

The Effect of Company Size, Profitability and Company Age on Environmental Performance with Environmental Costs as a Moderating Variable

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Abstract: The objective of this study is to examine the impact of company size, profitability, and company age on environmental performance, with environmental costs acting as a moderating variable. The study's population consists of companies within the energy and healthcare sectors, from which a sample of 12 companies was selected for the period spanning from 2021 to 2023, following purposive sampling methodology. To analyze the data, moderation regression techniques were applied using the SPSS software, allowing for an evaluation of the direct effects of each independent variable as well as the moderating effects on these relationships. The findings revealed that company size does not exert a significant influence on environmental performance, and similarly, profitability does not have a substantial effect on environmental performance. However, company age was found to have a noteworthy and significant impact on environmental performance. Regarding the moderating effect of environmental costs, the study indicated that environmental costs positively strengthen the relationship between profitability and environmental performance, while they serve to weaken the relationship between company age and environmental performance. Additionally, environmental costs were not found to moderate the effect of company size on environmental performance.

Keywords: Company Size, Profitability, Company Age, Environmental Performance, Environmental Cost.

Introduction

Profitability serves as a key indicator of how effectively a company manages its assets to generate profits, highlighting its financial performance—a critical aspect for investors. Apriani & Khairani, as cited in (Rahmadiva & Henny, 2024), explain that profitability reflects the company's operational efficiency, with higher profitability showcasing its capability to earn income and lower profitability signaling potential operational challenges, such as reduced sales or increased operational costs. Similarly, (Asjuwita & Agustin, 2020) reinforce the idea that profitability is a crucial metric for understanding the company's ability to sustain itself in competitive markets. Return on Assets (ROA), according to (Dwi & Haq, 2023), is one of the financial ratios most commonly used to evaluate a company's profitability. It measures how well the company utilizes its assets to generate profits,

providing a solid basis for decision-making by shareholders who use this metric to assess financial health and benchmark the company's performance against its peers in the industry.

In parallel with the pursuit of profitability, environmental challenges have emerged as significant concerns in the context of rapid global economic expansion. Companies, as key economic entities, bear considerable responsibility for adopting sustainable practices that ensure environmental preservation. The rise of global warming and environmental degradation in recent years has intensified calls for corporate accountability. Zaman et al. in (Paongan et al., 2024) argue that companies are no longer expected to focus solely on profit-making but must also incorporate sustainability into their core strategies, emphasizing environmental, social, and economic dimensions. This shift aligns with legal frameworks such as Indonesia's Law No. 40 of 2007 concerning Limited Liability Companies, which mandates businesses operating in natural resource-related sectors to engage in both social and environmental responsibility.

Despite these frameworks, corporate violations in environmental management persist, reflecting a lack of seriousness in addressing sustainability issues. For example, a notable environmental pollution case involving the pharmaceutical sector was reported by *news.detik.com* on November 11, 2021. The incident involved two companies, PT. MEF and PT. B, which were identified as the primary contributors to paracetamol contamination in Jakarta Bay. Investigations conducted by the DKI Jakarta provincial government revealed substandard wastewater management practices at these facilities. Laboratory tests confirmed that both companies had failed to optimize their wastewater treatment systems. As a result, they faced sanctions requiring improvements to their wastewater treatment facilities, adherence to technical approvals for discharge standards, and compliance with regulations on water pollution control. Further non-compliance would result in harsher actions, such as the closure of wastewater outlets. These measures are in line with Indonesia's Law No. 32 of 2009 on Environmental Protection and Management, as well as Government Regulation No. 22 of 2021, which collectively aim to preserve ecological balance and enforce sustainable business practices.

To encourage corporate responsibility, the government has introduced initiatives like the Environmental Management Company Performance Rating Program (PROPER). This program evaluates companies based on their environmental compliance, assigning ratings ranging from gold to black. PROPER serves as both an accountability tool and a performance benchmark for businesses, motivating them to adopt better practices. During the 2020–2021 assessment period, the program reported 47 gold-rated companies, 186 green-rated companies, 1,670 blue-rated companies, 645 red-rated companies, and no black-rated companies. However, 45 companies faced law enforcement actions, suspension, or ceased operations. This data underscores that while many companies have embraced environmental responsibility, a significant number still lag in achieving meaningful environmental impact.

The role of company age in shaping environmental accountability also warrants attention. As noted by Ciriyani and Putra in (Wirmaningsih & Setiawan, 2022), older

companies tend to prioritize transparency by disclosing environmental information in their annual reports. This trend reflects a long-term commitment to societal accountability and sustainability. Empirical research supports this notion, with Emerald Edem et al. demonstrating that older companies listed on the Ghana Stock Exchange exhibited higher levels of environmental disclosure, establishing a positive relationship between company age and environmental accountability.

Balancing economic, environmental, and social aspects of corporate operations contributes significantly to global and local economic development. Furthermore, these efforts enhance a company's public image, foster trust, and expand its market presence. Legitimacy theory, which underpins these practices, suggests that businesses operate in alignment with societal norms, integrating sustainability into their activities to maintain legitimacy and stakeholder trust. However, implementing sustainability initiatives involves considerable costs, which can pose a challenge for some companies. This has prompted researchers to investigate the role of environmental costs as a moderating factor. Specifically, environmental costs are seen as an investment that can enhance the positive relationship between sustainability practices and corporate performance. (Fahira & Yusrawati, 2023) concluded in their research that environmental costs positively influence corporate performance, reinforcing the notion that sustainability efforts are both a moral obligation and a driver of long-term financial success.

Theoretical Overview

Legitimacy Theory

Legitimacy theory emphasizes that organizations function as integral parts of society and must adhere to established social norms and expectations. The theory suggests that a company's or organization's continued existence relies on society's approval and alignment with its value system. This concept connects directly to sustainable development goals and sustainability reporting, as corporate strategies aligned with these goals and transparently communicated through sustainability reports can enhance public trust. By fostering trust, such practices help bridge the gap between the organization and society, promoting a more harmonious relationship.

Stakeholder Theory

Stakeholder theory posits that the role of a company extends far beyond simply serving its own interests or maximizing financial returns for its shareholders. Instead, this theory emphasizes a broader responsibility to address the needs and expectations of various stakeholder groups that are directly or indirectly impacted by the company's activities. These stakeholders include not only owners and investors, who are traditionally regarded as the primary beneficiaries of a company's success, but also other groups such as employees, management, the surrounding community, and the social environment at large.

The theory underscores that companies must balance their profit-driven motives with ethical and social obligations, ensuring that their operations generate value for all parties involved. By adopting a stakeholder-focused approach, businesses demonstrate their commitment to sustainable practices and long-term value creation, which is essential for maintaining their legitimacy and fostering trust among diverse groups. Ultimately,

stakeholder theory challenges companies to go beyond the narrow objective of wealth accumulation and instead adopt a more inclusive perspective that integrates economic, social, and environmental considerations into their decision-making processes.

Company Size

Company size is a key metric used to evaluate the scale of a business. Larger companies are generally more inclined to engage in socially and environmentally responsible practices compared to smaller companies. According to Sembiring as cited in (Rofiqkoh & Priyadi, 2016), larger companies face greater scrutiny and pressure from stakeholders due to their extensive operations and significant social and environmental impacts, which naturally draw the attention of shareholders.

Company size is also a commonly used predictive indicator in analyzing variations in corporate disclosures within annual reports. This relationship can be explained through agency theory, which suggests that larger companies, burdened with higher agency costs, tend to disclose more information to mitigate these costs. With their substantial resources, larger companies can generate and utilize information not only for internal purposes but also to share with external parties without incurring significant additional expenses. This enables more comprehensive and transparent reporting.

Conversely, smaller companies, operating with limited resources, may lack the breadth of information available to larger organizations. For them, preparing and disclosing detailed information often requires relatively higher additional costs. Furthermore, over-disclosure of information could potentially jeopardize a smaller company's competitive advantage. As a result, smaller companies typically disclose less information compared to their larger counterparts, balancing resource constraints and strategic considerations in their reporting practices.

Profitability

Harahap as cited in (Pradhana & Adi, 2022) characterizes the profitability ratio as a measure of a company's capacity to generate profits by leveraging all accessible resources, including sales operations, financial capital, human resources, and branch networks. Profitability reflects an organization's ability to generate income during its operational activities, serving as a crucial metric for assessing the efficiency and effectiveness of resource utilization. These resources encompass cash flow, tangible and intangible assets, workforce, and strategic initiatives.

A high profitability level signifies that a company is adept at managing its operations to achieve optimal outcomes, highlighting its strategic acumen and operational effectiveness. This measure is pivotal for stakeholders—such as shareholders, investors, and creditors—who rely on profitability indicators to assess the company's potential for future cash flow generation and long-term growth. Consequently, profitability not only serves as an internal benchmark for evaluating corporate performance but also functions as a critical determinant of external confidence and investment decisions, reinforcing its central role in both operational and strategic dimensions of corporate management.

Company Age

As an essential aspect of company characteristics, the age of a company serves as a significant determinant of its disclosure practices. Company age refers to the duration for which a business has sustained its operations, reflecting its ability to navigate competitive markets, ensure business continuity, and align with its overarching corporate objectives. This metric is often documented based on the year the company was first listed on the Indonesia Stock Exchange (IDX) following its initial public offering (IPO), with its age determined by subtracting the IPO year from the current year.

Older companies tend to exhibit a greater propensity for comprehensive disclosures in their annual reports compared to their younger counterparts. This practice is often attributed to their need to demonstrate resilience, stability, and adaptability within an ever-evolving market landscape. As Wulantika Oktariani cited in (Karjono, 2021) suggests, mature companies are perceived to have deeply integrated into the societal fabric. Under legitimacy theory, such integration ensures that the social and corporate systems function harmoniously, safeguarding the company's legitimacy and mitigating potential threats to its social acceptance. Consequently, the longevity of a company not only underscores its operational success but also its commitment to transparency and accountability in fostering trust with stakeholders and maintaining its legitimacy within the broader social and economic systems.

Environmental Performance

The evaluation of Indonesia's environmental performance can be conducted through various mechanisms, among which AMDAL, ISO certifications, and the PROPER program are prominent. These tools collectively provide a comprehensive framework for assessing and monitoring environmental responsibility within corporate and industrial sectors.

AMDAL (Environmental Impact Assessment), as stipulated by Government Decree No. 27 of 1999, is a critical analytical tool designed to assess the potential environmental impacts of planned business activities or projects in a given area. AMDAL plays a pivotal role in guiding decision-making processes by evaluating whether proposed developments align with sustainable practices. Its primary objective is to mitigate disruptions to natural ecological cycles by facilitating controlled interventions that measure and compare shifts in environmental quality parameters over time. For publicly listed companies, AMDAL disclosures are commonly found within their annual reports, further underscoring its significance in corporate accountability.

ISO 14001, part of the broader ISO 14000 family, pertains to international standards for environmental management systems (EMS). This standard establishes a structured methodology for managing environmental responsibilities systematically and effectively. According to the Indonesian Center for Environment and Energy (IEC, 2014), ISO 14001 serves as a management tool to ensure compliance with environmental regulations, prevent pollution, and drive continuous improvement. By adopting this framework, companies can align their production processes and products with global environmental obligations, reinforcing their commitment to sustainable practices.

The Company Performance Rating Program in Environmental Management (PROPER), spearheaded by the Ministry of Environment and Forestry, represents the government's flagship initiative for monitoring and promoting adherence to industrial environmental regulations. Governed by Ministerial Regulation No. 3 of 2014, PROPER offers a structured assessment of corporate environmental performance, categorizing companies based on their compliance and beyond-compliance efforts.

PROPER evaluations are bifurcated into two primary criteria:

1. Compliance Assessment – This aspect evaluates adherence to fundamental environmental regulations across key areas, including environmental document implementation, water and air pollution control, hazardous waste management, and measures to prevent environmental degradation. Compliance is graded on a five-color scale that is gold (Score: 5), green (Score: 4), blue (Score: 3), red (Score: 2), black (Score: 1)
2. Beyond-Compliance Evaluation – This aspect assesses companies' efforts to exceed regulatory standards, focusing on areas such as environmental management system efficacy, resource efficiency, and contributions to community development.

The detailed criteria for PROPER evaluations are outlined in the Regulation of the Minister of State for the Environment No. 5 of 2011. By categorizing companies based on their environmental performance into five distinct levels (Gold, Green, Blue, Red, and Black), PROPER provides a transparent and systematic mechanism for promoting corporate accountability and fostering continuous environmental improvement. Here are the proper levels in tabular form:

Table 1. Proper Level

Color rating	Explanation
GOLD	Consistently demonstrating environmental excellence in production and service processes, and conducting ethical and responsible business towards society.
GREEN	Conducting environmental management beyond compliance through the implementation of an environmental management system and utilizing resources efficiently and implementing social responsibility properly.
BLUE	Conduct environmental management efforts required in accordance with applicable laws and regulations.
RED	Conducting environmental management efforts but not yet in accordance with the requirements as stipulated in the legislation
BLACK	Intentionally committing acts or committing negligence resulting in environmental pollution or damage, as well as violating applicable laws and regulations and/or not implementing Administrative sanctions.

Environmental Costs

Susenohaji as cited in (Ulum et al., 2020) defines environmental costs as the financial and resource-based sacrifices that businesses incur due to the occurrence of environmental degradation and the measures taken to mitigate or prevent such damage. These costs, often referred to as Environmental Quality Costs, represent the financial implications of addressing the environmental impacts associated with a company's operations. Environmental cost information is incorporated within the broader framework of environmental accounting, a practice that involves systematically reporting these costs within a company's annual financial disclosures.

Environmental accounting serves as a method of integrating the financial consequences of environmental protection and remediation into the company's overall financial reporting structure. This practice highlights the growing recognition of environmental sustainability within corporate financial transparency. Furthermore, the concept of environmental costs is mirrored in ethical and spiritual teachings, such as the warning found in Surah Ar-Ruum, verse 41, which cautions humanity about the detrimental effects that environmental damage can inflict on the world. This verse serves as a reminder of the broader repercussions of environmental neglect, reinforcing the need for conscientious and sustainable corporate practices.

Hypothesis Development

The Effect of Company Size on Environmental Performance

Company size is fundamentally a key indicator used to assess the scale and magnitude of a business, often evaluated by the total assets held by the company. To facilitate and support its operational activities, a company must possess a substantial amount of assets, providing it with greater flexibility and capacity to optimize resource utilization. Company size can be quantified in various ways, with asset volume being one of the most common metrics. Larger companies, due to their significant asset base, tend to attract more public attention, which, in turn, amplifies the pressure and motivation to engage in environmentally responsible practices.

Research conducted by (Farlinno & Bernawati, 2023) indicates a noteworthy relationship between company size and environmental performance, suggesting that larger organizations are more likely to demonstrate improved environmental stewardship. This aligns with findings from previous studies that posit a direct correlation between a company's size and its capacity or drive to enhance its environmental performance. Consequently, the hypothesis emerges that:

H1 : Company size exerts a significant influence on environmental performance.

This hypothesis reflects the assertion that the greater the size of a company, the more substantial its environmental impact and, consequently, its responsibility to engage in sustainable practices.

Effect of Profitability on Environmental Performance

A company's financial performance, typically reflected in its financial statements for a specific period, offers valuable insights into its operational efficiency and profitability.

Profitability, which denotes a company's ability to generate profits within a given timeframe, is a critical indicator of financial success. A high level of profitability provides the company with the financial flexibility to allocate funds toward various initiatives, including environmental sustainability efforts.

There are several key financial ratios used to assess a company's profitability, such as the gross profit margin, net profit margin, return on assets (ROA), and return on equity (ROE). Companies with elevated profitability ratios not only enjoy a greater financial capacity but also possess the resources to invest in and enhance their environmental performance. In this context, a higher profit margin often correlates with a more robust financial position, enabling the company to devote resources to sustainable practices and environmental responsibility.

Research by (Farlinno & Bernawati, 2023) supports the hypothesis that profitability has a significant impact on environmental performance, asserting that companies with higher profitability are more likely to engage in environmentally conscious initiatives. Building upon previous research findings, the following hypothesis is posited:

H2 : Profitability has a significant influence on environmental performance.

This hypothesis suggests that companies with higher profit margins are not only more financially stable but are also better positioned to improve their environmental practices, underlining the interconnectedness of financial success and corporate responsibility towards the environment.

The Effect of Company Age on Environmental Performance

The age of a company refers to the duration for which the company has been operational, symbolizing its resilience and ability to endure in a competitive business environment. The age of the company is a testament to its survival and long-term business continuity, indicating that it has successfully navigated market challenges and remains relevant within its industry. This duration of existence is also reflected in the company's strategic documentation, which outlines its objectives and goals.

In general, older companies are more likely to disclose extensive information regarding their social and environmental responsibilities, a trend not as prevalent among younger organizations. The company's age is typically calculated from its establishment date, marking its operational lifespan. This concept aligns closely with legitimacy theory, which posits that organizations derive legitimacy through societal acceptance. According to the theory, companies are constantly seeking to align their activities with societal expectations, ensuring that their operations are viewed as acceptable by the public.

As companies age, their need to demonstrate long-term sustainability and social responsibility increases, compelling them to disclose more social and environmental information. This is often seen as a reflection of the company's commitment to maintaining its legitimacy within society. Research by (Irjayanti, 2014) supports this view, showing that a company's age positively influences both its performance and its tendency to engage in comprehensive environmental disclosure. Building upon these findings, the following hypothesis is posited:

H3: Company age has a significant influence on environmental performance.

This hypothesis underscores the idea that the longer a company has been in operation, the more likely it is to engage in transparent and responsible environmental practices, thereby enhancing its legitimacy in the eyes of the public and reinforcing its commitment to sustainable business practices.

The Effect of Environmental Costs in Moderating the Effect of Company Size on Environmental Performance

When a company undertakes environmental management initiatives, it inevitably incurs significant costs, particularly associated with activities such as environmental repairs, maintenance, and improvements. These costs are often perceived by the company as potential profit-reducing expenses. However, contrary to this belief, companies that allocate funds towards addressing environmental concerns may actually enhance investor confidence. The deliberate allocation of resources to environmental management can signal to investors that the company is committed to sustainable practices and responsible corporate governance, which can, in turn, boost the company's reputation and long-term financial prospects.

Research by (Permata and Khomsiyah, 2022) supports this notion, demonstrating that environmental costs can serve as a moderating factor in the relationship between company size and environmental performance. Essentially, while larger companies may already have the scale to influence their environmental outcomes, the incorporation of environmental costs into their operations further amplifies the effect of their size on environmental performance. This insight leads to the formulation of the following hypothesis:

H4: Environmental costs can moderate the effect of company size on environmental performance.

This hypothesis posits that environmental costs do not merely represent an expenditure; rather, they function as a catalyst that strengthens the link between a company's size and its ability to perform sustainably. By integrating environmental costs into their operations, companies may not only mitigate potential negative impacts on the environment but also improve their overall environmental performance, particularly when their size and resource capacity are factored into the equation.

The Effect of Environmental Costs in Moderating the Effect of Profitability on Environmental Performance

The process of preparing sustainability reports encompasses a broad range of metrics beyond just financial performance indicators. These reports include essential information regarding the conservation and valuation of natural resources, pollution control efforts, waste management strategies, and adherence to emission standards. Environmental costs play a critical role in this context, serving as a crucial management tool for balancing economic objectives with environmental responsibility. These costs arise when environmental standards are not met, reflecting the financial impact of failing to maintain environmental quality.

Environmental costs are directly linked to the extent of non-compliance with environmental regulations, representing the financial consequences of neglecting environmental quality standards. According to the research by (Permata and Khomsiyah, 2022), environmental costs can function as a moderating variable in the relationship between profitability and environmental performance. This suggests that while profitability can directly influence environmental performance, the incorporation of environmental costs may strengthen or alter this relationship, providing a more nuanced understanding of how financial success and environmental responsibility intersect. Building on this insight, the following hypothesis can be proposed:

H5: Environmental costs can moderate the effect of profitability on environmental performance.

This hypothesis asserts that the allocation of environmental costs does not merely act as a financial burden but also serves to reinforce the link between a company's profitability and its environmental performance. When environmental costs are factored into a company's financial strategies, they may enhance or adjust the impact of profitability on the company's ability to engage in sustainable environmental practices.

The Effect of Environmental Costs in Moderating the Effect of Company Age on Environmental Performance

The development of sustainability reports extends beyond the inclusion of financial indicators and incorporates critical factors such as the age of the company, which serves as a key marker of long-term business viability. The age of a company signifies its stability, accumulated experience, and capacity to navigate and overcome various challenges in the business environment. To sustain longevity, companies must strategically invest in innovation and risk management initiatives. These investments are crucial for ensuring that the company remains competitive and resilient in the face of evolving market dynamics. The costs associated with these endeavors must be meticulously allocated to maintain financial health and support sustainable growth.

Failure to ensure a company's continued existence over time can have detrimental effects on its reputation, profitability, and overall market positioning. As such, a well-thought-out strategy is indispensable for securing the company's future and its ongoing contribution to sustainable development. Research by (Permata and Khomsiyah, 2022) highlights the moderating role of environmental costs, suggesting that these costs can influence the relationship between company age and its environmental performance. The incorporation of environmental costs into a company's operational framework may enhance or modify the effects of a company's age on its sustainability practices. Based on these insights, the following hypothesis emerges:

H6 : Environmental costs can moderate the effect of company age on environmental performance

This hypothesis posits that the strategic allocation of environmental costs serves not merely as an operational expense but as a pivotal factor that influences the connection between a company's age and its environmental performance. As companies age, their established longevity and experience may guide their environmental initiatives, with

environmental costs acting as a moderating element that enhances or reshapes this relationship, furthering their commitment to sustainable and responsible business practices.

Methodology

Research Type

This study adopts a quantitative research approach, which is defined as "research that generates findings that can be quantified using statistical techniques or other measurement methodologies," as articulated by V. Wiratna Sujarweni in (Nababan et al., 2023). The quantitative approach was selected for this research due to the nature of the data, which is primarily derived from financial statements, annual reports, and sustainability disclosures of publicly listed companies on the Indonesia Stock Exchange (IDX). The focus of this study is on companies within the healthcare and energy sectors listed on the IDX between 2021 and 2023. The decision to concentrate on these sectors stems from their substantial environmental impact, particularly considering activities related to mining, medical waste management, and other environmental concerns associated with these industries. Both sectors are recognized for their significant operational and ecological footprints, which warrant closer examination in the context of environmental performance and sustainability practices.

Population and Sample

The sampling method employed in this research is purposive sampling, which is defined as a technique that involves selecting participants or units based on specific criteria or objectives aligned with the research focus, as described by Sugiyono in (Fakhri, 2021). Purposive sampling was chosen to ensure that the selected sample aligns closely with the research theme, which centers on green accounting. The criteria for sample selection in this study are as follows:

1. Companies that are listed in the healthcare and energy sectors on the IDX during 2021-2023
2. Companies that have been listed on the IDX prior to 2021
3. Companies that actively participate in the PROPER program during 2021-2023
4. Companies possessing complete financial statements and annual reports for the years 2021-2023
5. Companies that have not incurred any losses during 2021-2023
6. Companies that consistently incur environmental costs during 2021-2023.

These specific criteria were established to ensure the relevance of the data to the study's focus on the financial and environmental performance of companies in sectors with notable environmental impacts. From the description of the sample criteria above, the following is a description of the number of samples that will be used in this study.

Table 2. Description of Research Sample

No	Criteria	Healthcare	Energy
1	Companies listed on IDX 2021-2023	34	88
2	Companies with listing dates before 2021	20	66
3	Companies participating in PROPER 2021-2023	7	9
4	Companies with complete report 2021-2023	7	8
5	Companies that receive continuous profit 2021-2023	6	8
6	Companies that incur continuous environmental costs 2021-2023	5	7
	Total number of companies	12	
	Total number of samples	36	
	Number of samples removed due to outliers	(3)	
	Number of sample used	33	

Data Collection Technique

The data collection methodology employed in this study utilizes secondary data sourced from a range of documented materials, including financial statements, annual reports, and sustainability reports of the companies under investigation. The documentation process is primarily conducted through accessing and retrieving relevant information from the Indonesia Stock Exchange (IDX) website, ensuring the reliability and authenticity of the data collected for analysis.

Data Analysis Technique

To examine the relationships between the independent variables and the dependent variable, as well as the moderating influence of the moderator variable, a Moderated Regression Analysis (MRA) was performed. Additionally, to ensure the robustness and validity of the findings, classical assumption tests were conducted, alongside hypothesis testing, all utilizing the SPSS software version 23. This comprehensive analytical approach facilitated a thorough evaluation of the data, accounting for potential biases and ensuring the reliability of the conclusions drawn.

Operational Variables and Measures

Dependent Variable

Environmental performance serves as a crucial metric for assessing a company's ability to effectively manage and mitigate the adverse impacts of its operations on the surrounding environment. In this study, environmental performance is quantitatively evaluated using the PROPER (Environmental Performance Rating Program) score, which reflects the company's adherence to environmental management standards and its efforts to minimize environmental harm during a given year. This rating acts as an indicator of the company's commitment to sustainable practices and its compliance with environmental regulations, providing a comprehensive measure of its environmental responsibility and performance.

Independent Variable

Company size serves as a fundamental indicator to assess the scale of a business, reflecting its relative magnitude within its industry. This can be measured through various parameters, such as total assets, sales, or other relevant metrics. In this study, company size is primarily quantified by evaluating its total assets, which provides insight into the organization's resource base and operational capacity.

Profitability, on the other hand, is a key financial performance metric that gauges a company's ability to generate earnings from its core business activities. It reflects how effectively a company utilizes its resources to achieve financial success. For the purposes of this research, profitability is specifically assessed through the Return on Assets (ROA) ratio, which measures the efficiency with which a company generates profit relative to its total assets.

Company age is another vital indicator used to assess the longevity and operational sustainability of a business. It provides insight into how well a company has maintained its operations over time and its ability to adapt to changing market conditions. In this study, company age is determined based on the duration since the company was first listed on the Indonesia Stock Exchange (IDX), as publicly listed companies are subject to various obligations towards their stakeholders and the broader environment. The inclusion of company age as a variable reflects the expectation that companies with longer operational histories may exhibit greater stability and a higher degree of responsibility in terms of their environmental and social obligations.

Moderating Variable

Environmental costs are expenditures made by the company to manage and cope with environmental impacts that arise from the company's operations. Environmental costs in this study were taken from the company's sustainability report, which was then compared to the company's net profit.

Table 3. Independent & Dependent Variable Measures

No	Variable	Formulas
1	<i>Company Size</i>	$Size = LN (Total Assets)$
2	<i>Profitability</i>	$ROA = \frac{Net Profits}{Total Assets}$
3	<i>Company Age</i>	$Age = Year of Listing - Year of Research$
4	<i>Enviromental Cost</i>	$EC = \frac{Total Environment Spending}{Net Profits}$
5	<i>Environmental Performance (PROPER)</i>	Gold = 5 Green = 4 Blue = 3 Red = 2 Black = 1

Result and Discussion

Classical Assumption Test

Normality Test

Normality test is a test used to ensure that research data comes from a normal distribution. The Kolmogorov Smirnov test has an interpretation that if the significant value exceeds the value of 0.05, the data has a normal distribution.

Table 4. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		33
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.64757122
Most Extreme Differences	Absolute	.094
	Positive	.055
	Negative	-.094
Test Statistic		.094
Asymp. Sig. (2-tailed)		.200 ^{c,d}
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		

Based on table 4, it is known that the significant value is 0.200, so it is known that the data has a normal distribution.

Autocorrelation Test

The autocorrelation test is a test conducted to see the correlation between the residual value in a period and the residual value in another period. The Durbin Watson test has an interpretation that if the value of $dU < d < 4-dU$ then the data does not have autocorrelation.

Table 5. Autocorrelation Test Results

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.570 ^a	.325	.229	.69228	1.659
a. Predictors: (Constant), Environmental Cost, Company Age, Company Size, ROA					
b. Dependent Variable: Environmental Performance					

Based on $n = 33$ and $k = 3$, $dU = 1.6511$ and $4-dU = 2.3489$ are obtained. With a Durbin Watson value of 1.659, it is found that the Durbin Watson value exceeds the dU value and is less than $4-dU$. So it is known that the data does not have autocorrelation.

Heteroscedasticity Test

The heteroscedasticity test is a test used to see if there are differences in residuals at various levels of the dependent variable. Spearman's rho test has an interpretation that if the significant value exceeds the value of 0.05 then the data does not have heteroscedasticity.

Table 6. Heteroscedasticity Test Results

Correlations		
Spearman's rho		Unstandardized Residual
Company Size	Sig. (2-tailed)	.663
	N	33
ROA	Sig. (2-tailed)	.266
	N	33
Company Age	Sig. (2-tailed)	.921
	N	33

Based on table 6, it is known that the significant value for all independent variables exceeds the value of 0.05. So it is known that the data does not have heteroscedasticity.

Multicollinearity Test

The multicollinearity test is a test conducted to see if there is a strong correlation between the independent variables in the study. The multicollinearity test has an interpretation, namely if the tolerance value exceeds 0.1 and the VIF value is less than 10, the data does not have multicollinearity.

Table 7. Multicollinearity Test Results

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Company Size	.892	1.122
	ROA	.881	1.135
	Company Age	.961	1.040
	Enviromental Cost	.805	1.242

Based on table 7, the tolerance value for all variables exceeds 0.1 and the VIF value for all variables is less than 10. So it is known that the data does not have multicollinearity.

Hypothesis Test

F Test

The F test is a test conducted to see if there is a correlation between the independent variables and the independent variables simultaneously. The f test has an interpretation that if the variable has a significant value of less than 0.05 and an f_{value} that exceeds the f_{table} , then the independent variable has an influence.

Table 8. F Test Results

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.077	7	1.582	4.495	.002 ^b
	Residual	8.801	25	.352		
	Total	19.879	32			

a. Dependent Variable: Environmental Performance

b. Predictors: (Constant), Age*EC, ROA, Company Size, Company Age, ROA*EC, Environmental Costs, Size*EC

Based on table 8, it is known that all independent variables have an influence on the environmental performance variable which can be seen from the significant value of 0.002 and $f_{\text{value}} 4.495 > f_{\text{table}}$ of 2.93 ($df_1 = 3$, $df_2 = 29$).

T Test

The t test is a test conducted to see if there is a correlation between independent variables and independent variables individually. The t test has an interpretation that if the variable has a significant value of less than 0.05 and a t_{value} that exceeds the t_{table} , then the independent variable has an influence.

Table 9. T Test Results

Coefficients ^a				
Model		Standardized Coefficients	t	Sig.
		Beta		
1	(Constant)		.011	.991
	Company Size	.131	.478	.637
	ROA	-.042	-.258	.799
	Company age	1.094	3.836	.001
	Environmental Costs	-2.924	-.774	.446
	Size*EC	4.132	1.045	.306
	ROA*EC	.568	2.755	.011
	Age*EC	-1.525	-3.225	.003

a. Dependent Variable: Environmental Performance

Based on table 9, it is known that the variables of company size and ROA have no relationship to environmental performance which can be seen with a significant value of 0.637 and 0.799, so H1 and H2 are rejected. However, the company age variable has a relationship with environmental performance with a significant value of 0.001 and $t_{\text{value}} 3.836 > t_{\text{table}}$ of 2.04523 ($df_1 = 29$, $df_2 = 5\%$), so H3 is accepted.

Then for the moderation variable, it is known that environmental costs have no effect on environmental performance which can be seen from the significant value of 0.446. Environmental costs also cannot moderate the relationship between company size and environmental performance which can be seen from the significant value of 0.306, so H4 is rejected. But in contrast to ROA and company age, environmental costs can moderate the relationship between these two variables with environmental performance as seen from the significant values of 0.011 and 0.003 and t_{value} of $2.755 > 2.04523$ and $-3.225 < -2.04523$. So it is known that H5 and H6 are accepted.

Moderated Regression Analysis

Moderation linear regression analysis is a test conducted to see if there is a relationship between the independent variable and the dependent variable and the relationship between the independent variable which is influenced by the moderating variable. In addition to seeing the direction of the influence of the independent variable, regression analysis also sees whether the moderating variable strengthens or weakens the influence of the independent variable.

Table 10. Moderation Regression Analysis Results

Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	.051	4.649	
	Company Size	.077	.161	.131
	ROA	-.044	.173	-.042
	Company age	.096	.025	1.094
	Environmental Costs	-267.810	346.129	-2.924
	Size*EC	12.391	11.862	4.132
	ROA*EC	173.610	63.022	.568
	Age*EC	-9.292	2.881	-1.525

a. Dependent Variable: Environmental Performance

Based on table 10, the regression equation is as follows:

$$Y = ,051 + ,077 X_1 - ,04 X_2 + ,096 X_3 - 267,810 Z + 12,391 X_1.Z + 173,610 X_2.Z - 9,292 X_3.Z + e$$

- $a = ,051$ is the value of the environmental performance variable with the assumption that all independent variables do not affect the dependent variable.
- $X_1 = ,077$ is the value of the Company size variable which has a positive effect, meaning that if the variable increases by one unit, environmental performance will increase by ,077 assuming that the other independent variables are zero.
- $X_2 = -.044$ is the value of the ROA variable which has a negative effect, which means that if the variable increases by one unit, environmental performance will decrease by ,044 with the assumption that the other independent variables have a value of zero.

- $X_3 = ,096$ is the value of the Company age variable which has a positive influence, meaning that if the variable increases by one unit, environmental performance will increase by ,096 with the assumption that the other independent variables are zero.
- $Z = -267,810$ is the value of the ROA variable which has a negative effect, which means that if the variable increases by one unit, environmental performance will decrease by - 267,810 with the assumption that the other independent variables have a value of zero.
- $X1.Z = 12.391$ is the value of the Company size variable moderated by environmental costs which has a positive effect, meaning that if the variable increases by one unit, environmental performance will increase by 12.391 with the assumption that the other independent variables are zero.
- $X2.Z = 173.610$ is the value of the ROA variable moderated by environmental costs which has a positive influence, meaning that if the variable increases by one unit, environmental performance will increase by 173.610 assuming other independent variables are zero.
- $X3.Z = -9.292$ is the value of the company age variable moderated by environmental costs which has a negative effect, meaning that if the variable increases by one unit, environmental performance will decrease by -9.292 assuming the other independent variables are zero.

Determination Coefficient Test

The coefficient of determination test is a test conducted to see how much influence the independent variables have on the dependent variable simultaneously. Because in the study there were 3 independent variables, where the number of independent variables could cause the r square value to be high, the adjusted r square was chosen to see the coefficient of determination.

Table 11. Determination Coefficient Test Results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.746 ^a	.557	.433	.59334
a. Predictors: (Constant), Age*EC, ROA, Company Size, Company Age, ROA*EC, Environmental Costs, Size*EC				

Based on table 11, it is known that the Adjusted R Square is 0.433. This value indicates that simultaneously the dependent variable is influenced by the independent and moderation variables by 0.433 or 43.3% with the remaining 56.7% (100%-43.3%) being influenced by other variables not discussed in this study.

The Effect of Company Size on Environmental Performance

Based on the sig. 0.637, it is known that company size does not have a significant influence on environmental performance, so H1 is rejected. This shows that companies that have a large scale do not necessarily have a high concern for the environment. This may be

due to other interests that are the main focus of companies that have a large scale, such as large companies may focus more on financial performance or profitability compared to their environmental performance. Or also the structure of a company that has a large scale is certainly not as flexible as the structure of a company with a small scale, which causes bureaucratic difficulties as a factor that hinders the adoption of a culture of environmental care. The results of this study are in accordance with research (Tanjung & Kurnia, 2020) which states that company size has no significant effect on environmental performance.

The Effect of Profitability on Environmental Performance

Based on the sig. 0.799, it is known that profitability has no significant effect on environmental performance, so H2 is rejected. This shows that a company that has a high level of profitability does not necessarily have concern for the surrounding environment. Which means that companies that have large profits do not necessarily want to spend costs related to the environment even though the company is able to spend it. This may be due to the existence of other interests such as the interests of shareholders which can be explained by stakeholder theory, where the company will first prioritize investors so that investors are satisfied with the company's performance. The results of this study are in accordance with research (Widarsono & Hadiyanti, 2015) which states that profitability has no significant effect on environmental performance.

The Effect of Company Age on Environmental Performance

Based on the sig. 0.001 and t_{value} of 3.836 and based on the regression coefficient value, it is known that company age has a significant and positive influence on environmental performance, so H3 is accepted. This shows that companies that are old tend to have concern for the environment. This can be explained from a logic where a company that can stand for a long time is certainly a company that works well both operationally and socially. This can be linked to legitimacy theory where companies must take actions that are acceptable to society, the actions of a company must not only follow the rules but also the norms of society. Because companies that take improper actions certainly cannot last long. The results of this study are in accordance with research (Karjono, 2021) which states that company age has a significant and positive influence on environmental performance.

The Effect of Environmental Costs in Moderating The Effect of Company Size on Environmental Performances

Based on the sig. 0.306, it is known that environmental costs cannot moderate the relationship between company size and environmental performance, so H4 is rejected. This shows that environmental costs cannot strengthen the relationship between company size and environmental performance, companies that have a large scale do not necessarily have good environmental performance even though the company has issued environmental costs. Because it could be that the company only incurs environmental costs without seeing the actual environmental needs, which causes the company's environmental performance not to improve even though the company has incurred environmental costs. The results of this study contradict research (Permata & Khomsiyah, 2022) which states that

environmental costs can moderate the effect of company size on environmental performance.

The Effect of Environmental Costs in Moderating The Effect of Profitability on Environmental Performances

Based on the sig. 0.011 and t_{value} 2.755 and the regression coefficient value, it is known that environmental costs can strengthen the relationship between profitability and environmental performance, so H5 is accepted. This shows that companies that have high profitability can improve their environmental performance with environmental costs, meaning that a company that has a large profit can invest its profits to be able to improve or increase its environmental concern which causes the company's environmental performance to be good. The higher the profit owned, the higher the funds or costs that can be spent by the company to increase the company's contribution to the environment. The results of this study are in accordance with research (Permata & Khomsiyah, 2022) which states that environmental costs can moderate the effect of profitability on environmental performance.

The Effect of Environmental Costs in Moderating The Effect of Company Age on Environmental Performances

Based on the sig. 0.003 and t_{value} -3.225 and the regression coefficient value, it is known that environmental costs can weaken the relationship between company age and environmental performance, so H6 is accepted. This shows that environmental costs in long-established companies have an inverse impact, where long-established companies may not be able to manage environmental costs efficiently to improve their environmental performance. The possibility that companies that already have a long age can have the opinion that environmental costs are a burden that must be met due to regulations and not as an investment strategy, so companies are more reluctant to care about the environment if they have to incur environmental costs. The results of this study are in accordance with research (Permata & Khomsiyah, 2022) which states that environmental costs can moderate the effect of company age on environmental performance.

Conclusion

From the results and discussion of the study, it is known that among the 3 independent variables, only the age of the company has a significant influence so that the age factor of the company becomes a significant factor when looking at the environmental performance of a company. Other variables such as company size and profitability do not have a significant influence, which means that large-scale companies and those with high profits are not necessarily the main factors for companies in improving their environmental performance.

As for the moderating variable, namely environmental costs can strengthen the relationship of profitability and can weaken the relationship of company age, which means that environmental costs only provide benefits for companies that have large profits, which can then be used to improve their environmental performance. While environmental costs

have a negative impact on companies that have a long age, where aged companies consider that environmental costs are only a necessity or compulsion due to rules or regulations that cause companies to be increasingly reluctant to improve their environmental performance.

It is hoped that the environmental concern of the company can be developed based on the results and discussion of this research, various factors that may be useful for companies to improve their environmental performance. It is also hoped that the results of this study can help researchers and the general public to be able to increase knowledge and awareness about environmental care.

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