Return on Equity, and monitoring suppliers using ISO 140001 standards
- O2S1, O2S2, O2S3, O2S4, O2S5: Developing environmental protection schemes by investing in infrastructure, poverty alleviation programs, Return on Assets, Return on Equity, and monitoring suppliers
- O3S1, O3S2, O3S3, O3S4, O3S5: Regularly exchanging operational production information in infrastructure investment, poverty alleviation activities, asset return, return on equity, and supplier monitoring
- O4S1, O4S2, O4S3, O4S4, O4S5: Conducting supply collaboration in infrastructure investment, poverty alleviation activities, asset return, return on equity, and supplier monitoring

Competitive Strategy

- O1W1, O1W2: Developing an environmental protection scheme by encouraging executives to be involved in making decisions on sustainability programs and defective product recycling programs as well as social promotion responsibilities following ISO 140001
- O2W1, O2W2: Developing an environmental protection scheme by encouraging executives to be involved in making decisions on sustainability programs and defective product recycling programs as well as social promotion responsibilities
- O3W1, O3W2: Exchange of operational production information regularly with all executives in the sustainability program and product recycling program and social promotion responsibility
- O4W1, O4W2: Conducting supplier collaboration in encouraging the involvement of all executives in the sustainability program and recycling of defective products and social promotion responsibilities

Conservative Strategy

- S1T1, S2T1, S3T1, S4T1, S5T1: Increasing infrastructure investment, poverty alleviation, Return on Assets, Return on Equity, and supplier assessment as a form of process in preventing social, institutional pressure
- S1T2, S2T2, S3T2, S4T2, S5T2: Improving infrastructure investment performance, poverty alleviation, Return on Assets, Return on Equity, and supplier assessment with renewable resources
- S1T3, S2T3, S3T3, S4T3, S5T3, S1T4, S2T4, S3T4, S4T4, S5T4: Improving infrastructure investment performance, poverty alleviation, Return on Assets, Return on Equity, and supplier assessment to support environmental and social performance

Defensive Strategy

- T1W1, T1W2, W3: Improving executive performance to be involved in sustainability programs and recycling of defective products to prevent institutional and social pressures and socially responsible promotion for industrial companies to prevent social and institutional pressures
- T2W1, T2W2, T2W3: Improving executive performance to be involved in sustainability programs and recycling of defective products, socially responsible promotion for industrial companies with renewable energy sources
- T3W1, T3W2, T3W3, T4W1, T4W2, T4W3: Improving executive performance to be involved in sustainability programs and recycling of defective products in support of environmental and social performance and social promotion responsibility for industrial companies

Discussion

Hypothesis Test

Based on the analysis, the formulation of the hypothesis in this study is as follows:

- H1 was accepted, meaning that the environment was influenced by using renewable sources in production, recycling defective products, and involving workers in environmental protection schemes. ISO 140001 certification positively influenced the sustainable performance of the Garut Arabica Coffee supply chain. Using renewable sources in the production process can impact the availability of faster and more abundant coffee supplies to meet demand (Blackhurst et al., 2012). Recycling defective products reduce environmental waste, minimizes pollution and environmental damage, and increases the benefits of the damage caused by the production process. Management of workers in environmental protection will lead to awareness of workers in protecting the environment. The existence of ISO 140001, which coffee producers implement, will create a production process that conforms to standards and procedures that do not damage the environment. With good environmental performance, it is considered that the company has continuously committed to improving environmental performance.
- H2 was accepted, indicating that social influences related to investment in infrastructure facilities, poverty alleviation programs, social and institutional pressure, and promotion of social responsibility for industrial companies positively

influenced the sustainable performance of the Garut Arabica Coffee supply chain. Infrastructure facilities allowed coffee farmers to access the resources to process and market coffee. Thus, it will provide space for economic activities from all fields, transportation, and trade that drive the surrounding community's economy. It will also assist in poverty alleviation programs that support the government and society, thereby minimizing public pressure (Neilson & Pritchard, 2007).

- H3 was accepted, denoting that economic dimensions such as regular exchange of product information, ROA, ROE, and improving decision-making by executives by highlighting sustainability issues positively influenced the sustainable performance of the Garut Arabica Coffee supply chain. This economic dimension has a very significant and broad impact on other aspects because all social and environmental development activities must be supported by success and economic development, which is supported by the ability to produce and get maximum profit from the production and sales process (Borrella et al., 2015). It requires support from policymakers who care about environmental sustainability programs. This economic performance can be operationalized in terms of market, operational or accounting-based matrices that focus on efficiency (Koberg & Longoni, 2019).

The hypotheses showed that environmental, social, and economic dimensions positively and significantly influenced the supply chain process in Garut Arabica Coffee farming. Sustainable supply chain management's environmental, social, and economic dimensions are equally important (Kot, 2018). The environment is one of the important factors in developing sustainable supply chain management. Environmental factors of sustainable development must contain environmentally friendly production processes and efforts to reduce the amount of waste (Tsoulfas & Pappis, 2006; Min & Kim, 2012). Organizational activities such as selecting partners in the supply chain based on ecological guidelines and employee commitment to participate in environmental protection programs are essential factors from the environmental dimension in building good sustainable supply chain management. In addition, the social dimension also needs to be considered. Investments in poverty alleviation programs, participation in local community charitable actions, and regional and cross-regional development initiatives are important social elements to enhance the sustainability of good supply chain management (Colantonio, 2008). Moreover, the economic dimension of sustainability relates to the economic benefits derived by supply chain members, including the communities, regions, and countries in which operations are carried out (Sánchez-Flores et al., 2020). With active participation between supply chain members and customers, sustainable management can be achieved (Lambert, 2010).

SWOT Strategy

Implementing the SWOT strategy refers to the Quantitative Strategic Planning Matrix (QSPM). This implementation results from a SWOT analysis (aggressive, competitive, conservative, and defensive strategies). QSPM approach attempts to select the best strategy for a business objectively and recommends an aggressive strategy for the transformation process (Ommani, 2011). Further research can use all the strategies above to test which strategies positively influence the supply chain. Testing can be carried out

on a priority scale that positively impacts supply chain development from aggressive, competitive, conservative, and defensive strategies.

Conclusion

The performance of the sustainable supply chain of Garut Arabica Coffee has been well implemented. Several aspects (the use of technology in marketing and promotional media and the existence of cooperatives that oversee the supply chain) are in a good category. Even so, in some parts, it still needs to be improved, especially in the encouragement of the executive (government) in farmers' poverty alleviation programs, measuring and monitoring the process of recycling defective products and investing in sustainability facilities. The PLS-SEM analysis results revealed that economic, social, and environmental factors positively and significantly impacted the sustainability of the Garut Arabica Coffee supply chain. Furthermore, the SWOT analysis strategy uncovered that infrastructure support is needed for sustainability facilities, programs to eradicate poverty for farmers, recycling of defective products, and ISO 14001.

The results of this research are expected to provide input for each stakeholder, including farmers, cooperatives, coffee business actors, and the government, in developing factors to work together to implement the 14 strategies developed to improve the Garut Arabica Coffee supply chain. Evaluating and implementing aggressive, competitive, conventional, and defensive strategies are expected to create good, sustainable supply chain management.

The results of these findings can be used as material for a more in-depth study of how SEM and SWOT can be used in analyzing supply chain processes to deal with problems in improving performance. Accurate analysis of the SEM and SWOT methods can quickly formulate strategies and solutions to supply chain problems for various plantation products similar to the coffee supply chain. This research can also be used as reference material related to the performance of a sustainable coffee supply chain using the SEM and SWOT methods to be tested on other product supply chains. Hopefully, this research also provides ideas for further research to combine several methods to further refine the strategies and solutions to improve supply chain performance.

The limitation of this research is that it has not been tested and operationalized in research related to startup technology, including e-commerce, because environmental variables are not too influential. Hence, it is necessary to conduct further research related to technology fields, such as e-commerce, cryptocurrency, and artificial intelligence related to sustainability in economic, social, and environmental factors associated with supply chains.

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