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THE INFLUENCE OF GREEN INNOVATION, ECO-EFFICIENCY, AND ENVIRONMENTAL COSTS ON COMPANY VALUE

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Abstract
This study aims to empirically determine and analyze how green innovation, eco-efficiency, and environmental costs can affect firm value. This study uses a quantitative method of secondary data in the form of basic material sub-sector manufacturing companies in 2021-2023 that have conducted an initial public offering (IPO) and listed on the Indonesia Stock Exchange. This study uses purposive sampling techniques in selecting samples and uses data regression analysis in conducting data analysis using STATA 17 with significance level of 5%. The results of this study indicate that green innovation has a positive effect on firm value and eco-efficiency has a negative effect on firm value. Meanwhile, environmental costs have no impact on firm value.
Keywords: Eco-Efficiency; Environmental Cost; Firm Value; Green Innovation

INTRODUCTION

Rapid industrial development due to globalization has transformed national and international economic systems, encouraging companies to increase their effectiveness through innovation and new technologies. Ease of access to information enables companies to expand operations, achieve maximum profits, and remain focused on customer satisfaction, competitive advantage, and business sustainability (Santoso & Yanti, 2024). In this process, companies are committed to creating value for all stakeholders, especially shareholders, by increasing company value (Muchtar, 2021). Company value, which reflects shareholder perceptions of the company's ability to maximize share prices, is an important indicator because it supports the overall welfare of stakeholders, including shareholders (Ginting, 2021). Furthermore, according to Yamasitha et al. (2024), company value is influenced by various factors such as dividend policy, investment decisions, capital structure, financing decisions, company size, and growth rate.

As a business's ability to generate profits increases, stock prices tend to rise, as seen in the fluctuations in the Indonesian Composite Stock Price Index (IHSG) from 2019 to 2023 (Fanda & Dwijayanti, 2024). In 2018, the JCI fell 2.54% due to economic growth below 5%, the depreciation of the Rupiah, and a trade deficit. After rising 1.70% in 2019, the Covid-19 pandemic pushed the JCI down to minus 5.09% in 2020. Economic recovery drove the JCI to grow by 10.08% in 2021, followed by a 4.09% increase in 2022, reaching a final value of 6,850.52, the highest record since the privatization of the Stock Exchange. In 2023, the JCI grew 6.62%, supported by increased domestic economic activity and the number of retail investors (Santosa, 2023). Nevertheless, market uncertainty continues to impact the growth of the JCI and shareholders' perspectives on company performance in maximizing profits. To achieve sustainable corporate value, companies need to adapt to evolving industry trends (Santoso & Yanti, 2024) by optimizing resources such as labor, technology, and capital to improve operational efficiency (Murniati & Sovita, 2021).

Companies frequently face environmental and social risks in their operations, driving sustainability awareness that focuses attention not only on financial returns but also on social and environmental accountability (Valencia & Sri, 2022). This effort is crucial for creating positive and sustainable corporate value through the implementation of the triple bottom line concept planet, people, and profit to ensure long-term business sustainability (Rusmana & Purnaman, 2020). The 3P strategy, coupled with effective asset and liability management, can

provide a competitive advantage (Fanda & Dwijayanti, 2024), while ignoring social and environmental impacts can damage a company's image and undermine stakeholder trust. Environmental damage is increasingly driving stakeholders to urge companies to conduct environmentally friendly businesses (R. Dewi & Rahmianingsih, 2020), where compliance with environmental management and disclosure of sustainability reports demonstrate corporate responsibility. A BNP Paribas Global survey noted a 20% increase in investor interest in ESG-based instruments since the pandemic, underscoring the importance of stakeholder support for the success of sustainable businesses. Therefore, companies must always consider environmental impacts in all their activities by complying with guidelines such as ISO 14000 to minimize adverse operational impacts, as well as national regulations such as Government Regulation No. 22 of 2021, Law No. 32 of 2009, and Minister of Environment and Forestry Regulation No. 1 of 2021, which encourage sustainable environmental management, particularly in the industrial sector.

Based on research conducted by Renaldi & Idrianita Anis (2023), environmental costs have a significant positive influence on company value. Environmental accounting, particularly in the disclosure of environmental costs, can contribute to improved financial performance and overall optimize company value. Renaldi & Idrianita Anis (2023) added that by presenting relevant information on environmental costs, companies can not only improve their reputation but also feel a sense of security for stakeholders and the community. A significant influence of environmental costs on company value can be found in research by Setyaningrum & Mayangsari (2022) and Wulaningrum & Kusrihandayani (2020). Setyaningrum & Mayangsari (2022) stated that environmental cost management is a crucial factor that companies need to pay attention to. Increased spending on environmental costs can impact company performance, especially financial performance. When company management allocates increasingly high environmental costs, this has the potential to negatively impact the company. Wulaningrum & Kusrihandayani (2020) noted that public concern for environmental sustainability is increasing, as evidenced by the development of regulations and standards related to environmental accounting. Corporate awareness is also increasing, with companies paying attention to and disclosing financial and non-financial elements in their reports.

This contrasts with Fauzia & Sari (2023) and Rizki & Taufiq (2019), who found no correlation between environmental costs and firm value. Fauzia & Sari (2023) added that if a company uses environmental costs, these costs can impact the company's profits and reduce value. According to Rizki & Taufiq (2019), although large environmental expenditures do not necessarily increase company value, many companies do not specifically record the costs incurred to address environmental issues. Allocating costs to the environment can increase a company's burden and affect profits. Therefore, changes in profits have a significant impact on investors' investment decisions.

Basic materials subsector. With increasing global awareness of environmental and sustainability issues, companies are expected to focus not only on short-term profitability but also on environmental impact and resource efficiency. This research draws on the research of Tonay & Murwaningsari (2022), Osazuwa & Che-Ahmad (2016), and Hidayat et al. (2023) by taking green innovation, eco-efficiency, and environmental costs as independent variables. which is relevant in driving company performance and value. The results of this research open up opportunities for further exploration, particularly in the basic materials manufacturing subsector in Indonesia, whose operational activities have a significant impact on energy consumption, raw materials, and emissions. Furthermore, the implementation of green innovation and eco-efficiency plays a role in environmental cost efficiency, which can ultimately increase company value.

Based on the above description, this research is important in providing a basis for consideration in establishing corporate management strategies related to environmental sustainability and as a strategy implemented by companies to minimize environmental pollution and damage caused by company operations. Furthermore, previous studies have not produced stable and coherent results. Therefore, this research was conducted with the aim of providing a deeper understanding of the influence of Green Innovation, Eco-Efficiency, and Environmental Costs on Company Value.

LITERATURE REVIEW

Signaling Theory

According to Spence Michael (1973), signaling theory is a mechanism used by company management to communicate information to stakeholders, including investors. The purpose of this theory is to convey signals or clues to stakeholders regarding the company's performance and prospects. Furthermore, according to Ross (1977), company management with a deep understanding of the company's condition will encourage it to be communicated to stakeholders, particularly potential investors. The goal is for the company to improve stock performance and thereby increase its value. This information serves as an important signal for users.

Bergh et al. (2019) stated that the motivation for conveying this information is driven by an information imbalance between company management and stakeholders. The information conveyed serves as an important signal for stakeholders to assist in their investment decision-making (Hapsoro & Ambarwati, 2020). According to Utomo (2019), corporate signals aim to convey implications in the hope of changing external parties' assessments or views of the company. These signals can vary, from those easily observed directly to those requiring further analysis. These signals are powerful information that can alter external parties' assessments of the company. As a signal to stakeholders, companies disclose social and environmental responsibility reports in addition to providing financial information. This is one-way companies demonstrate their commitment to stakeholders.

According to Hapsoro & Ambarwati (2020), disclosing information related to a company's environmental responsibility is expected to send a positive signal to external parties, including investors. This is in line with signaling theory, where companies transparently report their environmental and social performance in annual reports and sustainability reports, which can send a positive signal to stakeholders. According to Fanda & Dwijayanti (2024), this positive signal can increase positive perceptions of the company, thus potentially creating maximum corporate value.

Company Values

Sugeng (2017) stated that company value indicates the total net assets owned by the owner. The primary focus of company management is to increase this value by optimizing revenue and reducing risk. Meanwhile, according to Marjohan (2022), company value is an investor's perception of the company and is often linked to stock prices, contributing to the determination of the company's value. Lathifatussulalah & Dalimunthe (2022) stated that one way to determine a company's value is often an indicator of the company's image or reputation, and stakeholder trust depends on the company's past performance and future prospects.

An increase in stock price indicates an increase in a company's value. A company's value is highly dependent on management's ability to generate greater profits. A strong company value can serve as a benchmark for future company performance, thus impacting stakeholder confidence. (Erlangga et al., 2021). In increasing company value, factors such as positive investor perceptions, which generally indicate rising stock prices, can create optimal company value.

Optimal company value is evidence that the company has successfully achieved its primary objectives. Optimizing company value demonstrates the company's success in meeting stakeholder expectations (Muchtar, 2021, p. 96). However, company value is not solely measured by short-term financial profits. Sustainable company growth requires the right combination of operational performance, reputation, and other aspects that support the company's sustainability. According to Prena et al. (2019), a significant increase in company value contributes to increased productivity, profitability, and broader business opportunities, which are crucial for company sustainability. Companies can also gain broader access to financial resources by maximizing their company value, as well as increasing the company's attractiveness to stakeholders.

Green Innovation

According to Chen et al. (2006) in their research, green innovation is an innovative development in software and/or hardware related to processes and products that support environmentally friendly business activities. Increasing resource efficiency, reducing waste, and reducing negative impacts on the environment are the main focuses in implementing this innovation. In addition, the definition of green innovation according to Dangelico & Pontrandolfo (2010) is defined as the implementation of technology and production procedures to reduce negative impacts on the environment, such as optimizing energy efficiency, materials, and pollution prevention in the development of environmentally friendly and sustainable products. Compared to conventional innovation, green innovation provides a competitive advantage by creating a positive impact on the environment, and can be considered a form of innovation that produces economic benefits and forms a sustainable business (Agustia et al., 2019). Based on the ISO 14000 family standardization, specifically ISO 14031: Environmental Performance Evaluation, (Chen et al., 2006) Green innovation is defined as everything a company uses to develop innovations that have a positive impact on the environment, including technology, design, and management systems that support environmentally friendly practices. Companies implement green innovation to achieve their business goals through the development and implementation of sustainable systems, techniques, and business practices that minimize environmental impact (R. Dewi & Rahmianingsih, 2020).

Eco-Efficiency

Business Council for Sustainable Development (WBCSD) (2000) states that eco-efficiency (ecological economic efficiency) is an approach that combines social and economic aspects by providing products and services that meet consumer needs at efficient costs, as well as environmentally friendly processes, such as reducing the use of natural resources and reducing negative impacts on the environment throughout the production process, distribution, until the end of the product's life. Eco-efficiency is a concept that encourages companies to balance environmental performance with economic performance (Putri & Sari, 2019). In addition, eco-efficiency according to the Ministry of Environment of the Republic of Indonesia is a concept that aims to produce products that have good quality and can reduce environmental impacts by efficient use of natural resources during operational activities (DP Sari et al., 2011). According to WBCSD in Findiastuti (2019) states that there are three objectives in implementing eco-efficiency.

Environmental Costs

Environmental costs are the amount of funds spent by company management to prevent, reduce, and repair the negative impacts of its operational activities on the environment (Hansen & Mowen, 2011) in (Saputri et al., 2023). According to Pasaribu et al. (2023), environmental costs arise from damage or potential damage to the environment. Companies allocate these costs to control and manage the environmental impacts resulting from the company's operational activities, in order to prevent or minimize possible environmental damage. These costs include

costs incurred to change production processes to be more environmentally friendly and sustainable, as well as costs to repair environmental damage caused by production waste from the company's business processes (Wulaningrum & Kusrihandayani, 2020). Hansen and Mowen (2009) in Hapsoro & Ambarwati (2020) states that there are three cost classifications in environmental costs, namely prevention, detection, and failure.

Green Innovation Has a Positive Impact on Company Value

Green innovation focuses primarily on achieving economic benefits by minimizing environmental risks resulting from company operations (Dai & Xue, 2022). Green innovation significantly contributes to environmentally friendly business practices through increased efficiency and serves as a way for companies to meet social expectations regarding social and environmental issues, while simultaneously responding to pressure from various parties to implement sustainable business practices (Husnaini & Tjahjadi, 2021). This aligns with signaling theory, where green innovation can serve as an important signal that provides information to stakeholders, particularly investors, to assist in investment decision-making (Dewi & Rahmianingsih, 2020). Green innovation can be a positive signal by demonstrating a company's commitment to social and environmental responsibility. In addition to reflecting efficiency and environmental awareness, green innovation can also strengthen the reputation and positive perspective of stakeholders, particularly investors, who can increase investment interest, which can indicate increased stock prices and the creation of maximum company value.

H1: Green Innovation has a positive effect on company value.

Eco-Efficiency Has a Positive Impact on Company Value

The implementation of eco-efficiency is not only to fulfill its social and environmental obligations but also key for companies to increase value for stakeholders, especially investors. In accordance with signaling theory, the implementation of eco-efficiency and the possession of ISO 140001 certification can be considered a positive signal regarding the company's commitment to sustainable and socially and environmentally responsible business practices (Yuliandhari et al., 2023). ISO 14001 certification is an important tool for companies in conveying information to stakeholders that the company is committed to running its business effectively and efficiently (R. Dewi & Rahmianingsih, 2020), environmentally friendly, and sustainable. This can be a positive signal, because the ownership of ISO 14001 indicates that the company cares about environmental issues, which can create a positive reputation for the company in the eyes of stakeholders (Fanda & Dwijayanti, 2024). This good reputation increases the trust of investors and other stakeholders, thereby driving increased company value. The higher public trust in a company's social and environmental commitment and responsibility, the greater the opportunity to attract investment and strengthen the company's performance and competence in the market, which can have a direct impact on the company's value.

H2: Eco-efficiency has a positive effect on company value.

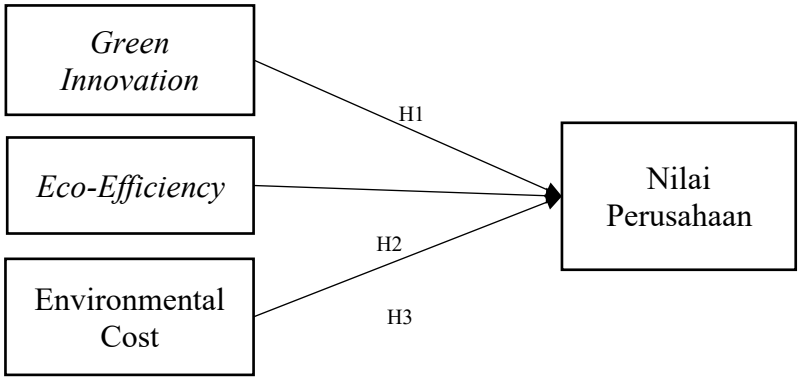

Figure 1Research Model

Environmental Costs Have a Negative Impact on Company Value

This disclosure of environmental costs is in accordance with signaling theory, where The large allocation of costs incurred to reduce environmental damage caused by a company's business activities can be a positive signal to stakeholders regarding the company's commitment to implementing environmentally friendly business activities (Saputri et al., 2023). This additional information can support better decision-making processes for stakeholders, especially investors, in making investments. Hapsoro & Ambarwati (2020) explain that companies that implement environmental accounting will strive to prevent environmental damage in order to reduce environmental costs and indicate efficient environmental cost management. The more efficient a company is in managing environmental costs, the higher its value.

H3: Environmental costs have a negative effect on firm value.

METHODS

Basic material sub-sector manufacturing companies listed on the Indonesia Stock Exchange during the 2021-2023 period. In determining the research sample, this study used purposive sampling, with the following criteria: 1) Basic material sub-sector manufacturing companies that conducted an Initial Public Offering in the 2021-2023 period; 2) Basic material sub-sector manufacturing companies that did not experience delisting during the 2021-2023 period; 3) Basic material sub-sector manufacturing companies that published annual reports on the Indonesia Stock Exchange website and/or on the company's official website for the 2021-2023 period; 4) Basic material sub-sector manufacturing companies that published CSR reports/ sustainability reports on the Indonesia Stock Exchange website and/or on the company's official website for the 2021-2023 period; 5) Basic material sub-sector manufacturing companies that disclosed environmental costs for the 2021-2023 period. This resulted in a total sample of 55 companies with 3 years of research, resulting in a total sample of 165 samples.

This study uses a quantitative method of secondary data, namely manufacturing companies in the basic material sub-sector obtained from annual reports and sustainability reports by accessing the site. The Indonesia Stock Exchange (www.idx.co.id) and the company's official website were used in the study. Data processing in this study utilized STATA 17 software. During data processing, three samples were found to have extreme values, resulting in the data not being normally distributed. However, before determining whether there are outliers, a box plot was performed. When data is far from the whisker, it is considered an outlier (Sihombing et al., 2023). Furthermore, the outliers were removed to ensure normal distribution, resulting in a total of 162 samples used in this study.

Company value as a dependent variable in this study is measured using Tobin's Q with the following formula:

$$Tobin's\ Q = \frac{(MVE + Debt)}{Total\ Asset}$$

Green innovation (X1) in this study was measured using a content analysis approach. This study analyzed the information contained in sustainability reports. In its measurement, green innovation was analyzed using several indicators. which focuses on two aspects, namely 3 indicators of green product innovation and 5 indicators of green process innovation which refer to the indicators found in the research of X. Xie et al. (2019). Then, green innovation will be assessed in each disclosure of the above indicators contained in the sustainability report with a scale of 0-2. 0 for companies that do not disclose green innovation indicators, number 1 for each indicator disclosed without implementation and details. 2 for companies that disclose

green innovation indicators with implementation and details, such as plans, processes or quantitative indicators.

Eco-efficiency variable in this study is measured by a company's ISO 14001 certification. Eco-efficiency is measured using a dummy variable. A score of 1 is assigned to companies with ISO 14001 certification, while a score of 0 is assigned to companies without ISO 14001 certification (Aviyanti & Isbanah, 2019; Damas et al., 2021; Osazuwa & Che-Ahmad, 2016).

Environmental costs are measured by the ratio of the total costs incurred by the company in carrying out environmental activities, including environmental prevention costs, environmental detection costs, and environmental failure costs, to the company's net profit after tax (Hapsoro & Ambarwati, 2020).

$$environmental\ cost = \frac{\Sigma environmental\ cost}{Earning\ after\ tax}$$

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistical analysis is used to provide a more in-depth overview of the characteristics of the research data and variables, such as Firm Value (NP), Green Innovation (GI), Eco-Efficiency (EE), and Environmental Cost (BL). Descriptive statistical analysis presents information including the mean, minimum, maximum, and standard deviation of the research data, as presented below.

Table 1Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
NP	162	1.28467	0.8397882	0.3412794	5.716727
GI	162	9.462963	3,178223	3	16
EE	162	0.691358	0.4633654	0	1
BL	162	0.0464235	0.2844595	-0.2933077	3,518261

Source: processed data (2024)

Table 1 shows the results of the descriptive statistical analysis of the variables tested in the study. This data shows a total of 162 observations, with 54 manufacturing companies in the basic materials subsector, and a three-year study period (2021-2023). Based on the table above, the maximum value reached 5.716727, generated by Chandra Asri Pasific (TPIA) in 2023. Based on this value, TPIA has a market value exceeding 5.7 times its asset value, reflecting strong market performance. Meanwhile, Intanwijaya Internasional (INCI) had a minimum value of 0.3412794 in 2023, indicating the company's lack of market interest.

Maximum value for the green innovation variable shows a full value of 16 obtained by PT. Avia Avian Tbk (AVIA) in 2021-2023. Furthermore, in 2021-2023, PT. Indocement Tunggal Perkasa Tbk (INTP) and PT. Solusi Bangun Indonesia Tbk (SMCB) in 2021 disclosed all indicators comprehensively with a value of 2 for each green innovation indicator. Meanwhile, the minimum value for the green innovation variable shows a value of 3 obtained by NICL in 2021 and DFKT in 2022 only disclosed 2 indicators, namely: 1) increasing and achieving efficiency in the use of resources and energy; and 2) Implementing an environmentally friendly campaign, with scores of 2 and 1. The mean value (average) in table 7 shows a value of 9.462963, which means that the average company in the sample discloses green innovation indicators quite well because the average value reaches more than half of the maximum value of 16. This indicates that most companies in the sample tend to meet the green innovation indicators. Then, the standard deviation value of 3.178223 indicates that not all companies have the same level of disclosure, with some companies being very detailed in disclosing green innovation indicators and other companies not disclosing indicators in detail.

This means that there is less variation because the standard deviation value is lower than the mean value.

The mean and standard deviation values in The eco-efficiency variables shown in Table 7 have values of 0.691358 and 0.4633654. This indicates that most companies in the sample have implemented eco-efficiency. Meanwhile, the eco-efficiency variable has a significant level of variation between companies, indicating that some companies do not yet have ISO 14001 certification. The maximum value of environmental costs is 3.518261 obtained by PT Alkindo Naratama Tbk (ALDO) in 2023. ALDO allocates environmental costs of approximately 352% of the current year's profit. This occurs because the company's profit is lower than the costs incurred for the environment. The environmental costs incurred by ALDO include the costs of maintenance, development, and environmental management. Meanwhile, the minimum value of the environmental cost variable is -0.2933077 obtained by PT Optima Prima Metal Sinergi Tbk (OPMS). This occurs because OPMS experiences losses but the company needs to incur environmental costs. In addition, the mean value shows a value of 0.0464235. This indicates that, in general, the companies in the sample only allocate 4.64%, or a small portion of their net profit. Furthermore, the environmental cost variable shows a standard deviation value greater than the mean, at 0.2844595, indicating significant variation in the proportion of environmental costs incurred by companies.

Results

To find information related to a suitable model for use in research, panel data regression testing is necessary. Three tests can be used: the Chow test, the Lagrange multiplier, and the Hausman test. The test results show The appropriate model for this study is the Random Effects Model (REM). The results of the classical assumption test have also confirmed that the data passes the classical assumption test.

The final test results are shown in Table 2 below.

Table 2Results of Partial Regression Test (T-Test)

Description	Random Effect Model				
	Coefficient (β)	Std. Err.	z	P > |z|	Conclusion
GI	0.0558588	0.0233419	2.39	0.017	H_1 : Accepted
EE	-0.4131017	0.1739546	-2.37	0.018	H_2 : Rejected
Bl	-0.0574761	0.5245418	-0.11	0.913	H_3 : Rejected
_cons	1.029487	0.2227762	4.62	0,000	
Number of obs		162			
Prob > chi2		0.0395			

Source: processed data (2024)

Green innovation obtained a probability value of 0.017, which is smaller than the significance value of α (0.05). This indicates that the first hypothesis is accepted, which states that green innovation has a positive influence on company value. This is due to the implementation of green innovation, such as the existence of environmentally friendly products, resource and energy efficiency, and other green innovation practices. This is due to the improvement of the company's reputation, operational efficiency, and financial performance that can increase investor interest in investing and increase the company's stock price which will ultimately be in line with the increase in company value (Fanda & Dwijayanti, 2024). The results of this study are supported by previous studies conducted by Damas et al. (2021), R. Dewi & Rahmianingsih (2020), and Fanda & Dwijayanti (2024) which stated that company value can be positively and significantly influenced by the green innovation variable.

Based on the results of the partial regression test, eco-efficiency obtained a probability value of 0.018 with a negative direction, indicating a significant negative influence between eco-efficiency and company value. Therefore, it can be concluded that the second hypothesis (H2) is rejected, stating that eco-efficiency has no effect on company value. This is because

investment in environmental management systems, such as ISO 14001, often requires significant costs. The large costs incurred to meet these environmental standards can increase the company's financial burden and reduce the profits received by investors. This can also be considered a negative signal for investors when the resulting benefits are not balanced with the costs incurred by company management. This condition can reduce positive investor perceptions and can negatively impact company value. This study has consistent results with research by Damas et al. (2021), Rahelliamelinda & Handoko (2024), and Septianingrum (2022).

Partial regression analysis shows a probability value of 0.913, which is known to be higher than the significance level. The results of this analysis indicate that an increase or decrease in environmental costs cannot affect company value. Therefore, the third hypothesis stating that there is a negative relationship between environmental costs and company value (H3) is rejected. Environmental costs are often considered to not provide direct economic benefits by investors. Although there are regulations that encourage disclosure of environmental costs, their voluntary nature prevents many companies from disclosing environmental costs in detail. Large expenditures without direct benefits are often not clearly recorded, so they are considered irrelevant by the market. This indicates that environmental cost management has not been a priority for companies, especially if the economic benefits cannot be directly felt. The results showing no influence between environmental costs and company value in this study are supported by research conducted by Fristianti et al. (2023), Prakoso & Zulfiati (2024), and Saputri et al. (2023).

The Influence of Green Innovation on Company Value

The results of this study indicate a significant positive influence between green innovation and company value. This is in accordance with signaling theory, which states that green innovation can signal to investors that the company is committed to sustainability and operational efficiency, which can support decision-making (Dewi & Rahmianingsih, 2020). Companies provide information in the form of green innovation implementation to stakeholders to overcome information asymmetry related to the company's commitment to social and environmental sustainability and operational efficiency, which are important aspects in investment decision-making. In addition to reflecting efficiency and environmental concern, green innovation can also strengthen the reputation and positive perspective of stakeholders, especially investors, which can increase interest in investing, which can indicate an increase in stock prices and the creation of company value.

In calculating the company value in this study, Tobin's Q is used, where a company is considered to have good performance if the market value of equity exceeds the value of its assets. This condition indicates that the company is able to manage its assets effectively and efficiently in creating good company value. By implementing green innovation, such as the existence of environmentally friendly products, environmentally friendly product packaging, resource and energy efficiency, environmentally friendly campaigns, the application of environmentally friendly technology, and other environmentally friendly processes, it can improve reputation, operational efficiency, and financial performance that can encourage investors to invest and be able to increase the company's stock price which will ultimately be in line with the increase in company value.

Based on descriptive statistical values, PT. Chandra Asri Pasific Tbk in 2023 generated a company value of 5.71%. and produced a green innovation score of 14. Furthermore, PT. Avia Avian Tbk in 2021 had the second-highest company value of 5.40 with a green innovation disclosure of 16, which is the maximum value for the green innovation variable. Furthermore, PT. Central Omega Resources Tbk. in 2023 had a company value of 0.44 and a green innovation

indicator disclosure score of only 4. This indicates that complete and transparent green innovation disclosure can contribute significantly to good company value.

The results of this study are supported by previous research conducted by Damas et al. (2021), R. Dewi & Rahmianingsih (2020), and Fanda & Dwijayanti (2024), which stated that company value can be positively and significantly influenced by the green innovation variable. According to Fanda & Dwijayanti (2024), this shows that the more companies implement and disclose green innovation in their operational activities, the greater the positive impact or influence created on the environment, which ultimately can drive optimal company value. The implementation of green innovation by Companies can increase their productivity through the use of environmentally friendly technology and resources or energy, thus making production processes more efficient. Furthermore, green innovation enables companies to convert production waste into valuable new products. This not only positively impacts the environment but also demonstrates a company's commitment to sustainability and attracts investors, potentially contributing to optimal company value.

The Influence of Eco-Efficiency on Company Value

Based on the test results, it was found that eco-efficiency and company value did not have a significant influence. This is indicated by the fact that the implementation of eco-efficiency is not always able to reduce operational costs, and can even increase the company's financial burden, especially if its implementation requires a large investment in environmentally friendly technology and additional costs to obtain environmental certification such as ISO 14001. According to Hazanudin (2015) in Damas et al. (2021), ISO 14001 certification requires significant investment, both in the form of consulting fees, employee training, and updating production technology to comply with established environmental standards. Therefore, eco-efficiency is sometimes only seen as an additional obligation that does not provide direct added value to the financial aspect, especially in industries that emphasize short-term profits rather than long-term sustainability. This also indicates that although environmental sustainability is important, stakeholder perceptions, especially investors, are more focused on traditional financial performance indicators than commitment to eco-efficiency.

The implementation of eco-efficiency, which aims to fulfill social and environmental obligations, sometimes conflicts with a company's primary priority of maximizing profits and corporate value. Based on signaling theory, the implementation of eco-efficiency, characterized by ISO 14001 certification, can be interpreted as a negative signal by investors, especially when the substantial costs incurred for certification and sustainability initiatives are not offset by significant financial benefits. In the view of some investors, a company's focus on eco-efficiency can indicate inefficient resource allocation, as expenditures on environmentally friendly technologies, employee training, and certification processes are often perceived as not producing immediate results visible in the financial statements. Furthermore, the implementation of eco-efficiency that focuses solely on fulfilling regulatory obligations without a clear business strategy can raise doubts about the company's ability to compete in the market. This can create the impression that the company is more oriented towards long-term goals that are not necessarily profitable in the short term, which ultimately can make investors hesitate to invest their capital. Thus, rather than being a positive signal, eco-efficiency can be a negative signal that worsens investors' perceptions of the effectiveness of the company's strategy and ultimately reduces the company's value.

PT. Gunung Raja Paksi (GGRP) Tbk. in 2022 and 2023 has obtained ISO 14001:2015 environmental management certification, but the Tobin's Q value or company value is still below 1, which is only 0.65 and 0.55. Furthermore, it can be seen that PT IFISHDECO (IFSH) Tbk in 2021 and 2022 did not have an ISO 14001 certificate, but had a Tobin's Q value of up

to 4.88 in 2021 and 2.15 in 2022. This shows that having ISO 14001 does not always have a positive impact on company value, especially if the costs of implementing and maintaining certification are not balanced by significant operational efficiencies. In addition, the low Tobin's Q indicates that the market does not appreciate having this certification.

This study aligns with the findings of Damas et al. (2021), Rahelliamelinda & Handoko (2024), and Septianingrum (2022), which support the negative impact of eco-efficiency on firm value. Septianingrum (2022) suggests that this negative impact arises from planning or calculation errors in implementing the eco-efficiency concept in company management. The implementation of eco-efficiency requires companies to make substantial investments, particularly in environmentally friendly technologies. Therefore, the implementation of eco-efficiency will increase the company's burden, which can ultimately reduce profitability and negatively impact firm value.

The Influence of Environmental Costs on Company Value

The analysis results show no correlation between environmental costs and firm value and a lack of alignment with signaling theory. This is due to factors such as companies' tendency to voluntarily disclose environmental costs, a lack of transparency in environmental cost disclosure, and investors' perceptions that focus on the company's economic benefits, such as profitability and business efficiency. Furthermore, the economic benefits of environmental costs are often not directly visible in the short term, so the market tends to ignore this information signal. As a result, signals intended to demonstrate a company's commitment to sustainability are perceived as irrelevant by investors and difficult to factor into decision-making, resulting in environmental costs not having a significant impact on firm value.

Companies that implement environmental accounting will strive to prevent environmental damage in order to reduce environmental costs and indicate efficient environmental cost management. The more efficient a company is in managing environmental costs, the higher its value (Hapsoro & Ambarwati, 2020). Based on the data in this study, there are 128 companies, equivalent to 79% of the data, whose environmental cost values are smaller than the average environmental cost value of 0.0464235. However, the more efficient environmental costs disclosed by a company do not automatically directly proportionate to the increase in company value.

In 2021, PT. Lotte Chemical Titan Tbk (FPNI) showed environmental costs with a value of 0.00007, which is known to be smaller than the average value (0.0464235), with a company value proxied by Tobin's Q showing a value still less than 1, namely 0.84. In addition, PT. Cita Mineral Investindo Tbk (CITA) in 2022 had environmental costs of 0.03537 and a company value of 2.80. Meanwhile, CITA in 2023 experienced a significant decrease in environmental costs with a value of 0.00453 and a decrease in company value with a value of 1.45. This indicates a mismatch between environmental cost efficiency and company value. This means that companies that successfully implement environmental cost efficiency do not always have high company value. Likewise, when companies with large environmental costs do not always experience a decrease in company value.

The results showing no effect between environmental costs and firm value in this study are supported by research conducted by Fristianti et al. (2023), Prakoso & Zulfiati (2024), and Saputri et al. (2023). This occurs because many companies allocate environmental costs specifically, considering that environmental costs have little direct economic impact. Therefore, disclosure of these environmental costs cannot directly contribute to firm value.

CONCLUSIONS

This study states that there is a significant positive effect between green innovation and company value. This suggests that the better a company is at meeting all green innovation

indicators, the higher its value. Furthermore, eco-efficiency has no effect on company value. This is because the high costs of meeting environmental standards such as ISO 14001 increase financial burdens and are perceived as a negative signal by investors. Furthermore, the relationship between environmental costs and company value is insignificant. This is because environmental costs are considered to provide no direct economic benefits and are often not disclosed in detail by companies.

Suggestions for future researchers include the use or addition of other independent variables, or even moderating and/or control variables that better explain firm value. Furthermore, future researchers could expand the population, such as manufacturing companies in the energy, industrial, or consumer sub-sectors, to generate a broader sample. Future research is also expected to utilize other proxies and robust references for environmental cost variables to more accurately illustrate their impact on firm value.

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