

SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICE AND SUSTAINABILITY PERFORMANCE IN THE ORGANIC-CERTIFIED COFFEE INDUSTRY IN EAST JAVA PROVINCE, INDONESIA

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Abstract

Sustainable development has recently been identified as a challenge for many countries and has become a critical issue for food-related industries. Business actors of industries apply the concept of Sustainable Supply Chain Management (SSCM) as a pivotal component in improving the company's competitiveness in the market. Therefore, sustainable supply chain management practices in this industry must be properly addressed for the sustainability performance. The present study aims to analyze the effect of sustainable supply chain management on the sustainability performance of supply chain on organic-certified coffee commodities. Sustainable supply chain management practices can be examined through three aspects, i.e., supplier, manufacturing, and consumer; while the performance of the supply chain can be examined through the aspects of economy, environment and social. A quantitative method was used in this study. Data regarding the respective supply chains were garnered from managers of small and medium enterprises producing organic-certified coffee in East Java, Indonesia. Structural Equation Modeling-Partial Least Square (SEM-PLS) was adapted for the analysis. The results of the study revealed that the practice of sustainable supply chain management affected the sustainability of environment, economy, and social. Based on these findings, it is critical to engage in the practices of sustainable supplier management, operation management, and customer management to promote the overall sustainability performance of supply chain.

Keywords: Organic Coffee; Performance; Small and Medium Enterprises; Supply Chain; Sustainability

1. INTRODUCTION

Eminent and competitive competition in market drive business actors realize that participations of internal and external parties in the supply chain requires well-integrated coordination in the flow of information and transformation of goods and services starting from upstream to downstream, and also involves companies and stakeholders to achieve an effective supply chain management (Furqon, 2014). This issue is also addressed in coffee industries e.g. tougher competition as shown by the increasing number of emerging coffee businesses with various types of coffee products. In addition, organic-certified coffee has developed into one of eminent agricultural products. Although it has great potential in the market, organic-certified coffee, especially in East Java, still has problems in its production activities. Therefore, organic coffee products in Java East have not been able to successfully compete in the market, and are considered as unpromising income. It requires evaluation of sustainable supply chain management practices in order to affect the sustainability performance of organic-certified coffee products. Consequently, it can help to enhance competition and solve problems on economic performance, and achieve a sustainable business.

Business actors apply the concept of Sustainable Supply Chain Management (SSCM) as a pivotal component in improving the company's competitiveness in the market and are able to develop a sustainable business. According to Heizer and Render (2017), the implementation of a sustainable supply chain needs to consider a supply chain system supported by three sustainable dimensions or 3P i.e. people, planet, and profit. This concept represents risks and opportunities for a business occupying the supply chain. Sustainable supply chain management must be able to optimize profit (economic aspect), the people concerned and relationship (social aspects) and the environment performance (environment aspect). According to Govindan et al. (2013), the environment aspect is able to minimize the materials and energy use which, consequently, can reduce the surrounding environment destruction during the production process.

The performance of a sustainable chain indicating profit and loss on a supply chain management is proposed by Triple Bottom Line (TBL) i.e. economic, social, and environment performance to define sustainability. Those three aspects have their own goals (Blackhurst et al., 2012). Environment performance is to engage in reducing the environmental impact generated by the industry in the entire supply chain. Social performance is to drive the company to improve the welfare of employees, and customers' satisfaction affecting corporate brand image (Esfanbodi et al., 2017). Economic performance describes the distribution and flow of financial resources among stakeholders, and its impact on the environment (Saeed and Kersten, 2017).

Several previous studies regarding the sustainable supply chain have been conducted in various contexts. Ahi and Searcy (2013) conducted a research on the actual definition of the sustainable supply chain management. Yet, they did not discuss in details about the practice of supply chain management and its performance in an enterprise. Lu et al. (2018) reviewed supply chain management from a social perspective only. Narimissa et al. (2019) analyzed indicators in the performance of sustainable supply chain because they realized the importance of these indicators to assist companies in developing a sustainable supply chain. They applied concept of trilogy in their study, but they did not relate to the performance of the company.

Emamisaleh et al. (2018) applied similar research related to the practice of Sustainable Supply Chain Management (SSCM) and sustainability performance, but their research was implemented in large industries. To fill the gap, the present study aimed to analyze how the practice of Sustainable Supply Chain Management (SSCM) is applied to the sustainability performance of supply chain in small and medium enterprise selling organic-certified coffee in East Java, Indonesia.

2. LITERATURE REVIEW

This section outlines the concepts underlying the research variables, which include Sustainable Supplier Management Practices, Sustainable Operations Management Practices and Sustainable Customer Management Practices. These are summarized in table 1.

Table 1: Literature Review

Variable	Indicator	Items
Sustainable Supplier Management Practice	Supplier Quality	Quality suppliers' sustainable performance throughout the supply chain. This quality can help to improve sustainable practices (Hong and Ding, 2018).
	Energy Use	Company choose suppliers who provide consultation on efficient energy use (Ahi and Searcy, 2013).
	Supplier Development	Company actions taken to improve supplier capabilities or performance in relation to sustainability. One example of such partnerships is the transfer of knowledge about sustainability from one company to another (Yildiz and Sezen, 2019).
Sustainable Operation Management Practice	Product Quality Management	Quality management relates to upgrading the quality of products and processes, maintaining equipment and productivity levels, and optimizing the production processes of supply chain companies (Hasan, 2013).
	Management of the environment	Implementation of a set of plans and programs to improve environmental performance within the supply chain (Mitra and Datta, 2013).
	Social Responsibility	Improving employees' overall health, safety and salary by reporting quantitative and qualitative information about the company's sustainable performance and humanitarian commitments to social groups (Aganet al., 2016).
Sustainable Customer Management Practice	Product Reliability	Building costumer trust with quality and special products to make customer retention (Chen and Lin, 2015).
	Sharing information	Information sharing with customers in the supply chain to inform manufacturing companies about customers' perceptions of sustainability (Pekovic et al., 2016)
	Building Relationships with Costumers	Management of consumers to enhance their overall satisfaction with regard to sustainability and the environment (Pekovic et al., 2016).
Sustainability Performance	Economic Performance	Improving the organization's finance and marketing performance (Wang and Sarkis, 2013).
	Environment Performance	Companies' efforts to reduce environmental and water pollution, greenhouse gases, and threats posed by waste generated in the industrial environment throughout the supply chain (Esfahbodiet al., 2017).
	Social Performance	Efforts made by supply chain companies to participate in social activities, to take account of employee safety and health, to pay equitable salaries, and to perform humanitarian work (Lu et al., 2018).

3. MATERIALS AND METHODS

3.1. Sample and Procedure

The research was conducted in East Java province; and non-probability sampling was used to recruit respondents in this present study. This sampling method was a non-randomized method chosen from the doer of supply chain of organic coffee in East Java, Indonesia. Purposive sampling was employed to choose respondents. Show at and Parveen (2017) stated that purposive sampling meant that the researcher had respondents based on the criteria and assessments in accordance with the research objectives. Samples obtained were 101 respondents who were the managers of small industry producing ready-marketed coffee package.

The data obtained in this study were divided into two, i.e. primary and secondary data. Primary data were garnered from observations, interviews and questionnaires. Secondary data were garnered from literature studies, related agencies, namely organic-certified coffee farmer groups in East Java, and Centre for Seed and Plantation Plant Protection Surabaya. The questionnaire used to measure the research variables was based on previous studies and consisted of a number of open and closed questions and employed a five point Likert scale(1 - 5), ranging from strongly disagree (1) to strongly agree (5).

3.2. Analysis

The constructs were analyzed using confirmatory factor analysis (CFA) and Cronbach's alpha. Structural equation modelling (SEM) was used to test the hypotheses and validate the model, taking account of the measurement model and the structural model. The data were analyzed using Structural Equation Modeling-Partial Least Square (SEM-PLS) was employed to analyse the data using Warp PLS 6.0.

Table 2: Confirmatory Factor Analysis (CFA)

Variables	Factor Loading	SCM	1-SCM	CR	AVE
Sustainable Supplier Management Practice (SSM)					
Supplier Quality	0.839	0.704	0.296	0.856	0.665
Energy Use	0.811	0.658	0.342		
Supplier Development	0.795	0.632	0.368		
Sustainable Operation Management Practice (SOM)					
Product Quality Management	0.844	0.712	0.288	0.876	0.701
Management of the environment	0.831	0.691	0.309		
Social Responsibility	0.837	0.701	0.299		
Sustainable Customer Management Practice (SCM)					
Product Reliability	0.663	0.440	0.560	0.840	0.64
Sharing information	0.852	0.726	0.274		
Building Relationships with Costumers	0.869	0.755	0.245		
Economic Performance (ECP)					
Stability and Profitability	0.853	0.728	0.272	0.825	0.616
Income Distribution	0.862	0.743	0.257		
Sustainable Expenditure	0.613	0.376	0.624		
Environment Performance (ENP)					
Land Use	0.704	0.496	0.504	0.833	0.504
Material Efficiency	0.822	0.676	0.324		
Recycling and Waste	0.769	0.591	0.409		
Environmental Regulations	0.560	0.314	0.686		
Certificate Ownership	0.665	0.442	0.558		
Social Performance (SOP)					
Social Activities	0.802	0.643	0.357	0.842	0.639
Human Resources Management / employees	0.810	0.656	0.344		
Social relations	0.786	0.618	0.382		

As shown in table 2, the Average Variance Extracted (AVE) is greater than 0.5 and the Composite Reliability (CR) of the measurement model is above 0.7 as recommended by Hair et al., (2014).

Table 3: Discriminant validity

	SSM	SOM	SCM	ECP	ENP	SOP
SSM	0.815					
SOM	0.750	0.837				
SCM	0.746	0.737	0.800			
ECP	0.682	0.686	0.723	0.784		
ENP	0.579	0.582	0.627	0.652	0.709	
SOP	0.699	0.673	0.643	0.722	0.692	0.799

The AVE and CR values confirm that the model has adequate convergent validity. Discriminant validity was verified by comparing the square root of the AVE for each construct and correlation level involving the constructs (Hair et al., 2014). Table 3 shows that the square root of the AVE for each construct is larger than the correlation level involving the constructs, so confirming discriminant validity.

Measurement model fit using Goodness of Fit (GoF) was assessed by evaluating: absolute fit measures including ten indicators as shown in table 4. Goodness of Fit (GoF) is an evaluation used as a measurement to see the relationship between constructs and their assumptions (Solimun et al., 2017). Goodness of Fit (GoF) in this present study proposed ten indicators of the fit model and their criteria.

Table 4: Evaluation of Goodness of Fit

Model Fit and Quality Indices	Fit Criteria	Results	Notes
Average path coefficient (APC)	$p < 0.05$	0.270 P=0.001	Fit
Average R-squared (ARS)	$p < 0.05$	0.560 P<0.001	Fit
Average adjusted R-squared (AARS)	$p < 0.05$	0.547 P<0.001	Fit
Average block VIF (AVIF)	Acceptable if ≤ 5 , ideally ≤ 3.3	2.986	Fit
Average full collinearity VIF (AFVIF)	Acceptable if ≤ 5 , ideally ≤ 3.3	2.843	Fit
Tenenhaus GoF (GoF)	Small ≥ 0.1 , medium ≥ 0.25 , large ≥ 0.36	0.593	Fit
Sympson's paradox ratio (SPR)	Acceptable if ≥ 0.7 , ideally =1	1.000	Fit
R-squared contribution ratio (RSCR)	Acceptable if ≥ 0.9 , ideally = 1	1.000	Fit
Statistical suppression ratio (SSR)	Acceptable if ≥ 0.7	1.000	Fit
Nonlinear bivariate causality direction ratio (NLBCDR)	Acceptable if ≥ 0.7	1.000	Fit

From table 4, the results of measurement models showed that the ten indicators were fit reaching a satisfactory level or, in other words, the inner model in the present research was considered feasible.

4. RESULTS AND DISCUSSION

4.1. Characteristics of Respondents

Table 5: Characteristics of Respondents

	Criteria	Frequency	Percentage (%)
Gender	Male	68	67.3
	Female	33	32.7
Age (years)	17-25	3	2.97
	26-35	23	22.77
	36-45	22	21.78
	45-65	53	52.48
Education	Elementary	32	31.68
	Junior high	14	13.86
	Senior high	44	43.57
	Associate degree	1	0.99
	Bachelor degree	7	6.93
	Master degree	3	2.97

That respondents who were actors in the supply chain of organic coffee in East Java Province were recruited based on the established assessment. The percentage of respondent characteristics is presented based on gender, age, and education as shown in table 5. Based on gender, most of the respondents were male with an average age of 26-65 years. In addition, most of the respondents have graduated from high school education.

4.2. Descriptive Statistics

Table 6: Descriptive Statistics Analysis

Items	Means	Std. Dev	Skew	Kurt
SSM	3.87	1.11	-0.496	-0.854
SOM	3.83	1.11	-1.144	0.567
SCM	4.02	1.00	-0.593	-0.397
ECP	3.96	1.02	-0.719	0.345
ENP	3.94	1.02	-0.777	0.126
SOP	3.98	0.93	-0.500	0.508

Descriptive statistics of this research shows mean, standard deviation, skewness, and kurtosis. Each variable has three to five indicators measured by a 5-pointlikert scale. The means of all variables were 3.8, and above the standard deviation. It implies that respondents agree with the statement in a questionnaire resulted in less varied data.

The results of each variable showed a negative skewed. The peak tended to the left, and it included in highly skewed. Furthermore, the results of kurtosis analysis on each variable were less than 3. It included in platykurtic category or distribution that has an almost horizontal peak with a taper value <3.

4.3. Major Findings and Managerial Implications

After validating the measurement model, the structural model is used to test hypotheses. The result of hypothesis shown in table 7 the main hypothesis of the present study was to determine the effect of sustainable supply chain management on the sustainability performance of supply chain. Hypothesis test was defined as follows: $p\text{-value} \leq 0.10$ (weakly significant), $p\text{-value} \leq 0.05$ (significant), and $p\text{-value} \leq 0.01$ (highly significant) (Solimun et al., 2017).

Table 7: Path Coefficient and p-value

Path	Hypothesis	Estimate	p-value	Results
SSM →ECP	H1	0.176	0.034**	supported
SSM →ENP	H2	0.095	<0.001***	supported
SSM →SOP	H3	0.289	<0.001***	supported
SOM →ECP	H4	0.298	<0.001***	supported
SOM →ENP	H5	0.480	0.407	not supported
SOM →SOP	H6	0.402	<0.001***	supported
SCM →ECP	H7	0.367	<0.001***	supported
SCM →ENP	H8	0.269	<0.001***	supported
SCM →SOP	H9	0.124	0.102	not supported

***Significant at $p < 0.01$; **Significant at $p < 0.05$; *Significant at $p < 0.1$ Table 7 displays path coefficients test and p-value of SSM variable on ECP, ENP and SOP which had a positive and significant effect. SOM variable on ECP and SOP has significant effect, but insignificant at ENP. While, SCM variable on ECP and ENP have a significant effect, but insignificant at SOP. From the test, it is also known that H5 and H9 were rejected, while others were accepted or, in other words, path coefficient at 7 constructs had a positive and significant effect, two constructs did not have a significant effect.

Figure1. Diagram of path coefficient

The result show SSM affects economic performance. The better industry selects and develops suppliers, the more its economic performance is. Furthermore, the empirical evidences have also found that through farmer groups, the government provided training and education e.g. training of organic farming, producing manure, manufacturing plant pesticide, and training of financial management. In line, Wang and Sarkis (2013) found that the sustainable suppliers applying environmental oriented practices were able to reduce costs through environmental efficiencies, thus, it could affect economic performance. Years of experience as coffee farmers and, now, having shifted to organic farming systems are used for suppliers to learn. Applying organic farming systems, having informal education, and gaining experiences drive suppliers aware that the cultivation needs financial management during cultivation, starting from the initial harvest, and other costs related to the cultivation process.

SSM also has a positive and significant effect on social performance. Hong et al., (2018) claim that suppliers have a positive effect on social performance in the supply chain, and the dimensions they used, namely a supplier quality, supplier development, and information sharing among suppliers can be used to improve social performance among farmers. Organic coffee suppliers receive training and informal insights to ensure the good human resources, to implement organic farming system, and to use manure and plant pesticide. Farmer groups promote the members' capability by planning a training and education to support an advanced agriculture, and establishing an Internal Control System (ICS) aiming to follow all organic farming regulations.

SSM also has an effect on environment performance. The better the quality and development of the supplier, the better the environment performance is. The results of the present study are in line Emamisalehet al. (2018). He discovered the outcome of the value and innovation improvement from their suppliers through supplier development, supply methods improvement, and supply chain network optimization. All of those things are done to enhance the company's environment performance, especially energy efficiency (Hasan, 2013). Certificate ownership of organic farming systems e.g. ICERT and Agricultural Certificate of Thailand is considered as evidence that the supplier has made the coffee cultivation which offers a good impact on the environment.

SOM has a positive and significant effect on the economic performance meaning that the industry has been able to implement the management on the part of its operation and to follow the sustainable regulations which significantly improves the economic performance in the industry. In accordance, Emamisalehet al. (2018) and Esfahbodiet al. (2017) found that processing had a positive effect on economic performance. The organic-certified coffee is still novel in East Java. In the beginning, farmer's organic coffee lost their income. Thus, demands for producing a good quality product and environmentally friendly is a challenge for farmers' groups in East Java. While, the price of organic coffee in the market is still relatively the same with inorganic coffee, and its demand is still relatively low. Consequently, the desired profits have not been achieved yet. But it does not dwindle the farmers' willingness to make a change because they believe that the yield will increase and be good for environment in a long term.

On another side, SOM does not affect significantly on the environment performance meaning that the better and organization performs management on its operations and follows the sustainable regulations, environment performance does not follow to increase. Mitra and Datta (2013) conducted a research in developing countries and concluded that a low level of awareness on environmentally friendly products can lower the product acceptance in the market. The organic coffee processing follows the environmental regulations issued by the government, and reprocesses the waste obtained, such as coffee husks are processed into products that are worth selling, and livestock wastes are processed into manure.

SOM has a significant effect on the social performance. The better the organization carries out the management on its operations and follows the sustainable regulations, the social performance increases more. Processing focuses on how an organization manages the supply or manages the coffee received from suppliers into quality products, and the manufacture

process of the products do not destruct social and is responsible for society. In similar vein, Govindan et al. (2013) conducted a research on the effect of supply chain management from the internal and external perspective of the company on the Triple Bottom Line (TBL). Their study revealed that supply chain management has an effect on TBL, one of which is social performance. The organic coffee industry receives assistance from government in the form of coffee processing equipment and training how to use it. This assistance helps to enhance knowledge related to coffee, especially in the operations section by increasing the quality of the product using the existing equipment. Furthermore, the product varieties are as one of the efforts to attract more customers and gain customer satisfaction. The industry also undergoes social responsibility by recruiting labor from the surrounding community in order to decline unemployment.

SCM has a significantly positive effect on economic performance meaning that the better the industry performs customer management and follows sustainable regulations; the economic performance will increase more. In similar vein, Pekovic et al. (2016), and Emamisaleh et al. (2018) found that customer management had a positive effect on the sustainable economic performance. The industry tries to build good relationships with customers directly and indirectly as well as exchange information, and to receive criticisms and suggestions from customers. From these findings, it can be concluded that customers' orientation drives the industry to maximize the development of its own organic coffee products.

SCM also has a positive and significant effect on environment performance meaning that increasing customers' orientation improves environment performance significantly. In accordance, Pekovic et al. (2016) found that the sustainable management of customers had a positive effect on environment performance. In addition, Emamisaleh et al. (2018) revealed those customers' expectations regarding to environmental factors, like pollution control, and the use of environmental resources could be met by collecting and managing customers' information in order to design products which paid attention to the environment.

SCM has a positive but insignificant effect on social performance. Although, the organization conducts customer-oriented management and follows the sustainable regulations, it has not been able to improve their social performance. On contrary, Emamisaleh et al. (2018) and Chen and Lin (2015) discovered that customers had a positive effect on the sustainable social performance. It is due to their research used the large-scale industries which had already done a good customer management, and had departments focusing on handling customer management. Unlike in large industries, small industries have tried to build good relationships with customers, yet they uttered that less customers bought organic coffee sustainably. The customers thought that organic coffee is the same as inorganic coffee. It is assumedly the cause of less numbers of customers buying the organic coffee. This result is echoing David and Ardiansyah (2017) study. They revealed that in Indonesia, the increasing population and the economic growth has not led to an increase consumption of organic products. Suharjo et al (2016) also posit that the number of consumers of organic products in Indonesia tends to be stagnant, so the initial assumption stating that there will be an increase demand for

organic products is not completely proven. It is the cause why the industries do not give effect on social or surrounding society.

5. CONCLUSION AND RECOMMENDATION

This study aimed to analyse the effect of a sustainable supply chain management on the sustainability performance of organic coffee applying sustainable regulations, and practices of Sustainable Supply Chain Management (SSCM). Organic coffee, the coffee planted using an organic farming system, has pivotal role for Indonesian economy, and its prospect is high due to the large scale production in Indonesia. This study used SSCM practices mainly focusing on actors in the supply chain and the Triple Bottom Line as the basis of sustainability performance.

The variables used in the present study can be ascertained that the variable on the practice of sustainable supply chain management (sustainable supplier management, sustainable operation management, and sustainable customer management) has a positive effect on the sustainability performance of (environment, social, and economy) and several variables requires improvements in order to significantly affect the performance.

Based on the results of research and analysis, several recommendations are drawn to enhance the sustainability performance of supply chain as follows. Small and medium coffee enterprises should improve the treatment of cultivated plant by referring to GAP (Good Agricultural Practice) in order to optimize the production of coffee beans. In addition, the suppliers/ farmers through farmer groups need to test the soil quality to ensure the fertility of cultivated plants which, later, become raw materials for organic coffee products. Furthermore, industry should provide education to customers regarding the eminent difference between organic coffee and inorganic coffee, so that the price and sales of the product increase. It is expected that coffee industry has customers with the sustainable purchases so that it can contribute on economy, environment and social.

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