

The Effect of Green Process Innovation on Corporate Sustainability and Environmental Performance as a Mediation Variable

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The Effect of Green Process Innovation on Corporate Sustainability and Environmental Performance as a Mediation Variable

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ABSTRACT

This research aims to examine the environmental performance as a mediating variable of the relationship between green process innovation on the corporate sustainability in small and medium enterprise (SME) in South Sumatra. The respondents in this research were the managers and owners of manufacturing small and medium-sized businesses. There were 70 SMEs as research samples. The data analysis used partial least square structural equation technique (PLS3). The results proved the green process innovation directly had a positive and significant effect on environmental performance, the green process innovation does not have effect on corporate sustainability, and the environmental performance has a positive and significant effect on corporate sustainability. The moderating variable in this research is environmental performance. The result showed the green process innovation has positive effect on corporate sustainability and the environmental performance can moderate the relationship between green process innovation and corporate sustainability.

Keywords: green process innovation, corporate sustainability, environmental performance

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1. INTRODUCTION

In recent years, corporate sustainability (CS) has attracted a lot of attention among researchers. Studies assessing and maintaining sustainability have increased worldwide. [1]. Nowadays, stakeholder demands and institutional influence have prompted companies to incorporate corporate sustainability into their internal policies and strategies [2]. There are three perspectives measuring the corporates sustainability; economic benefits, reduction of environmental impacts, and social welfare (triple bottom line concept) [1], [3]. Furthermore [4] states that this term refers to being a sustainable corporation, which is not only consistent with the triple bottom line concept but is also a business orientation that meets stakeholder's needs over the long term. In order to achieve long-term sustainability, businesses will have to manage not only economic capital, but also their natural capital and their social capital.

Corporate sustainability has been defined as a balance between profit, environment, and social without impacting future development [3]. Corporate sustainability as an organization's capacity to create and maintain economic, environmental, and social value for itself, stakeholders, and society in general

both in the short and long term. The implementation of corporate sustainability is not always associated with social responsibility programs that companies in Indonesia mainly carry out. More important is how companies can synergize environmental harmonization and community empowerment activities into their business processes to achieve profits. To support organizations that want to develop their business sustainably, companies must develop a sustainable implementation strategy which is usually part of their business process improvement strategy [5]

One of the industries that are encouraged to develop business sustainably is the small and medium enterprise (SMEs) sector. In Asia, SMEs play an essential role in economic growth and the achievement of sustainable development goals. SMEs are the key to job creation and income distribution, as well as export growth [6]. For example, in Indonesia, SMEs contributed to the Gross Domestic Product by 61.07%, with a total investment of 60.42%. However, SMEs in the manufacturing sector are also responsible for most of the world's resource consumption, air and water pollution, and waste generation [6]. Moreover, from their production activities, SMEs can influence the environmental impact of large-scale companies, 60-70% of the total pollution produced by SMEs [7].

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Therefore, SMEs become objects that are pretty important to be investigated by raising the issue of whether owners and managers of SMEs know how environmentally-based and environmentally friendly business concepts can improve corporate sustainability.

Through an environmentally-based business concept, managers and owners can pay more attention to environmental impacts and to face increasing pressure from the community and government. Therefore, companies must be greener or more environmentally friendly [8]. In addition, the shift in consumer behavior that starts looking for environmentally friendly products emphasizes the importance of environmentally friendly business concepts. For SMEs in Indonesia, especially in South Sumatra, this awareness must be created and developed. The research results of Wang et al., 2021 stated that the business concept with an environmental concept has a significant impact on market competitiveness [9]. For this reason, SMEs can put forward green process innovation as a strategy for improving business processes. In addition to increasing profits and company sustainability, they can also become environmentally friendly SMEs according to the expectations of local community stakeholders.

Based on the explanation above, this study aims to confirm previous research on green process innovation on corporate sustainability with environmental performance as a mediating variable in SMEs in South Sumatra. Furthermore, this research is also expected to provide practical benefits for SMEs to become environmentally friendly SMEs. The government, especially local governments, always offer support to SMEs through coaching programs to become more competitive SMEs in South Sumatra.

2. LITERATURE REVIEW

2.1. Stakeholder Theory

Stakeholder is an individual or a group of individuals who can influence the organization in achieving organizational goals. These groups or individuals include employees, communities, local governments, customers, even suppliers, competitors, etc. Currently, the Company's primary goal is not only to gain profit or profit, but the Company strives to maintain business continuity in the future without disturbing the ability of future generations to meet their needs

8 Although industrialization and globalization present essential advantages 8 for companies and countries, their negative impact on the environment has attracted significant attention from various stakeholder groups, governments, international bodies, and others. Thus, achieving environmental sustainability is no

longer an option but is mandatory for companies [10]. Based on this, the Company needs good management and strategies in carrying out its operational activities to maintain good relations with all stakeholders to generate positive responses from all stakeholders.

2.2. Green Process Innovation

Green process innovation improves existing production processes or adds new production processes to reduce environmental impacts and production costs [11]. An important goal of green process innovation is to improve economic performance and an environmental management strategy [12]–[14]

2.3. Environmental Performance

Environmental performance is the result of a company that cares about the surrounding environment. Companies with good environmental performance have greater social concern for the community and their workforce (Rahmawati, 2012). The care of the environment will create concern for the production process, product quality, and product safety. Companies that can integrate environmental care with every aspect of company activities will get a good response from stakeholders.

2.4. Corporate Sustainability

Corporate sustainability is an effort to meet the interests of the company's stakeholders, either directly or indirectly, such as shareholders, employees, clients, communities, and others, without compromising its ability to meet the needs of stakeholders in the future [4]. Corporations have become more sensitive to social, environmental, and economic issues and stakeholder concerns and are striving to become better corporate citizens. Whether the motivation is concern for society and the environment, government regulation, stakeholder pressures, or economic profit, the result is that managers must make significant changes to more effectively manage their social, economic, and environmental impacts. Corporate sustainability is a principle that applies a balance between economic factors (profits), environmental factors (planet), and social factors (humans) or what is known as the triple bottom line. Through this concept, companies must be more responsible in managing their business without damage future development. The most important thing is that the emphasis is no longer on whether organizations should consider sustainability issues and their consequences but on how organizations can integrate environmental, social, and economic responsibilities into day-to-day decision making [15]

3. HYPOTHESES DEVELOPMENT

3.1. Relationships Between Green Process Innovation and Environmental Performance

In some previous studies [9], [13] revealed the green process innovation could improve environmental and economic performance. In others study [11], [16], [17] indicated that the green process innovation positively impacts the company's competitive advantage and sustainability. And the results of the study [10] that the green process practices are significantly and positively affect the company's reputation and environmental performance in SMEs.

H1: Green process innovation has a positive effect on environmental performance

3.2. Relationships Between Green Process Innovation and Corporate Sustainability

Study on the relationship of green process innovation to corporate sustainability is still little (Sezen & Çankaya, 2013). However, there has been increasing attention to the innovation process for sustainable development in the last two decades. The study results [11] revealed that green process innovation positively affects corporate sustainability performance. Meanwhile, the study results [18] show that green process innovation as measured by knowledge management has a positive relationship to corporate sustainability development.

H2: Green Process Innovation has a positive effect on corporate sustainability

3.3. Relationships between Environmental performance and corporate sustainability

Environmental performance management aims to fulfil all laws and regulations, and environmental requirements in a thorough manner. This activity can reduce the quality of ecological impacts to below the quality standards required by related regulations [19]. Furthermore [20] stated that in terms of environmental performance as organizational effectiveness, SMEs leaders could play an essential role in implementing environmental strategies to achieve environmental performance. SMEs stakeholders, such as employees, competitors, customers, suppliers, local communities, and public authorities, expect companies to achieve environmental and financial performance [7]. Meeting the expectations of local community stakeholders is significant for the competitiveness of SMEs because SMEs are more dependent on local communities and require closer interaction and more business activities

than large companies [8]. Stakeholder-focused environmental compliance and crisis mitigation can be the key to the survival of SMEs [20]

H3: Environmental performance has a positive effect on corporate sustainability

3.4. Relationships between Environmental Performance as a Mediating Variable on Green Process Innovation and Corporate Sustainability

Previous research revealed [9], [13] that the green process innovation can improve environmental and economic performance. Based on past studies [11], [16], [17] also revealed that green process innovation positively impacts the company's competitive advantage and sustainability. And the results of the research [10] revealed that the green process has relation significant and positive effect on the company's reputation and environmental performance in SMEs. The research results [21] stated that eco-efficiency provides excellent opportunity for companies to achieve environmental performance.

H4: Green process innovation has a positive and significant effect on corporate sustainability with environmental performance as a mediating variable.

4. RESEARCH METHOD

South Sumatra province is known as one of the rich provinces in natural resources. In 2020, the number of companies in the large and medium categories in South Sumatra Province was 105 food industry. Compared to districts/cities in South Sumatra, Palembang City has the highest number of companies in large and medium enterprises, as many as 70 units. Beside that number of micro and small enterprise categories in South Sumatra Province in 2019 was dominated by the food industry with 25,795 units.

The study employed a quantitative approach and the data used in this study is primary data, namely the respondent's answer to the questions on the research questionnaire. The questionnaires were sent by email to the owners and managers of manufacturing SMEs in South. From the results of sending the questionnaire online, there are 70 respondents answer. The sampling technique was carried out by non-probability sampling (not random) with the criteria of SMEs as respondents based on the number of employees and the number of assets owned. The scale used in the questionnaire preparation is the Linkert scale, where the measured research variables as measured in the form of question items with a 5-point assessment (from strongly disagree (=1) to absolutely agree (=5). The questions posed in this questionnaire are modified questions from previous researchers.

The measurement model used is Variance Based Structural Equation Modeling (VB-SEM) using smartPLS3 through construct reliability and validity, discriminant validity, and outer loading. The model used aims to test the construct relationship for further analysis. Furthermore, measurement of the structural model analysis, namely, R square, path coefficients, and bootstrapping, tests the research hypothesis.

This study has three types of variables: the independent variable, the dependent variable, and the mediating variable, which are green process innovation and eco-efficiency. The dependent variable is corporate sustainability, and a mediating variable in this study is environmental performance. The question items are modifications from previous research [6], [9], [22]. The figure of the model on the illustration below:



Figure 1 Research Model

5. ANALYSIS AND DISCUSSION

5.1. Description of Research Sample

The description of research sample show in the table 1:

Table 1 Description of Research Sample (n = 70)

Description	Frequency	Percentage
Education Level:		
Junior High School	27	39%
Senior High School	31	44%
Bachelor	8	11%
Master	4	6%
Region :		
Palembang	32	46%
Indralaya	4	6%
Prabumulih	9	13%
Muara Enim	18	26%
Lahat	5	7%
Betung	1	1%
Ogan Ilir	1	1%
Business Period:		
<1 year	10	14%
1 – 4 years	34	49%
4 – 7 years	14	20%
>7 years	12	17%
Total Assets:		
<50 million	61	87%
50 – 500 million	7	10%
>500 million	2	3%
Employee:		
3 - 15 Peoples	60	86%
26 – 35 Peoples	7	10%
> 35 Peoples	3	4%

5.2. Measurement Model

5.2.1. Outer Loading

A loading factor value of 0.70 or more means has a strong enough validation to explain the

latent construct. From the results of testing the data, the value of the question items for each variable has resulted in a value above 0.70 which means it is acceptable and has validity. The value of outer loading show in Table 2

Table 2 Outer Loading

Item	Green Process Innovation	Corporate Sustainability	Environmental Performance
X1.1	0,753		
X1.2	0,820		
X1.3	0,799		
X1.4	0,869		
Y1.1		0.901	
Y1.2		0,841	
Y1.3		0,878	
M1.1			0,840
M1.2			0,897
M1.3			0,895

5.2.2. *Reliability and Validity Test*

A measurement model requires an assessment that aims to see whether or not there is a relationship between the latent variable and the indicator. In this research, the first uses measurements of composite reliability and Cronbach's alpha. If the value of

Composite reliability and the Cronbach's is between 0.60 - 0.90, it is mean accepted. The second is using convergent validity. The convergent validity value is received when the average variance extracted (AVE) value is above 0.50 [23]. The results are show in the Table. 3

9 **Table 3.** Construct Reliability and Validity

	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Green Process Innovation	0,828	0,869	0,906	0,763
Corporate Sustainability	0,846	0,842	0,885	0,659
Environmental Performance	0,851	0,859	0,910	0,771

The measurement of latent variables and indicators for measuring Cronbach's alpha and composite reliability of green process innovation are 0.828 and 0.906, corporate sustainability is 0.846 and 0.885, and environmental performance is 0.851 and 0.910. The average variance extracted (AVE) from green process innovation is 0.763, corporate sustainability is 0.659, and environmental performance is 0.771, from the results of the variables, its mean received.

5.2.3. *Discriminant Correlation Test*

The discriminant correlation test to see the correlation between the constructs and other constructs. If the value of the square root of the AVE for each construct is greater than the correlation value between the construct and other constructs in the model. This means the construct has a good level of validity.

Table 4. Discriminant Validity

	Corporate Sustainability	Green Process Innovation	Environmental Performance
Corporate Sustainability	0,874		
Green Process Innovation	0,553	0,812	

Environmental Performance	0,717	0,622	0,878
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5.2.4. Model Structural

The structural model analysis can see from R-Square (R²). The value of R² show that exogenous variables can measure and explain exogenous variables. In general, the value of R2 for endogenous

variables there are three categories of values, namely 0.75 means strong, 0.50 is medium, and 0.25 is weak (Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, 2017). The estimated R-square values are shown in the table. 5.

Table 5. Nilai R-square

	R Square	R Square Adjusted
Corporate Sustainability	0,534	0,513
Environmental Performance	0,561	0,548

5.2.5. Direct and Indirect Analysis

5.2.5.1. Direct Analysis

Based on testing using the bootstrapping function, if the p-value is below 0.05 or the

T-statistic value is above 1.96, it means that the hypothesis is accepted. Thus, from the bootstrapping process, the path coefficients are in Table 6

Table 6. Path Coefficients

H	Variable / Construct	Original Sample	Sample Mean	Standard Deviation (STDEV)	T-Statistic (O/STDEV)	P - Values	Result
H1	Green Process Innovation → environmental performance	0,427	0,446	0,113	3,760	0,000	Accepted
H2	Green Process Innovation → Corporate Sustainability	0,172	0,208	0,133	1,294	0,196	Rejected
H3	Environmental Performance → Corporate Sustainability	0,582	0,563	0,138	4,206	0,000	Accepted

Based on table 6, the hypothesis 1 (H1) has T-Statistic is 3,760 and the p-value is 0.01, it's means that (H1) is accepted, because T-statistic more than 1,96 and p value less than 0.05. Green process innovation has effect on environmental performance. The second hypothesis has the t-statistic is 1,294 less than 1,96 and the p value is 0,196 more than 0,005, this means H2 is rejected. The green innovation process does not have effect on corporate sustainability. The third hypothesis has the t-statistic

is 4,206 more than 1,96 and the p value is 0,000, which reveal the environmental performance has effect on corporate sustainability, and the third hypothesis is accepted..

5.2.5.2 Indirect Analysis (Mediation)

The result of the indirect analysis are show in Table 7

Table 7. Specific Indirect Effects

	Variable / Construct	Original Sampel	Sampel Mean	Standard Deviation (STDEV)	T Statistic (O/ST DEV)	P - Values	Result
H4	Green Process Innovation → Environmental performance → Corporate Sustainability	0,268	0,255	0,093	2,877	0,004	Accepted

Based on the table 7, the sixth hypothesis (H4) has t statistic is 2,877 more than 1,96 and the p value is less than 0,05 it's means H4 is accepted. The green process innovation has effect on corporate sustainability through environmental performance as a mediating variable that gives full mediation results, which reveal that without environmental performance, green process innovation is not able to effect corporate sustainability.

These findings indicate that stakeholder theory supports this research. Creating or increasing company value is not only concerned with profit, but it is necessary to pay attention to stakeholders for their needs in a healthy environment, and company operations must be in line with communities expectations. Green process innovation has a positive effect on environmental performance. SMEs managers and owners realize the importance of an environmentally-based business concept. Support from local communities, consumers, suppliers, and the government is significant for the sustainable of SMEs.

6. CONCLUSIONS

Corporate Sustainability of SMEs in South Sumatra has no relation with green process innovation. Green process innovation only affected on environmental performance. This situation happen because SMEs in South Sumatra have not implemented the concept of green innovation as a whole, there are still many parts of the production process that use traditional technology. One of the reasons is that SMEs are still not given a good education and understanding of the benefits of green technology for SME business sustainability. SMEs also need the participation of all parties, both internal and external to implement the Green Process Innovation and Eco-Efficiency. In addition, SMEs that have an environment-based business concept will affect the success of large-scale companies. However, this study has limitations, including too few respondents and the indicator questions are few, and for further researchers to be able to expand the number of respondents by adding question indicators that are directly related to business processes or use medium large sized enterprises in South Sumatera as respondents to

prove green process innovation positively effect on corporate sustainability.

AUTHORS' CONTRIBUTIONS

Siti Khairani: Conceptualization, literature review, writing research, research method, making questionnaires, sampling design, data collection, hypotheses testing, use software tools, SmartPLS3, measurement model, outer loading, testing validity and reliability, discriminant correlation test, review and editing (entire manuscript). Didik Sustyo: Conceptualization, literature review, research methodology. Yusnaini: Conceptualization, literature review. Hasni Yusrianti: Conceptualization, literature review, research methodology, review and editing.

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