

Empirical Examination of Green Industry Strategy through ISO-14001 on Firm Value: Mediating Roles of Profitability and Leverage



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<https://doi.org/10.18280/ijstdp.170505>

ABSTRACT

Received: 20 April 2022

Accepted: 15 July 2022

Keywords:

green industry strategy, eco-efficiency, ISO-14001, firm value, profitability

The research aims to analyze the effect of green industry strategy on firm value by leverage and profitability as a moderating variable. Green strategies are widely seen as being able to direct industries and corporations to increase productivity and competitiveness. In addition, this strategy can help the industry promote economic value. In this study, an empirical examination of the green strategy is assessed from the implementation of ISO-14001 as an important consideration in interpreting green practice in industry. Specifically, the variables used to measure it are using eco-efficiency proxies as independent variables with a dummy with ISO-14001, the dependent variable of firm value with Tobin-Q, and using moderating variables of leverage and profitability with Return on Assets (ROA). Using the purposive sampling method on 74 companies and 222 samples listed on the Jakarta Composite Index (JCI) in 2016-2018, the research results underline the important role of eco-efficiency in promoting firm value. This shows that the implementation and proactiveness of management in the green industry through ISO-14001 is an important consideration for investors and stakeholders and ensures the sustainability of the company in the long term. Practically, recommendations need to be made regarding the role of corporations and sectoral industries in dealing with issues of sustainability, environmental pollution, environmental degradation, and deforestation. This paper proposes an empirical innovation in examining how the adoption of environmental standards by companies can be useful for increasing manufacturing company profitability. This study has limitations on the object of research which only examines the manufacturing industry. Therefore, further studies are expected to investigate the role ISO-14001 in other industries with high environmental risks.

1. INTRODUCTION

Large industry is an important source of local pollution and a source that must be considered for regional air pollution [1, 2]. This industrial pollution, combined with urban source pollution, is a threat to human health and well-being [3-5]. The use of chemicals that continues to increase and is widespread in all sectors has been accompanied by an accumulation of negative effects, including pollution of soil, water and air [6]. These materials can enter the food chain which can threaten human health and the environment [7].

The role of industry is very substantial in environmental sustainability, in relation to the contribution of emissions and carbon footprints contributed by this sector [8, 9]. To that end, regulations in recent years have focused on compliance, regulation and law enforcement regarding industries with a high carbon footprint. This in turn is considered to be able to address climate change in a focused and substantial manner. In Indonesia, policies on industrial compliance with sustainability aspects have been formulated in several legal products that regulate the company's obligations to control pollution and maintain ecological functions. In addition, Law No. 32 of 2009 focuses on the obligation of corporations to provide reliable and valid information regarding

environmental protection and management [10]. In particular, to reduce activities that are not environmentally friendly, companies are required to comply with quality standards and environmental criteria. This in turn encourages companies to adopt some green measures to increase company value, and maintain competitiveness.

One of these green management is the implementation of the ISO-14001 standard in public companies, along with increasing public awareness and pressure for companies to behave in an environmentally friendly manner and contribute to reducing the negative impacts of climate change [7]. Management of the resources owned must be responsible, wisely preserving the supply of resources so that future generations can enjoy them. The community can achieve prosperity because they can take advantage of the resources they have. Environmental impact reduction should be carried out by the company as a responsibility to the environment and society. However, at the same time, companies are a source of environmental pollution, such as water, air, and soil pollution [11]. One of the concepts that can be developed in dealing with problems that are often carried out by companies is the Green Industry Strategy concept [12-14].

The Green Industry Strategy is broadly defined as a series of corporate strategic policies to create low-carbon products

and processes based on green growth and focus [15-17]. This strategy is an effort to streamline organizational resources while increasing the value of the company in the eyes of stakeholders. This makes the green strategy one of the practical concepts applied to reach the equilibrium point in the corporation, between suppressing energy and achieving optimal productivity [18]. By applying ISO-14001 as one of the widely accepted internationally accepted indicators for environmental management standards, companies can pursue high and legitimate corporate values in the public and stakeholders. As one of the main contributors to CO₂ emissions, the manufacturing industry has a big responsibility to adopt green measures.

Today, a green economy has become the new norm in both public policy and corporate strategy as water, soil and air pollution is rapidly increasing that affects the earth's biosphere [19]. Various economic and business frameworks have been proposed along with the huge demands on manufacturing, mining, plantation, agriculture and extractive industries as some of the biggest contributors to emissions and carbon footprints [20]. However, this change in business norms is seen as having a negative impact on companies along with the perception that the green economy is a burden and increases expenses [21-23]. However, ethical principles adopted nowadays by stakeholders and consumers require companies to pay more attention to the suitability of their production and processes with environmental preservation and sustainability. Previous studies have confirmed public and stakeholder decisions by the company's green industry strategy. In this context, companies that can align their green strategy are more likely to have greater corporate value and profitability as consumers buy more environmentally friendly products [24-27]. In this case, this study seeks to empirically examine the implementation of a green industry strategy through ISO-14001 as an eco-efficiency effort. This paper proposes an empirical innovation in examining how the adoption of environmental standards by companies can be useful for increasing manufacturing company profitability. In this study, a large number of public manufacturing companies listed on the Jakarta Composite Index (JCI) were examined during 2016-2018. The findings are expected to contribute theoretically and practically in affirming the important role of eco-efficiency in promoting corporate value.

2. LITERATURE REVIEW

2.1 Green industry strategy concept

Reducing the environmental impact will help in restoring the ecosystem. For that all it needs cooperation between experts and decision makers so that the decision-making process is based on a strong analysis. Companies also need to present information and future strategies so that they can produce environmentally friendly products. On the other hand, companies are still less motivated to do environmental protection because they have to follow many procedures for this. Osazuwa and Che-Ahmad [28] state that there are processes in environmental recovery that have led to the emergence of a Green Industry Strategy in the form of eco-efficiency. The concept of eco-efficiency is the midpoint between economy and the environment. The existence of various policies in the environmental sector has led to the development of a concept that aims to find solutions for

meeting business objectives and solving environmental problems called Green Industry Strategy [29]. In the context of a public company, the application of green standards, such as ISO-14001 is considered effective for companies to pursue green standards while increasing performance through increasing firm value. This makes implementing a green strategy not only beneficial in governance, but also a source of competitive advantage for enterprises and sustainable economic development. This includes cost advantages resulting from environmental production processes which include redesign of production into non-polluting production and using energy-efficient equipment or manufacturing processes [30, 31].

Manufacturing companies are more likely to capable of applying the eco-efficiency controlling the risk of environmental pollution. Implementation of the ISO 14001 Environmental Management System is a non-negotiable solution for manufacturing companies. ISO 14001 has proven effective in the world for controlling environmental aspects. The question now is, how is the application of ISO 14001 in the manufacturing industry. The process of implementing ISO 14001 in the manufacturing industry must use an approach that focuses on manufacturing industrial processes that have the risk of pollution to the environment.

As companies are basically founded to generate profits, Barolla [32] explains that the main purpose of establishing a company is to increase the prosperity of shareholders and owners. In this case, an increase in the value of the company is more likely to achieve this goal [33]. When society acts through various representative bodies, so that various rules emerge to regulate the positive and negative impacts of social goals with economic efficiency, from there the company's duties will become clearer. Many investors are starting to consider investing in companies that are environmentally and socially responsible. However, there is a debate about improving environmental performance that will reduce shareholder value. The cost of a company when complying with ethical standards will result in a higher cost of goods which will put the company at a disadvantage in the industry and reduce profitability [34]. Another group argues that environmental performance improvement strategies can increase the efficiency of the company's products [35, 36].

2.2 Firm value

The increase in firm value can be achieved if the company management is able to cooperate well with other parties in making financial decisions. Other parties referred to include, among others, shareholders and stakeholders. If the manager and the other party can build a good relationship, there will be no problems between the two parties. However, in actual conditions, the union of interests between the two parties often encounters problems [32]. These results underscore the important role of green strategy as awareness of environmentally friendly business grows among regulators, investors and consumers. This makes it necessary for companies to proactively take actions that contribute to emission reductions to reduce their carbon footprint and suppress climate change. In practical terms, the stronger pressure for businesses to behave in an environmentally friendly manner prompts them to provide credible information on roles, actions and strategies in environmental management and sustainability. In particular, several strategies that can be taken are related to the issue of dealing with environmental

pollution and preventing pollution through product management [37].

The management of the company is required to be able to improve the welfare of the stakeholders and is also faced with the interests of improving the welfare of each of them [38]. As a result, it is not uncommon for these differences of interest to cause management to have other objectives that may conflict with the general objectives of the company. The company will calculate the income it will receive during the operating period. In general, the calculation is to estimate the benefits and advantages compared to the costs or disadvantages used to achieve the green standard. Broadly speaking, the green measure is also not only related to the internal impact on corporate profits, but also focuses on its social impact. This means that companies are required to focus on ecological and social governance in pursuit of green standards [39].

Firm value can be influenced by various factors, one of which is profitability. Profitability can affect the size of the company value. A study confirms that organizations can achieve profitability by taking advantage of economies of scale, by reducing costs from suppliers, eliminating all additional costs to add value to products, and presenting costs that are not required by buyers. The ability of a company to generate profits can be seen in how much profitability the company generates from sales and investment. When the company can present high profitability to stakeholders, the company can be rated well by the stakeholders. Increasing profitability will increase ROA and ROE.

Bragdon and Marlin [40] provide evidence of a positive relationship between proxied profitability by earnings per share and return on equity, and the Economic Priority Council (CEP) rates environmental performance. Other factors that can also affect firm value besides profitability. Leverage is the most contentious role in finance in investment policy. The effect of negative leverage on company growth can increase firm value by preventing managers from taking projects that will cause losses for the company. And positive leverage can moderate the relationship between environmental policy and firm value.

2.3 Signaling theory

Connelly et al. [41] define signaling theory as the delivery of information from providers to recipients so that they can consider specific types and ways of using and interpreting that information. In the financial sector, signal theory conceptually assumes a relationship that may arise from the company's financial performance as wider disclosure is considered to be able to give a positive signal to the parties concerned. In order for recipients to interpret correctly, companies need to distinguish the type of information to be provided. Credible information can improve the quality of information and decision making in the capital market [42]. This information tries to give a signal to investors and lead to the right decision making to determine the possibility of investing in a company.

Giving a positive signal through credible information regarding environmental management and preservation can result in pressure from regulators and stakeholders on green practices that must be implemented [43]. Given the weakness in implementing green standards in Indonesian companies, the obligation to provide transparent information can lead to proper assessment by stakeholders. This in turn will give rise to forms of rewards and punishments for the company's achievements and negligence on social and environmental

responsibilities and governance. The application of the eco-efficiency concept is more likely to provide added value for the company and streamline production costs. The main goal of the company is to seek profit by paying attention to environmental and social elements, by reviewing the management of factory waste and its negative effects on the ecosystem and violations of regulations and ethics.

In this context, the application of ISO-14001 aims to attract investors to invest as the company has shown their green commitment and also prioritized environmental protection. Companies that adopt ISO14001 are directly bound by the stipulation that companies must have greater incentives to address environmental problems. This condition seems to be some of the real actions taken by the company in carrying out positive activities for the environment and this seems to be considered by investors as a positive step towards maintaining the company's sustainability. In this regard, Nishitani & Kokubu [44] found a relationship between increasing firm value as a positive impact on reducing greenhouse gas emissions.

Based on the theoretical background, the focus of this study is to examine and analyze the effect of profitability and leverage on eco-efficiency and firm value. This study uses manufacturing companies listed on the Jakarta Composite Index (JCI), with the research model shown in Figure 1.

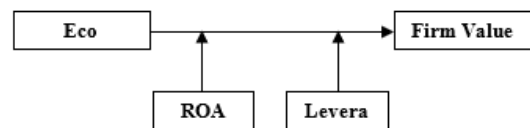


Figure 1. Research model

Figure 1 shows the direct relationship between eco-efficiency and firm value. The hypothesis developed is that eco-efficiency has a positive and significant effect on firm value. Furthermore, this study uses ROA and leverage as mediating variables. Based on the theoretical framework shown in Figure 1, the hypotheses proposed in this study are as follows:

H1. Eco-efficiency has a positive and significant impact on the firm value of public companies in the manufacturing sector in Indonesia.

H2. ROA is able to strengthen the positive effect in the relationship between eco-efficiency and firm value. This means, companies with higher ROA are more likely to have more benefits from implementing eco-efficiency in increasing firm value.

H3. Leverage is able to mediate the relationship between eco-efficiency and firm value. This means, companies with lower leverage are more likely to have more benefits from implementing eco-efficiency in increasing firm value.

3. RESEARCH METHODS

Theoretical foundation for this research adopted Osazuwa and Che-Ahmad [28] which examines eco-efficiency, firm value, leverage and profitability. An important notion is that managers need to align environmentally friendly practices through eco-efficiency in order to gain public legitimacy and obtain positive corporate value from stakeholders.

This research year used is 2013-2015. This study focuses on manufacturing companies listed on the Jakarta Composite

Index (JCI) in accordance with previous studies which also use manufacturing companies but are listed on the Bursa Malaysia. The difference with previous researchers by Sinkin et al. [45]; Guenster et al. [46] is that this study uses a moderating variable.

Meanwhile, to measure company value, Tobin's Q is used. If Tobin's Q value is greater or equal to 1, it means that the company is categorized as growing or developing. Meanwhile, if a company has a Tobin's Q value that is smaller than 1, it means that the company is categorized as not experiencing growth. The use of Tobin's Q in calculating firm value is also carried out by other researchers, such as that of [47].

$$MVE+DEPT$$

$$Tobin\ Q=Total\ asset$$

$$MVE=closing\ price\ x\ number\ of\ shares\ outstanding$$

$$DEBT=Total\ Liabilities$$

$$TA=Total\ Assets$$

Profitability is the company's ability to generate short-term profits. In this study, the profitability ratio is measured using Return on Assets (ROA) and is used to evaluate whether management has received adequate compensation from the activities under its control. Leverage is the proportion of total debt to shareholder equity. The ratio is used to provide an overview of the company's capital structure, so that it can be seen the risk level of a debt uncollectible [48]. Here is the regression equation:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\epsilon$$

Simultaneous hypothesis testing is conducted with the F-test while partial testing is examined with the t-test. F-test is used to determine whether there is a joint influence between the independent variables on the dependent variable. In addition, t-test or partial test aims to determine how far the independent variables individually influence the dependent variable [49].

In this study, a company can be said to be Green Industry Strategy if the company has ISO-14001 [45]. In this regard, the application of ISO-14001 standard is a specification document or an Environmental Management System requirement document [50].

This study uses a sample of companies with an observation period of 3 years, from 2015 to 2017. The research sample is a manufacturing company that has complete financial and annual report information during 2015 - 2017. Based on observational data, 74 companies were obtained (Table 1).

Table 1. Sample selection

Description	Amount
Manufacturing companies listed on the JCI	148
Do not make ISO 14001	(26)
	122
Do not publish consecutive annual report	(48)
Research sample	74
Observations for 3 years (3 x 74)	222
Outlier	6
Final sample	216

4. RESULTS

Cumulatively, in combining data for 3 years of observation,

the research data is 222 sample data. Furthermore, some data is used for data analysis and hypothesis testing. Data analysis in this study used multiple linear regression analysis model with moderating variables. The results of normality testing using the Kolmogorov Smirnov test are shown in Table 2.

Table 2. Descriptive statistics

	N	Min	Max	Mean	Std. Deviation
ROA	216	-.1358	.5267	.0659	.0881
LEV	216	.0390	.8806	.4369	.1882
FIRMVALUE	216	.2681	23.2858	1.8182	2.9409

Descriptions of company profitability in the form of performance measures of return on assets or ROA of all sample companies obtained an average of 0.0659 or 6.59%. This average value shows that the sample companies are able to get a net profit of up to 6.59 percent of the company's total assets. The lowest ROA value is -0.1358 and the largest ROA value reaches 0.5267.

The company's leverage variable, which is the ratio of debt to total assets of the company, shows an average value of 0.4369. This value reflects that the average sample company has a debt of 43.69% of the total assets owned by the company. Leverage values below 0.50 reflect that companies tend to use their own capital as a source of corporate funding. The smallest value of leverage is obtained at 0.0390, while the largest leverage is 0.8806.

The firm value measured using Tobins Q shows how much the market value of the asset is compared to the book value of the assets of the sample companies. The greater the value of Tobins Q indicates that the firm is experiencing growth in the value of its shares so that the comparison with the book value is getting higher. Table 2 shows that there is an average Tobins Q of 1.8182. The lowest Tobins Q value was 0.2881 and the highest Tobins Q value was 23.2858. The Tobins Q standard deviation is 2.9409 which indicates a fairly large variation in data.

Table 3. Normality test

	Unstd. Residual
Sample	216
Kolmogorov-Smirnov Z	1.124
Asymp. Sig. (2-tailed)	.160

The results of the normality test of 216 data indicate that the regression model has a residual value that is normally distributed where it is found that Asymp. Sig. (2-tailed) of the Kolmogorov Smirnov test is 0.160 > 0.05 (Table 3). Table 4 showed the multicollinearity test results of the regression model in the forms of Tolerance and VIF value.

Table 4. Multicollinearity test results

Variable	Tolerance	VIF
ECOEFF	0.119	8.419
ROA	0.522	1.914
LEV	0.672	1.489
ECOEFF.ROA	0.359	2.784
ECOEFF.LEV	0.136	7.348

The multicollinearity test results obtained that the VIF value on all variables has a value smaller than the number 10 which

indicates the absence of multicollinear problems in the model. Heteroscedasticity testing is done by using the Glejser test as shown in Table 5.

Table 5. Glejser test

	Sum of Squares	df	Mean Square	F	Sig.
Regression	.916	5	.183	1.620	.156 ^b
Residual	23.743	210	.113		
Total	24.659	215			

a. Dependent Variable: AbsRes b. Predictors: (Constant), ECOEFF.LEV, ROA, LEV, ECOEFF.ROA, ECOEFF

Statistical output obtained from Glejser test on the regression model indicates that the model does not have a heteroscedasticity problem with p-value of 0.156 (> 0.05). The calculation of this regression analysis uses the help of the Eviews program version 6 with the test results presented in Table 6.

Table 6. Regression test results

Relationship	Coefficient	Std. Error	t	Prob
Constant	-0.820	0.123	-6.691	0.000
ECOEFF	0.631	0.213	2.965	0.003
ROA	4.312	0.564	7.639	0.000
LEV	1.201	0.233	5.154	0.000
ECOEFF*ROA	3.627	0.843	4.300	0.000
ECOEFF*LEV	-1.325	0.421	-3.144	0.002
F	58.170			
Sig F	0.000			
Adj R2	0.562			

The results showed that the coefficient of the eco-efficiency variable or ISO 14001 and the interaction between eco-efficiency and ROA has a positive direction, while the interaction between eco-efficiency and leverage has a coefficient in a negative positive direction.

5. DISCUSSION

Regarding model test, obtained F value of 58.170 with p-value of 0.000 <0.05. This means that this regression model gives meaning to the effect of eco-efficiency on firm value which is moderated by ROA and leverage. The coefficient of determination can be obtained from the adjusted R2 value. The adjusted R2 value from this study was obtained at 0.562, which means that 56.2% of the variation in firm value can be explained by variations in eco-efficiency by using moderating effects of ROA and leverage. In the effect of eco-efficiency on firm value. The results of testing the effect of eco-efficiency with ISO 14001 on firm value obtained a t value of 2.965 with p-value of 0.003 <0.05. This means that the adoption of ISO 14001 for eco-efficiency shows a positive and significant effect on firm value. This means that Hypothesis 1 is accepted. Thus, ISO14001 as a standard is more likely to have better management systems for companies or stakeholders that meet its standards.

ISO 14001 is a standard process that must be carried out by companies in managing environmental impacts so that ISO 14001 is a form of tool that is used as a representation of the environmental management system. A company that is ISO

14001 certified indicates that the company has implemented a management system that is in accordance with ISO 14001 standards and has documentation that verifies this conformity. There is a positive and significant effect of the effect of ISO 14001 eco-efficiency on firm value shows that stakeholder theory is widely shared by managers company. In other words, looking at the application of ISO14001 to environmental performance shows that investors in Indonesia are starting to agree with the arguments given by stakeholder theory rather than agency theory. Based on the stakeholder theory, where one of the stakeholders of the company is the surrounding community and the community who is the consumer of the product, which must also be protected by the company [51]. By adopting ISO 14001, companies have shown their commitment to implementing processing by companies that also prioritize environmental protection. Companies that adopt ISO14001 are directly bound by the stipulation that companies must have greater incentives to address environmental problems. This condition seems to be some of the real actions taken by the company in carrying out positive activities for the environment and this seems to be considered by investors as a positive step towards maintaining the company's sustainability. The results of this study are generally the same as Nishitani & Kokubu [44] who found a relationship between increasing firm value as a positive impact on reducing greenhouse gas emissions.

Moreover, the test results regarding the effect of ROA on the relationship between eco-efficiency and firm value obtained a t-value of 4.300 with p-value of 0.000 (p <0.05). This shows that profitability can moderate the relationship between eco-efficiency and company value. This means that hypothesis 2 is accepted. The results of testing the second hypothesis show that ROA profitability can moderate the relationship between eco-efficiency and firm value. Profitability in this study is measured using return on assets ROA where a high ROA value indicates that the company is able to get a bigger net profit for each asset invested by the company. The positive influence of profitability on the relationship between eco-efficiency and firm value supports stakeholder theory and resources-based view. Stakeholder theory explains that any group or individual who can influence or be influenced by the achievement of organizational goals. In relation to this environmental issue, the company will consider fulfilling the demands of stakeholders as their strategic investment, in accordance with commitments beyond the minimum required to seek community legitimacy as well as meet wider stakeholders. This can give the company a competitive advantage [46, 52].

The test results regarding the effect of leverage on the relationship between eco-efficiency and firm value obtained a t value of -3.144 with p-value of 0.002 (<0.05). This shows that leverage can moderate the eco-efficiency relationship with company value. This means that hypothesis 3 is accepted. The results of testing the third hypothesis show that leverage can moderate the relationship between eco-efficiency and firm value. Leverage in this study is measured using total debt to total assets where a high leverage value indicates that the company has large liabilities to external debtors. Lastly, the test results regarding the effect of leverage on the relationship between eco-efficiency and firm value obtained a t value of -3.144 with p-value of 0.002 (p <0.05). This shows that leverage can moderate the eco-efficiency relationship with company value. This means that hypothesis 4 is accepted.

These results underscore the important role of green

strategy as awareness of environmentally friendly business grows among regulators, investors and consumers. This makes it necessary for companies to proactively take actions that contribute to emission reductions to reduce their carbon footprint and suppress climate change. In practical terms, the stronger pressure for businesses to behave in an environmentally friendly manner prompts them to provide credible information on roles, actions and strategies in environmental management and sustainability. In particular, several strategies that can be taken are related to the issue of dealing with environmental pollution and preventing pollution through product management [37]. In the context of a public company, the application of green standards, such as ISO-14001 is considered effective for companies to pursue green standards while increasing performance through increasing firm value. This makes implementing a green strategy not only beneficial in governance, but also a source of competitive advantage for enterprises and sustainable economic development. This includes cost advantages resulting from environmental production processes which include redesign of production into non-polluting production and using energy-efficient equipment or manufacturing processes [30, 31].

6. CONCLUSIONS

The results show a positive and significant effect of eco-efficiency as proxied by the application of the green standard of ISO 14001 on firm value. This theoretically means the adoption of ISO 14001 is more likely to increase the value of the company. Furthermore, the study shows that the effect of profitability performance as proxied by ROA is empirically proven to be able to bridge the relationship between eco-efficiency and firm value. This means that companies with high ROA are more likely to benefit more from implementing eco-efficiency on firm value. Finally, the results of statistical tests reveal the mediating effect of leverage in the relationship between eco-efficiency and firm value, with a negative and significant effect. This means that manufacturing firms with low leverage are more likely to benefit more from implementing eco-efficiency to promote firm value.

The findings are expected to contribute theoretically and practically in affirming the important role of eco-efficiency in promoting corporate value. The research results underline the important role of eco-efficiency in promoting firm value. This shows that the implementation and proactiveness of management in the green industry through ISO-14001 is an important consideration for investors and stakeholders and ensures the sustainability of the company in the long term. Practically, recommendations need to be made regarding the role of corporations and sectoral industries in dealing with issues of sustainability, environmental pollution, environmental degradation, and deforestation.

The limitation of this study is that the observation period is quite short, thus limiting generalizability more broadly. Furthermore, this study only focuses on manufacturing companies, and does not examine other companies with a high carbon footprint such as plantations and mining. Further studies are expected to empirically estimate the implementation of green strategies in manufacturing companies in the longer term. Further research also needs to expand the sample base not only in public companies, but also in private companies. In addition, other variables that are considered financially influential on firm value need to be

investigated more deeply. Finally, future studies could include industries with a high carbon footprint such as plantations and mining to respond to issues of deforestation and environmental degradation. This in turn can improve the international public's perception of environmental conservation and management by companies in Indonesia and encourage greener and more sustainable business practices.

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