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The Effect of Lean Practices on Organizational Sustainability Through Green Supply Chain Management as Intervening Variables (Study on the Palm Oil Industry in North Sumatra Province)

Hidayatna Putri[1], Iskandar Muda[2], Muammar Khadafi[3]

[1,2,3]Faculty of Economics and Business, University of Sumatra Utara

ABSTRACT: The purpose of this study was to determine and analyze the effect of kaizen and innovation management on Organizational Sustainability through Green Supply Chain Management in the Palm Oil Industry in North Sumatra Province. The independent variables in this study are kaizen and innovation management, the intervening variable in this study is Green Supply Chain Management, while the independent variable is organizational sustainability. The population in this study were 127 palm oil processing companies located in North Sumatra. Samples were selected using saturated samples. The data was processed using the SEM method with SmartPLS 3.0. The results of this study prove that the application of kaizen has no effect on organizational sustainability in oil palm processing companies in North Sumatra. Innovation management has a positive and significant effect on organizational sustainability, kaizen has a positive and significant effect on green supply chain management, innovation management has no effect on green supply chain management, green supply chain management has a positive and significant impact on organizational sustainability, green supply chain management mediates relations kaizen on organizational sustainability, while green supply chain management does not mediate the relationship between innovation management and organizational sustainability in palm oil processing companies in North Sumatra.

KEY WORDS : Organizational Sustainability, Kaizen, Innovation Management, Green Supply Chain Management.

INTRODUCTION

The manufacturing industry is one of the important factors in the economic development and progress of a country. Industry needs to be developed in a balanced and integrated manner by involving active community participation in efforts to optimally utilize all available natural and human resources. Based on data from the Indonesian Manufacturing Company Directory in 2020, it can be seen that there are 24 types of manufacturing industries. One type of industry in the Directory of Manufacturing Companies is the food industry (manufacture of food products), which consists of 8 industrial divisions. In this industry, there are types of edible oil and vegetable and animal fats (manufacture of vegetable and animal oils and fats) industries, which include discussing manufacturing companies engaged in palm oil processing, both CPO (Crude Palm Oil) and PKO (Palm Kernel Oil).

Currently, palm oil is included in one of the economic activities of the Master Plan for the Acceleration and Expansion of Indonesia's Economic Development 2011-2025 (MP3EI) for the Sumatra region. In MP3EI 2011-2025, Sumatra's main economic activities are oil palm, coal, steel, and shipping. One of the reasons is that plantations in Sumatra are dominated by oil palm production, where 70% of palm oil producing land in Indonesia is located in Sumatra (Tree Corp Estate Statistics Of Indonesia 2018-2020).

North Sumatra is the province with the third largest oil palm plantation area in Indonesia, with an area of 1,630,744 hectares. This oil palm area is located in 10 districts. In addition, based on data from the Directorate General of Estate Crops, the Province of North Sumatra makes a very large contribution to the total national oil palm production. Indonesia's palm oil production in 2020 is 49,117,260 tons and North Sumatra produces 6,601,399 tons.

Facing these changes, companies in the palm oil industry must be able to manage their resources in order to realize the company's goals which will ultimately maintain the company's sustainability (organizational sustainability) and fully increase the

value of the company. To be able to realize the company's goals, lean practices are needed in the company's operations so that lean will be one of the keywords in helping companies to become more competitive. Lean practices in companies can be in the form of implementing kaizen and innovation management (Singh, Singh, and Kumar, 2019). Another factor that can influence organizational sustainability is green supply chain management. Green supply chain management is a supply chain management concept that is integrated with environmental aspects which include product design, supplier selection, material procurement, manufacturing activities, packaging activities, product delivery activities to consumers, and end-of-life product management. In the palm oil industry, environmental pollution is one of the main problems that is often discussed so that in order to continue to survive, palm oil companies need to pay attention to environmental aspects in their operational activities. on data obtained through the official website of the Ministry of Industry, it can be seen that the waste that is not environmentally friendly produced for every 1 tonne of FFB processed is 0.3-0.4 tons. If this waste is allowed to continue, it will cause environmental pollution. To overcome this, it is necessary for companies to take into account the ecological side in every decision making.

LITERATURE REVIEW

Organizational sustainability is a principle in improving social, environmental, and economic performance in business operations (Khumar, 2016). Organizational sustainability focuses on sustainable growth, which is defined as the company's ability to meet current needs while considering future needs (Khumar and Jain, 2013). Organizational sustainability in the business sector is more imposed on some of the performance contained in the company. There are three characteristics that also affect organizational sustainability in the company, namely: environment performance, economic performance, and competitive performance (Wang, 2010).

Lean practices

Kaizen is continuous improvement or improvement. According to Cua (2001), kaizen is a way of thinking for management that is used not only within the scope of management but also in the daily operations of the company. Thus Kaizen means continuous and gradual development in increasing value, intensification, and improvement (Yokozawa, 2021). Kaizen is a continuous improvement process that gives progress to all company activities (Imai, 1998). The Kaizen concept is widely applied by companies because Kaizen functions to tidy up all company activities slowly but with definite results (Ishijima, 2021). According to Singh (2019) the concept of kaizen can be influenced by several indicators including Total quality management (TQM), Total productive maintenance (TPM), Customer relationship, Supplier development, and 5S issues.

Management innovation strategies are the process of managing innovation in a company so that it can be efficient for the creation of a sustainable competitive advantage for the company (Zeng et al (2010). Innovation management is needed to recognize that ideas must continue to flow as quickly as possible and at all times in anticipation of In an increasingly fast, diverse and dynamic world (Bowen and Steel, 2010), innovation management plays an important role in this regard. Innovation is a research, development, and/or engineering activity that aims to develop the practical application of new scientific values and contexts, or new ways to apply existing science and technology into products or production processes (Karatepe, 2020). There are several indicators that influence the management of innovation strategies including Innovation resources, Organizational culture, and Organizational structure (Zeng et. al, 2010)

Green supply chain management is the process of integrating enterprise supply chain management and its activities through cooperative organizational relationships, effective business processes, and a high level of information exchange so as to form a high-performance value system that provides a sustainable competitive advantage for members of the organization and combines considerations environment into every stage of organizational decision making (Handfield, 2002). Green supply chain management focuses specifically on reducing the ecological burden which includes all aspects of product manufacturing/reconditioning, use, handling, logistics, and post-production waste management, including reuse and recycling (Dheeraj and Vishal, 2012). There are four components/dimensions of GSCM that need to be processed, namely green purchasing, green manufacturing, green packaging, and reverse logistics (Lin, 2011).

RESEARCH METHODOLOGY

The types of data in this study are primary data and secondary data. Primary data was obtained based on respondents' answers to the question items contained in the research questionnaire. Each company filled out 1 questionnaire. Of the 127 questionnaires distributed, 97 were returned. Thus, the number of questionnaires that can be processed is 97 questionnaires or in other words there are 97 companies that are willing to fill out research questionnaires. Of the total questionnaires

distributed, the percentage of questionnaires used in the study was 76.38%. The data was processed using the SEM method with SmartPLS 3.0.

DATA ANALYSIS

This section includes the detailed description of statistical analysis performed to validate the questionnaire and meet the objectives of the study.

Hypotheses for the study, validity, and reliability test

To ascertain the role of Kaizen and innovation on organizational sustainability through GSCM (mediating effect), SEM technique has been applied to the different independent and dependent variables. To assess the performance of these lean strategies, an individual model and mixed model have been prepared to ascertain the relationship between latent variables with each other and also on measured variables assigned to each latent variable. The error variables depicting measurement error are also included in relation to measurement variables. The variance of all the error variables has been fixed in software SmartPLS 3.0. The validity of data is measured from loading factor which is greater than 0,70 and AVE is greater than 0,50 (table 1 show AVE). (Figure 2 show the validity test before reduce). Thus, seeing that there are still items that are not feasible to measure the latent variable, it is necessary to reduce (simplify) the use of indicators in variables, namely by removing indicator items that are declared invalid, and excluding the indicators that have been reduced when the re-estimation is carried out. (figure 3 show the validity test after reduce). All the values are greater than 0.70, which is appropriate for the survey research.The reliability of data is measured from composite reliability and cronbach alpha which must be greater than 0,70 (table 2 show reliability test).

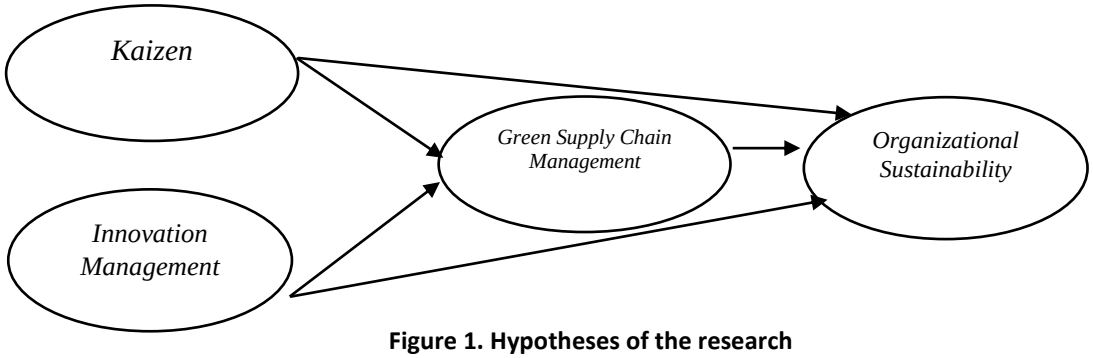

Figure 1. Hypotheses of the research

The hypotheses have been framed for the present research in concern with SEM as shown below:

H1. kaizen affects organizational sustainability

H2. innovation management affects organizational sustainability

H3. kaizen affects green supply chain management

H4. innovation management affects green supply chain management

H5. green supply chain management affects organizational sustainability

H6.green supply chain management mediates the relationship between kaizen to organizational sustainability

H7. green supply chain management mediates the relationship between innovation management and organizational sustainability

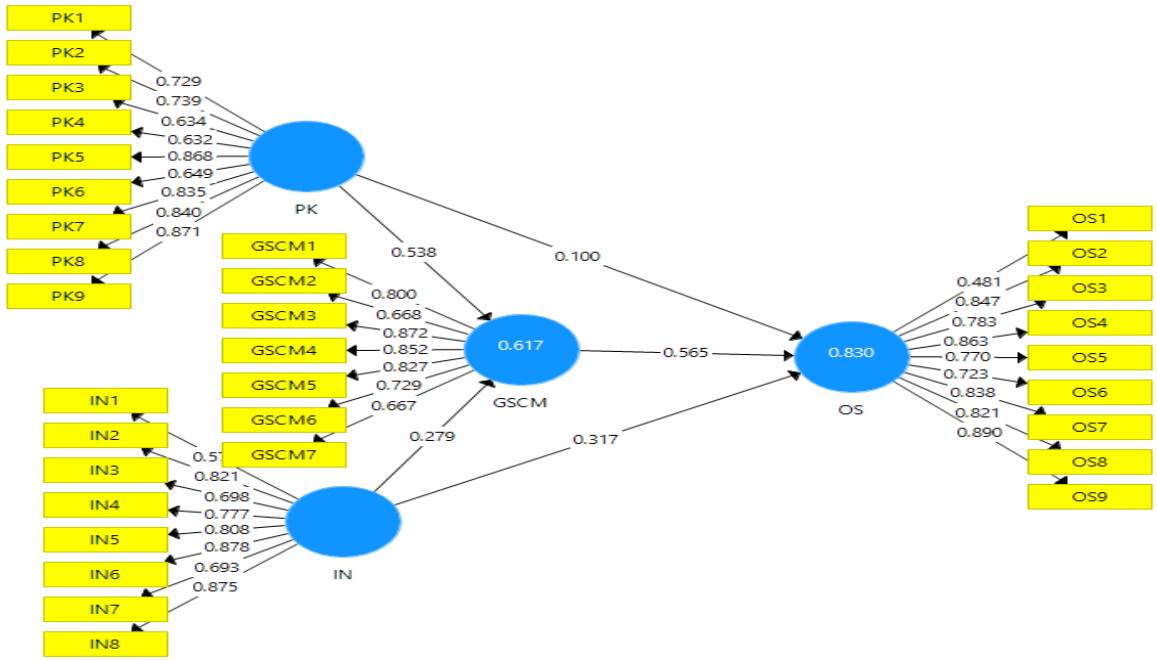

Figure 2.Measurement model for validity (loading factor before reduce)

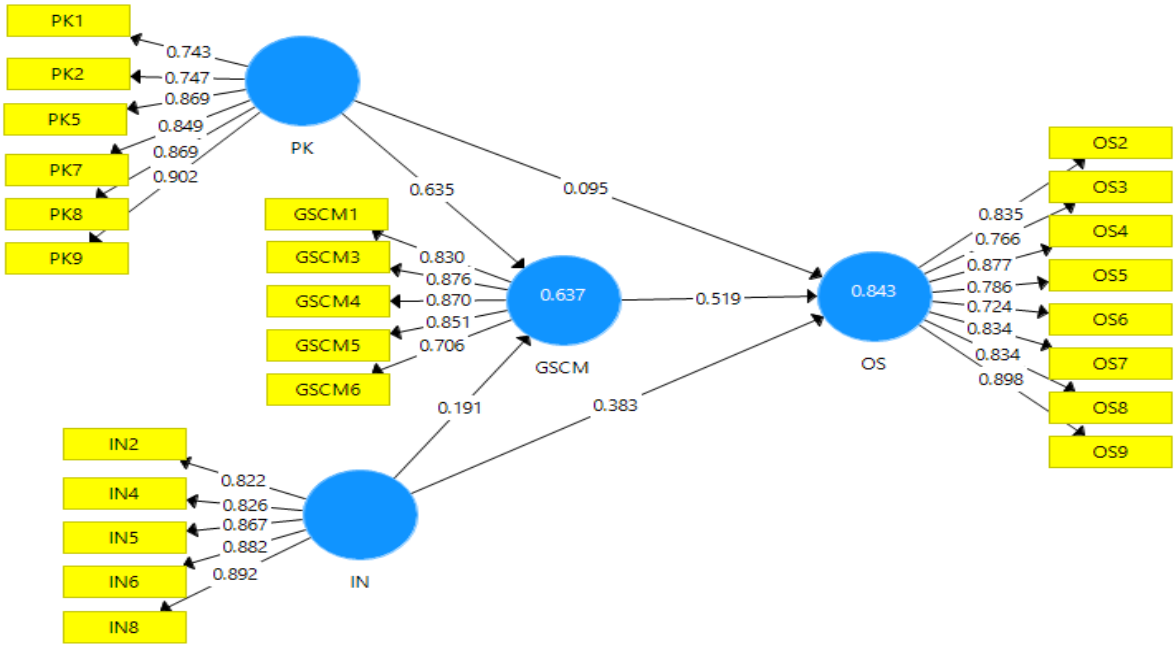

Figure 3. Measurement model for validity (loading factor after reduce)

Table 1. Avarage variance extract (AVE)

	AVE
Kaizen	0.693
Innovation Management	0.736
Green Supply Chain Management	0.687
Organizational Sustainability	0.674

Provisions regarding the measurement parameters (rule of thumb) of the measurement model (outer model) that the AVE is considered to have met convergent validity if the AVE value is greater than 0.50 (Ghozali and Hengky, 2015). So based on the

table of AVE values above, it can be seen that the AVE value of each construct is valid. So that the construct has met convergent validity.

Table 2. Composite Reliability and Cronbach's Alpha

	Composite Reliability	Cronbach's Alpha
Kaizen	0.931	0.910
Innovation Management	0.933	0.910
Green Supply Chain Management	0.916	0.885
Organizational Sustainability	0.943	0.930

Each construct is above 0.70, so it can be stated that the indicators used in this study have met good reliability (reliable). Assessing the inner model is to look at the relationship between latent constructs, by looking at the results of the estimated path parameter coefficients and their level of significance (Ghozali, 2008). The structural model in PLS is evaluated using R-square for the dependent variable and the path coefficient value for the independent variable which is then assessed for significance based on the T statistic value of each path.

Table 3. R-Square

	R-Square
Green Supply Chain Management	0.637
Organizational Sustainability	0.843

The table shows the R-square value for the green supply chain management variable of 0.637 and for the organizational sustainability variable of 0.843. This shows that 63.7% of green supply chain management variables are influenced by kaizen and innovation management variables and 84.3% organizational sustainability variables are influenced by kaizen, innovation management, and green supply chain management variables.

RESULT

The basis for testing the hypothesis in this study is the value contained in the output path coefficient.

Table 4. Path coefficient for direct effect

	Original sample	T statistic	P value
Kaizen-> Organizational Sustainability	0.095	0.832	0.406
Innovation Management ->Organizational Sustainability	0.383	3.404	0.001
Kaizen-> Green Supply Chain Management	0.635	3.088	0.002
Innovation Management ->Green Supply Chain Management	0.191	1.006	0.315
Green Supply Chain Management -> Organizational Sustainability	0.519	5.130	0.000

The effect of kaizen on organizational sustainability shows the path coefficient value of 0.095 with a tstatistic value of 0.832. This value is smaller than t table (1.96), which means that hypothesis 1 is rejected. The effect of innovation management on organizational sustainability shows the path coefficient value of 0.383 with a tstatistic value of 3,404. This value is greater than t table (1.96) which means innovation management has a significant positive effect on organizational sustainability. The effect of kaizen on green supply chain management shows the path coefficient value of 0.635 with a tstatistic value of 3.088. This value is greater than t table (1.96), which means that hypothesis 3 is accepted. The effect of innovation management on green supply chain management shows the path coefficient value of 0.191 with a tstatistic value of 1.006. This value is smaller than t table (1.96) which means innovation management has no effect on green supply chain management. The effect of green supply chain management on organizational sustainability shows the path coefficient value of 0.519 with a tstatistic value of 5.130. This value is greater than t table (1.96) which means that hypothesis 5 is accepted.

Table 5. Path coefficient for indirect effect

	T statistic	P value
Kaizen-> green supply chain management-> organizational sustainability	3.573	0.000
Innovation management-> green supply chain management-> organizational sustainability	0.947	0.344

The effect of kaizen on organizational sustainability through green supply chain management as an intervening variable is indicated by the tstatistic value of 3,573 which is greater than t table (1.96). This means that Hypothesis 6 is accepted. Kaizen has no direct effect on organizational sustainability. However, when including the green supply chain management variable as a mediator of the relationship between kaizen and organizational sustainability, it shows significant results. Thus, it can be said that there is a perfect mediation (full mediation).The effect of innovation management on organizational sustainability through green supply chain management as an intervening variable is indicated by the tstatistic value of 0.947 which is smaller than t table (1.96). This means that hypothesis 7 is rejected.

DISCUSSION

Kaizen has no effect on organizational sustainability. This shows that the application of kaizen in palm oil industry companies in North Sumatra can not directly affect organizational sustainability in the company. The application of kaizen in companies requires other factors to achieve organizational sustainability. This is because kaizen emphasizes a process-oriented mindset while management must find, recognize, and correct errors in the process through innovation and work motivation in the process (Maarof and Mahmud, 2015). Kaizen requires long internalization dynamics including the internalization process, changes in human resources, kaizen working process by subject, the process of applying kaizen culture to subjects, and kaizen work application results to achieve organizational sustainability (Khumar and Jain, 2013).

Innovation management has an effect on organizational sustainability. The existence of an organization culture in the process of managing innovation in palm oil industry companies in North Sumatra has the power to create a competitive advantage for the company. Innovation management is a tool that companies can use to achieve long-term sustainability (Kalay and Lyyn, 2015).

The application of kaizen in the company's production process will provide an update on the overall knowledge and processes in the palm oil industry in North Sumatra, which in turn will provide an effective production process compared to competitors and can further improve green supply chain management (Perez. et al, 2010). Kaizen will assist the integration process of supply chain management companies and their activities through cooperative organizational relationships, effective business processes, and high levels of information exchange to form a high-performance value system (Green. et al, 2012).

The application of innovation management in palm oil industry companies in North Sumatra has no impact on improving environmental aspects which will lead to the creation of good green supply chain management aspects for the company. Green supply chain management is considered to be part of innovation that focuses on efforts to improve environmental aspects (Dheeraj, 2012).

Green supply chain management in the palm oil industry helps companies to achieve organizational sustainability (Singh, 2019). To balance the development of global industry which is currently aware of environmental issues, companies that are producers must pay more attention to the environment so that they can continue to exist in global developments. Therefore, the application of green supply chain management in companies can be a competitive advantage that companies can use as a way to achieve organizational sustainability.

To achieve good organizational sustainability in a company, a driving aspect of the operational process is needed in the form of continuous improvement practices. In addition, it is also necessary to practice environmental performance that can work together in achieving organizational sustainability within the company. Palm oil companies in North Sumatra are currently actively paying attention to environmental issues. This is due to government pressure regarding regulations for oil palm plantation companies to obtain ISPO (Indonesian sustainable palm oil) certificates which aim to reduce environmental impacts as well as environmental mitigation for companies operating in the palm oil sector. In the process, green supply chain management also influences kaizen in achieving organizational sustainability. Continuous improvement or kaizen coupled with environmental management or green supply chain management makes the company operate more optimally.

The Effect of Lean Practices on Organizational Sustainability Through Green Supply Chain Management as Intervening Variables (Study on the Palm Oil Industry in North Sumatra Province)

Innovation management does not need to go through green supply chain management first to be able to influence organizational sustainability in the palm oil industry in North Sumatra because it does not play a role at all in linking the two variables. Thus, it can be said that there is no mediation (no mediation). Green supply chain management is considered to be part of innovation that focuses on efforts to improve environmental aspects so that it will not affect innovation management in relation to organizational sustainability.

LIMITATION

The study has some limitations as shown below:

- Scope of subjectivity might be there because managers have responded according to their own perceptions.
- There is a possibility of method variance in applying SEM PLS.

For further research, organizational sustainability variables can be replicated in palm oil processing companies in other regions to strengthen the results of this study and explore the level of generalization across palm oil processing companies in other regions in Indonesia.

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