THE EFFECT OF ENVIRONMENTAL PERFORMANCE, ENVIRONMENTAL COSTS, CARBON EMISSION DISCLOSURE ON FINANCIAL PERFORMANCE AND VALUE OF PROPERTY AND REAL ESTATE COMPANIES IN THE PERIOD 2022-2024

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Abstract

This study examines the effect of environmental performance, environmental costs, and carbon emission disclosure on financial performance and firm value in property and real estate companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period. A quantitative approach was employed using secondary data obtained from annual and sustainability reports. The research sample was selected through purposive sampling based on the availability and completeness of relevant data. Financial performance was measured using Return on Assets (ROA), while firm value was proxied by Tobin's Q. Environmental performance was assessed through ISO 14001 certification, environmental costs were calculated as the proportion of corporate social responsibility expenditure to profit, and carbon emission disclosure was measured using a dichotomous disclosure index. Data were analyzed using multiple linear regression, supported by descriptive statistics and classical assumption tests. The findings indicate that environmental performance has a positive effect on financial performance, while environmental costs negatively affect financial performance. Carbon emission disclosure does not significantly influence financial performance. Regarding firm value, environmental performance and environmental costs show no significant effect, whereas carbon emission disclosure positively influences firm value, suggesting that investors increasingly value transparency related to environmental impacts. These results highlight the differing roles of environmental initiatives in shaping corporate financial outcomes and market valuation.

Keywords: Carbon Emission Disclosure, Environmental Costs, Environmental Performance, Financial Performance, Firm Value

INTRODUCTION

Rapid technological advancement has increased operational efficiency and profitability across industries; however, this efficiency-driven orientation often conflicts with environmental accountability. Corporate decisions that emphasize cost minimization and output maximization frequently overlook ecological consequences, thereby intensifying environmental degradation and generating social externalities for surrounding communities (Nafsi & Kusuma, 2023; Setyaningrum & Mayangsari, 2022; Putri & Agustin, 2023). This inherent tension between operational efficiency and environmental responsibility creates a dilemma for firms, while simultaneously complicating stakeholders' ability to evaluate whether corporate value creation is achieved in a sustainable manner.

This conflict is ultimately reflected in, and influenced by, corporate financial outcomes and market-based valuations. In property and real estate companies listed on the Indonesia Stock Exchange, fluctuations in financial performance and firm value commonly proxied by Return on Assets (ROA) and Tobin's Q indicate that market assessments are not solely driven by operational performance, but are also shaped by how firms manage and disclose their environmental responsibilities (www.idx.co.id). Nevertheless, stakeholders often face difficulties in interpreting these indicators due to inconsistencies in environmental performance measurement and reporting practices.

One major source of this inconsistency lies in the absence of standardized environmental performance metrics. Companies employ diverse assessment frameworks, such as PROPER, ISO 14001, and other national or international standards, each relying on different evaluation methodologies. As a result, cross-company comparability becomes limited, weakening stakeholders' capacity to consistently assess environmental risk exposure and climate mitigation efforts (Arief et al., 2020). These limitations are further exacerbated by incomplete disclosure of environmental costs. Many firms fail to report key information, including savings from emission-reduction initiatives, projected environmental expenditures in capital planning, and Scope-3 emissions, thereby restricting stakeholders' ability to estimate long-term environmental risks and potential future costs. Such information asymmetry may ultimately contribute to stock mispricing and unstable firm valuations (Arimbi & Mayangsari, 2022).

Carbon emission disclosure represents one of the most prominent mechanisms through which firms demonstrate environmental accountability. However, this practice may also introduce short-term financial trade-offs. The costs associated with measuring, managing, and reducing emissions can suppress cash flows, reduce profit margins, and provoke adverse market reactions, potentially exerting downward pressure on ROA and Tobin's Q. This dynamic helps explain why carbon emission disclosure remains voluntary and uneven across firms in the property and real estate sector (Wang, 2023). Empirical evidence on this issue remains inconclusive. While several studies report that stronger environmental performance enhances financial performance and firm value—suggesting that sustainability initiatives generate reputational and efficiency benefits (Angelina & Nursasi, 2021; Saputra, 2020; Hafidz & Deviyanti, 2022)—other studies find insignificant or even negative effects, indicating that environmental initiatives may be perceived as cost burdens rather than value drivers (Putri et al., 2024; Sari et al., 2025).

Similar inconsistencies are observed in research on environmental costs. In theory, environmental cost allocation reflects corporate responsibility and signals a commitment to mitigating negative environmental impacts, which may strengthen corporate image, attract investors, and enhance consumer trust (Hapsari et al., 2021; Wahyuningtyas, 2023; Azizah & Cahyaningtyas, 2023). Empirical findings, however, remain divided. Some studies confirm that environmental costs positively affect profitability and firm value (Hapsari et al., 2021; Setyaningrum & Mayangsari, 2022), while others report no significant relationship, suggesting that environmental expenditures do not automatically translate into improved financial outcomes (Putri et al., 2024; Apriandi et al., 2022).

Indonesia's commitment to climate change mitigation further strengthens the relevance of this issue. Through its participation in the Paris Agreement and the enactment of Presidential Regulation No. 61 of 2011 on the National Action Plan for Greenhouse Gas Emission Reduction, the government has emphasized the strategic role of corporate participation in achieving national emission reduction targets (Anggita et al., 2022). Within this framework, carbon emission disclosure serves as a key instrument of transparency, enabling stakeholders to assess corporate environmental responsibility and long-term business sustainability (Hardiyansah & Agustini, 2021; Alfayerds & Setiawan, 2021). Yet, empirical studies again yield mixed conclusions: some document a positive relationship between carbon emission disclosure and financial performance or firm value (Bhakti & Wulandari, 2025; Maryanti et al., 2025), while others identify negative effects, implying that disclosure may heighten perceived risk and reduce market valuation (Yuliandhari et al., 2023; Hadiwibowo et al., 2023).

Financial performance remains a central indicator of managerial effectiveness and corporate sustainability, as sustained profitability enhances investor confidence and shareholder welfare (Pradipta et al., 2022; Ismail & Afridian, 2025). In turn, firm value reflects market perceptions regarding management's ability to allocate resources efficiently and generate future economic benefits, commonly manifested through stock price movements (Swastika & Agustin, 2021; Putra et al., 2021; Warisman & Amwila P., 2022). Despite this theoretical linkage, empirical studies examining the interrelationships among environmental performance, environmental costs, carbon emission disclosure, financial performance, and firm value continue to report inconsistent results.

These inconsistencies highlight a clear research gap. Prior studies often examine environmental performance, environmental costs, or carbon emission disclosure in isolation, employ different measurement proxies—such as Tobin's Q, disclosure indices, green accounting dummy variables, or ISO 14001 certification—and focus on varying industrial contexts. Such methodological fragmentation may partially explain the contradictory findings reported in the literature (Wara et al., 2023). Accordingly, this study seeks to address this gap by simultaneously examining the effects of environmental performance, environmental costs, and carbon emission disclosure on financial performance and firm value within the property and real estate sector. By adopting an integrated analytical framework, this research aims to provide more comprehensive and consistent evidence, thereby offering valuable insights for stakeholders, regulators, and business practitioners in formulating sustainable and accountable corporate strategies (Dharmawati et al., 2024).

REVIEW OF LITERATURE

Stakeholder Theory

Yasah et al. (2024) argue that stakeholder theory emphasizes the interdependence between internal and external parties, suggesting that organizations should not focus solely on financial gains but also consider the impacts of their business on stakeholders. The sustainability of a business relies heavily on stakeholder support, as failure to address stakeholder needs can lead to protests, reduced legitimacy, and ultimately lower corporate performance and reputation (Cristofel & Kurniawati, 2021; Novita & Sebrina, 2022). Current stakeholder concerns predominantly involve environmental issues, including noncompliance with regulations, ecological damage from business activities, and rising carbon emissions (Kospa, 2021). Companies that successfully meet stakeholder expectations tend to gain broader support, enhance their reputation, and establish mutually beneficial relationships, which positively influences firm value and financial performance by improving customer loyalty, employee productivity, and access to resources and market opportunities (Nurmila & Sisdianto, 2024). Therefore, stakeholder theory provides a relevant framework for understanding the relationship between stakeholder engagement, corporate value, and financial performance.

Financial Performance

Financial performance reflects a company's ability to evaluate its operational activities over a specific period (Hastiwi et al., 2022) and indicates the entity's capacity to generate profit (Sari et al., 2023). It serves as a tool to assess how well a company adheres to and implements existing regulations (Damanik, 2021). According to the Indonesian Financial Accounting Standards (PSAK) No. 1 on "Presentation of Financial Statements," the purpose of financial reporting is to provide stakeholders with information on financial performance, cash flows, and financial position to support strategic decision-making (Astawa et al., 2021). Financial performance can be measured using ratios such as return on equity, which provides a comprehensive view of corporate performance (Kusuma et al., 2021), or return on assets (ROA), which reflects the effectiveness of asset utilization in generating profit (Sari, 2021). This study adopts ROA as the proxy for financial performance, following Sari (2021), because higher ROA indicates greater efficiency in generating profit, which in turn can attract investors interested in committing capital to the company (Permana et al., 2021; Irawan & Muarifah, 2020).

Company Values

Stakeholder trust reflects a company's value as perceived through its performance achievements (Suryati & Murwaningsari, 2022). Firm value represents the company's condition and future prospects, often indicated by stock prices, where increases in stock value signal effective financial management combined with attention to social and environmental responsibilities (Rusmanto & Triyani, 2022). Companies demonstrating strong social and environmental accountability tend to attract more investors, particularly amid global concerns such as climate change (Nazwa & Fitri, 2022). Stock prices serve as a proxy for firm value, illustrating the level of shareholder confidence and public perception of corporate performance, with the primary goal of enhancing market appeal and reputation (Anggita & Nugroho, 2024). Evaluating firm value can be achieved using financial ratios such as ROA, ROE, and Tobin's Q, which provide insights into asset efficiency, profitability, and long-

term growth prospects, especially when considering non-financial factors (Febriyanti et al., 2023; Putri & Serly, 2024).

Environmental Performance

Environmental performance reflects a company's efforts to mitigate the negative impacts of its operations on the ecosystem, where minimal ecological damage indicates higher performance, while significant damage leads to a decline (Angelina & Nursasi, 2021; Cahyani & Puspitasari, 2023). Various indicators measure environmental performance, including PROPER, an Indonesian government initiative aimed at motivating companies to comply with environmental regulations and improve ecological outcomes (Ritonga et al., 2024). Additionally, ISO 14001 serves as a systematic and structured framework for organizations to manage environmental impacts from operational activities (Istiningrum, 2023). This study employs ISO 14001 as the measurement indicator, following Burhany et al. (2021), as its certification ensures companies implement effective environmental management practices. The ISO 14001 standard, as part of the Environmental Management System, assists organizations in identifying, managing, and prioritizing potential environmental risks, ultimately supporting initiatives oriented toward environmental protection (Alwi et al., 2024).

Environmental Costs

Environmental costs refer to the expenses a company allocates to address environmental damage resulting from business operations (Angelina & Nursasi, 2021). Such costs serve as a means to promote environmental sustainability and ensure long-term business continuity. Effective and efficient management of these funds requires structured identification and measurement processes (Nisa & Ervina, 2022), as inadequate environmental quality generates costs that must be mitigated, corrected, or prevented (Suryaningrum & Ratnawati, 2024). Investing in environmental initiatives can enhance a company's image, contributing to competitive advantage and potentially increasing revenue (Cahyani & Puspitasari, 2023; Putri et al., 2024). Stakeholder theory supports this approach, emphasizing that firms should consider not only profit but also environmental preservation and impact mitigation (Ramadhan, 2023). Environmental management accounting provides a framework to identify, collect, analyze, and utilize financial and physical information related to environmental impacts (Rifai et al., 2024), while environmental cost disclosure offers a qualitative measure of corporate commitment, transparency, and accountability toward stakeholders (Arimbi & Mayangsari, 2022). This study adopts environmental cost disclosure as the primary indicator, reflecting the company's financial management of environmental impacts in a transparent and accountable manner.

Carbon Emission Disclosure

Carbon emission reporting from corporate activities represents a company's responsibility toward stakeholders who support its operations (Mulyani & Octalica, 2023). This reporting aims to provide information on total carbon emissions, their accounting recognition, and disclosure within sustainability reports or financial statements, often including emission calculations, energy efficiency policies, and related measures (Oktariyani, 2024). Such disclosures serve as a key source of information for stakeholders and require companies to align with national and international carbon reduction programs, with emission data acting as indicators for assessing carbon trading effectiveness (Bhakti & Wulandari, 2025). Standardized guidelines, such as the Global Reporting Initiative (GRI)

Index, outline procedures for carbon emission disclosure in sustainability reporting (Putri & Murtanto, 2023). Additionally, global frameworks like the Greenhouse Gas (GHG) protocol facilitate measurement and reporting of emissions across three categories, while carbon emission disclosure encompasses not only total emissions but also intensity measurement and tracking reductions over time (Pandey & Angglena, 2025). In this study, carbon emission disclosure is utilized as the primary indicator of environmental performance due to its global relevance, structured methodology, and strategic value (Wahyuningsih et al., 2023).

Hypothesis Development and Previous Research

Based on the explanation of the basic stakeholder theory and the framework of thought that has been put forward, the following hypothesis can be formulated:

The Influence of Environmental Performance on Financial Performance

The escalating environmental degradation has prompted companies to recognize the importance of managing the environmental impact of their operations, aiming to support ecological preservation (Hadiwibowo et al., 2023). Environmental performance reflects a firm's commitment to sustainability, and proactive conservation efforts are expected to mitigate the negative consequences of operational activities (Kusumawardhany, 2022). Firms with strong financial performance tend to attract investors, potentially further enhancing their financial outcomes. Research by Saputra (2020) indicates that environmental performance positively affects financial performance, as economic and financial resource allocation can be influenced by societal expectations, and companies can use environmental performance reporting to validate their activities in the public eye. Annual reporting conveys corporate responsibility toward the environment, fostering social acceptance. Conversely, Putri et al. (2024) found that environmental performance does not significantly impact financial performance, suggesting that consumers may not prioritize environmental considerations in purchasing decisions, and improvements in environmental performance alone do not necessarily guarantee financial gains. Consequently, the following hypothesis is formulated.

H_1: Environmental Performance Affects Financial Performance.

The Impact of Environmental Costs on Financial Performance

According to Siregar et al. (2022), companies incur environmental costs to mitigate the damage caused by operational waste, and achieving good environmental performance requires such expenditures. The amount spent depends on the company's efforts to reduce environmental harm, and while these costs may not yield immediate benefits, they can be considered long-term investments with future advantages (Setyaningrum & Mayangsari, 2022). Research by Hapsari et al. (2021) indicates that environmental costs positively affect financial performance, as measured by profitability, highlighting the importance of effective management and allocation of these costs. Companies that implement sustainable and efficient environmental accounting practices may achieve greater profits than the costs incurred. However, Putri et al. (2024) argue that environmental costs do not significantly influence financial performance, since higher production costs may not substantially affect product pricing or consumer perception. Based on these perspectives, the following hypothesis is formulated.

H_2: Environmental Costs Affect Financial Performance.

The Impact of Carbon Emission Disclosure on Financial Performance

Research by Maryanti et al. (2025) indicates that companies disclosing carbon emissions, such as total energy consumption and renewable energy usage, contribute

positively to ecosystem sustainability, the well-being of future generations, and the long-term viability of firms with robust environmental management systems, thereby enhancing stakeholder and consumer trust. Syafis (2022) emphasizes that companies, as part of society, must adhere to prevailing social norms, aligning corporate practices with values accepted by the community, which in turn builds public trust, encourages product purchases, and improves firm performance. Supporting this, Bhakti & Wulandari (2025) find that carbon emission disclosure significantly and positively affects financial performance, serving as a marketing tool that reflects environmental commitment and enhances profitability, often measured by return on assets. Conversely, Yuliandhari et al. (2023) report that carbon emission disclosure can have a significant negative effect on financial performance, as efforts to reduce emissions may incur substantial costs, potentially threatening profitability and limiting stakeholders' priorities, thereby constraining companies' ability to implement such disclosures.

H_3: Carbon Emission Disclosure Affects Financial Performance.

The Influence of Environmental Performance on Company Value

ffective environmental performance can enhance a company's reputation, leading to increased customer loyalty, positive public perception, and higher profits (Pramono, 2024). Well-managed environmental practices also foster stronger relationships with shareholders, which, alongside robust financial performance, contribute to higher firm value (Hascaryo & Widaryanti, 2025). Environmental performance positively influences firm value by demonstrating corporate responsibility in managing and protecting the surrounding environment during operational activities, as reflected in achievements such as favorable PROPER ratings, which signal sustainability to stakeholders (Hafidz & Deviyanti, 2022). This aligns with the triple bottom line concept, emphasizing that companies should balance profit generation (profit) with environmental stewardship (planet) and stakeholder interests (people). However, some studies indicate that environmental performance may not always positively impact firm value, as investors do not universally consider it a determinant for investment decisions, and strong environmental practices do not automatically guarantee financial returns (R. Sari et al., 2025). Consequently, the following hypothesis is proposed.

H_4: Environmental Performance Affects Firm Value

The Influence of Environmental Costs on Company Value

A company's success in managing environmental impacts can be reflected in its environmental performance, as posited by stakeholder theory, which suggests that firms with strong performance are more likely to disclose environmental management outcomes to stakeholders, whereas firms with poor performance tend to withhold such information. Various factors influence environmental cost disclosure, including government regulations, social priorities, corporate image protection, and public demand. Research by Setyaningrum and Mayangsari (2022) indicates that environmental costs positively and significantly affect firm value, suggesting that higher environmental expenditures signal a company's commitment to sustainability and motivate transparency and accountability through financial and sustainability reporting. Conversely, Saputri et al. (2023) found no significant impact of environmental costs on firm value, as the economic benefits of such expenditures may be indirect and not immediately realized, depending on the company's strategy, type, and financing approach. Therefore, these findings form the basis for the following hypothesis.

H_5: Environmental Costs Influence Firm Value

The Effect of Carbon Emission Disclosure on Company Value

Positive signaling through corporate disclosures serves as an indicator of successful business activities and provides feedback to stakeholders, particularly shareholders, thereby enhancing investor confidence and potentially increasing firm value and stock prices (Meiliana et al., 2024). This aligns with stakeholder theory, which emphasizes that companies should generate benefits for stakeholders, not solely for themselves. Empirical evidence indicates that carbon emission disclosure positively and significantly affects firm value, as sustainability and financial reports serve as intermediaries that influence stakeholders' investment decisions, indirectly boosting firm value (Maryanti et al., 2025). However, inconsistent or non-transparent carbon emission reporting can harm investor and consumer trust, reduce stock liquidity, and consequently decrease stock prices and firm value (Hadiwibowo et al., 2023). Therefore, transparent and credible disclosure of environmental impacts is critical for maintaining investor confidence and sustaining firm value.

H_6: Carbon Emission Disclosure Affects Firm Value.

RESEARCH METHOD

This study employs a quantitative approach to empirically examine the effects of environmental performance, environmental costs, and carbon emission disclosure on financial performance and firm value. The population consists of all property and real estate companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period, totaling 92 firms based on IDX sector classification, with the observation period selected to capture recent post-pandemic corporate sustainability practices. A purposive sampling method was applied to ensure data availability and consistency, selecting firms that were actively listed throughout the study period, published complete annual and sustainability (or integrated) reports, and disclosed all data required to measure the research variables, resulting in a final sample of XX companies and XX firm-year observations. Secondary data were collected through documentation from the IDX and company websites. Financial performance was measured using Return on Assets (ROA) to reflect profitability, while firm value was proxied by Tobin's Q to capture market-based investor perceptions. Environmental performance was measured using ISO 14001 certification as a binary variable, which, despite not reflecting the quality of environmental outcomes, was employed due to its standardized and verifiable nature. Environmental cost was proxied by the ratio of CSR expenditure to net profit due to the limited disclosure of specific environmental cost items, acknowledging that CSR may encompass broader social activities. Carbon emission disclosure was measured using a dichotomous index adapted from GRI 305 indicators, covering emission reporting, reduction targets, and mitigation initiatives, with scores converted into percentages. Panel data analysis was conducted using multiple linear regression with two models ROA and Tobin's Q as dependent variables—following descriptive statistics and classical assumption tests, while model selection among pooled OLS, fixed effects, and random effects was determined using Chow and Hausman tests; hypothesis testing employed F-tests, t-tests, and adjusted R^2 to evaluate model significance, partial effects, and explanatory power.

RESULTS AND DISCUSSION

Description of Research Object

This study employs a quantitative research design, utilizing statistical approaches to process numerical data. The research aims to examine the effects of environmental performance, environmental costs, and carbon emission disclosure on financial performance and firm value. Secondary data were collected through annual and sustainability reports using a documentation method, accessible via www.idx.co.id and the official websites of each company. The research objects include all property and real estate companies listed on the Indonesia Stock Exchange (IDX). Purposive sampling was applied to select samples based on specific criteria to ensure representativeness of the sector. Following these criteria, 37 companies were sampled annually, resulting in a total of 111 data points.

Table 1.
Sample Selection Results Using the Purposive Sampling Method

No	Criteria	Amount
1	Property and real estate companies listed on the Indonesia Stock Exchange (IDX) between 2022 and 2024.	92
2	Companies that failed to publish complete and consistent annual reports and sustainability reports between 2022 and 2024.	-33
3	Companies that failed to present complete data related to the variables studied in the research between 2022 and 2024.	-22
	Criteria	37
	Property and real estate companies listed on the Indonesia Stock Exchange (IDX) between 2022 and 2024.	3
	Companies that failed to publish complete and consistent annual reports and sustainability reports between 2022 and 2024.	111
	Companies that failed to present complete data related to the variables studied in the research between 2022 and 2024.	0
	Criteria	111

Source: Data Analysis Results, 2025

Data Analysis

Descriptive Statistics

Table 2.
Results of Descriptive Statistical Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Environmental Performance	111	.00	1.00	.2613	.44131
Environmental Costs	111	-4.60	33.38	.4150	3.31188
Carbon Emission Disclosure	111	.06	.89	.5771	.17997
Financial performance	111	-18.69	42.83	1.7923	7.70799
Firm Value	111	3.85	176214.99	4622.2399	22439.64450
Valid N (listwise)	111				

Source: Data Analysis Results, 2025

Based on Table 2, the study analyzed 111 observations from 37 property and real estate companies listed on the Indonesia Stock Exchange (IDX) over 2022–2024. Financial performance (Y1) ranged from -18.69 (PT. Bliss Properti Indonesia Tbk., 2023) to 42.83 (Pudjiadi Prestige Tbk., 2022) with a mean of 1.7923 and standard deviation of 7.70799, indicating high variability. Firm value (Y2) varied between 3.85 (PT. Pudjiadi Prestige Tbk., 2023) and 176,214.99 (PT. Pakuwon Jati Tbk., 2024), with a mean of 4,622.2399 and standard deviation of 22,439.64450, also reflecting substantial heterogeneity. Environmental performance (X1) spanned 0.00 (PT. Bumi Citra Permai Tbk., 2022) to 1.00 (PT. Bekasi Fajar Industrial Estate Tbk., 2024), averaging 0.2613 with a standard deviation of 0.44131, showing diverse company practices. Environmental cost (X2) ranged from -4.60 to 33.38 (PT. Bima Sakti Pertiwi Tbk., 2022–2023), with a mean of 0.4150 and standard deviation of 3.31188, indicating variability among firms. Meanwhile, carbon emission disclosure (X3) ranged from 0.06 (PT. Metropolitan Kentjana Tbk., 2022) to 0.89 (PT. Pakuwon Jati Tbk., 2023), with a mean of 0.5771 and standard deviation of 0.17997, suggesting relatively homogeneous data.

Classical Assumption Test

The data analysis in this study was conducted using multiple linear regression and hypothesis testing, employing partial t-tests and simultaneous F-tests. To ensure the regression model is free from bias, diagnostic tests including normality, multicollinearity, heteroscedasticity, and autocorrelation were performed using SPSS version 29. Normality was assessed through the Central Limit Theorem (CLT), confirming that with 111 observations ($n > 30$), the data distribution is approximately normal, fulfilling the normality assumption. Multicollinearity tests indicated that environmental performance, environmental cost, and carbon emission disclosure had tolerance values of 1.000, 0.998, and 0.998, respectively, all above 0.10, and VIF values of 1.000, 1.002, and 1.002, all below 10, suggesting no multicollinearity issues for both financial performance (Y1) and firm value (Y2) as dependent variables (Data Analysis Results, 2025).

Heteroscedasticity was examined using the Park test, revealing that all independent variables showed p-values greater than 0.05, indicating no variance inequality among residuals. Specifically, for Y1, the p-values were 0.476, 0.247, and 0.067, and for Y2, 0.820, 0.921, and 0.988, confirming homoscedasticity. Autocorrelation was tested using the runs test, with asymptotic significance values of 0.294 for Y1 and 0.070 for Y2, both exceeding 0.05, implying the absence of autocorrelation. Collectively, these results validate that the regression model satisfies the classical assumptions and is appropriate for further hypothesis testing (Data Analysis Results, 2025).

Multiple Linear Regression Analysis

Table 3.
Results of Multiple Linear Regression Test (Y1)

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.120	.171		.702	.484
	Environmental Performance	.239	.113	.196	2.111	.037
	Environmental Costs	-.033	.015	-.203	-2.188	.031

	Carbon Emission Disclosure	.152	.278	.051	.547	.585

Source: Data Analysis Results, 2025

Based on Table 3, the multiple linear regression model obtained is expressed as KK = 0.120 + 0.239KL – 0.033BL + 0.152CED + e. The constant value of 0.120 indicates that overall, an increase in environmental performance, environmental cost, and carbon emission disclosure contributes positively to firm performance. Specifically, the regression coefficient for environmental performance (KL) is 0.239, implying that higher environmental performance is associated with improved financial performance. Conversely, the coefficient for environmental cost (BL) is –0.033, suggesting that rising environmental costs slightly reduce financial performance. Meanwhile, the coefficient for carbon emission disclosure (CED) is 0.152, indicating that greater transparency in carbon emission reporting enhances financial performance.

Table 4.
Results of Multiple Linear Regression Test (Y2)

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	-17868.418	6926.609		-2.580	.011
	Environmental Performance	8500.084	4607.346	.167	1.845	.068
	Environmental Costs	785.402	614.676	.116	1.278	.204
	Carbon Emission Disclosure	34560.354	11311.396	.277	3.055	.003

Source: Data Analysis Results, 2025

Based on Table 4, the multiple linear regression equation derived from this study is expressed as NP = -17,868.418 + 8,500.084 KL + 785.402 BL + 34,560.354 CED + e. The regression results indicate that the constant value of -17,868.418 suggests that if environmental performance, environmental cost, and carbon emission disclosure remain unchanged, the firm value tends to be low. The coefficient for environmental performance (KL) is 8,500.084, implying that an improvement in environmental performance is associated with an increase in firm value. Similarly, the environmental cost (BL) coefficient of 785.402 indicates that higher environmental expenditures contribute positively to firm value, while the carbon emission disclosure (CED) coefficient of 34,560.354 demonstrates that greater transparency in carbon emission reporting significantly enhances firm value.

F-Test

Table 5.
F-Test Results (Y1)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.622	3	.874	3.172	.027b
	Residual	29.482	107	.276		
	Total	32.104	110			

Source: Data Analysis Results, 2025

Based on the results presented in Table 5, the F-statistic is 3.172 with a significance value of 0.027, indicating that the significance level of 0.027 is below the 0.05 threshold.

This result suggests that environmental performance, environmental cost, and carbon emission disclosure simultaneously exert a significant effect on financial performance.

Table 6.
F Test Results (Y2)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6732659767.119	3	2244219922.373	4.935	.003b
	Residual	48656481210.086	107	454733469.253		
	Total	55389140977.206	110			

Source: Data Analysis Results, 2025

Based on the results presented in Table 6, the F-statistic was 4.935 with a significance value of 0.003, indicating that the significance level of 0.003 is less than 0.05. This demonstrates that environmental performance, environmental costs, and carbon emission disclosure simultaneously have a significant effect on firm value.

Partial t-test

Table 7.
t-Test Results (Y1)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.120	.171		.702	.484
	Environmental Performance	.239	.113	.196	2.111	.037
	Environmental Costs	-.033	.015	-.203	-2.188	.031
	Carbon Emission Disclosure	.152	.278	.051	.547	.585

Source: Data Analysis Results, 2025

Based on Table 7. the significance test results indicate that environmental performance significantly influences financial performance, with a p-value of 0.037, supporting H1. Similarly, environmental cost also shows a significant effect on financial performance with a p-value of 0.031, confirming H2. In contrast, carbon emission disclosure does not have a significant impact on financial performance, as indicated by a p-value of 0.585, leading to the rejection of H3.

Table 8.
Result of t-Test (Y2)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-17868.418	6926.609		-2.580	.011
	Environmental Performance	8500.084	4607.346	.167	1.845	.068
	Environmental Costs	785.402	614.676	.116	1.278	.204
	Carbon Emission Disclosure	34560.354	11311.396	.277	3.055	.003

Source: Data Analysis Results, 2025

Based on Table 8, the significance test results indicate that environmental performance (H4) has a p-value of 0.068, exceeding 0.05, implying it does not significantly

affect firm value. Similarly, environmental cost (H5) shows a p-value of 0.204, also above 0.05, indicating no significant impact on firm value. In contrast, carbon emission disclosure (H6) has a p-value of 0.003, below 0.05, suggesting a significant influence on firm value. The coefficient of determination (R^2) was employed to assess the extent to which the independent variables environmental performance, environmental cost, and carbon emission disclosure explain the variation in the dependent variables, namely financial performance and firm value.

Table 9.
Results of the Determination Coefficient (Y1)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.218a	.048	.021	7.62703	1.564

Source: Data Analysis Results, 2025

Based on Table 9, the model yields an Adjusted R-Square of 0.021, indicating that only 2.1% of the variation in financial performance can be explained by environmental performance, environmental cost, and carbon emission disclosure, while the remaining 97.9% is attributed to other factors not included in the model.

Table 10.
Results of the Determination Coefficient (Y2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.349a	.122	.097	21324.48052	.691

Source: Data Analysis Results, 2025

Based on Table 10, the Adjusted R-Square value of 0.097 indicates that 9.7% of the variation in firm value can be explained by environmental performance, environmental cost, and carbon emission disclosure, while the remaining 90.3% is attributed to other factors not included in the model.

The Influence of Environmental Performance on Financial Performance

Based on the hypothesis testing results, environmental performance positively affects financial performance, as indicated by a regression coefficient (B) of 0.239, a standardized beta of 0.196, t-value of 2.111, and significance level of 0.037, which is below 0.05, supporting H1. This finding aligns with stakeholder theory, emphasizing that firms are accountable not only to shareholders but also to all relevant parties, including the surrounding environment (Widianti et al., 2024). Demonstrating strong environmental performance can build stakeholder trust, enhance customer loyalty, improve access to capital, and gain regulatory support, all of which strengthen financial outcomes. Consistent with Saputra (2020), effective environmental management enhances corporate reputation, influencing investor decisions and positively impacting profitability by mitigating operational environmental risks. Diantini et al. (2023) further highlight that companies with good environmental performance achieve higher economic value by complying with regulations, reducing penalties and litigation risks, and attracting environmentally-conscious institutional investors. Similarly, Dahlia et al. (2024) indicate that sustainable practices, such as energy efficiency, waste reduction, and emission management, improve returns and lower long-term operational costs, reinforcing the link between environmental and financial performance. Theoretically and empirically, this relationship reflects a firm's ability to respond to

stakeholder demands, showing that environmental responsibility is not merely a regulatory requirement but a strategic approach that adds value. Consequently, companies should integrate sustainability programs into corporate strategy, allocating resources strategically to environmental initiatives, while regulators and investors can use these findings to design incentives and assessment mechanisms favoring firms with superior environmental performance.

The Influence of Environmental Performance on Financial Performance

Based on hypothesis testing, environmental costs significantly affect financial performance, indicated by a regression coefficient (B) of -0.033, a standardized beta of -0.203, a t-value of -2.188, and a significance level of 0.031 (<0.05), confirming H2. While higher environmental costs may reduce short-term profitability, stakeholder theory emphasizes that companies must meet stakeholder expectations for environmentally responsible practices to sustain operations (Nurudin, 2024). Studies in the property and real estate sector suggest that investments in eco-friendly technologies and waste management positively influence financial performance by improving operational efficiency and attracting investors, positioning environmental costs as strategic long-term investments rather than mere expenses (Setyaningrum & Mayangsari, 2022). Similarly, Widodo and Suryanto (2019) found that initial environmental expenditures are offset by energy savings and government incentives, enhancing overall profitability. Theoretically and practically, environmental costs function as strategic investments that generate returns through operational efficiency, energy savings, and increased market value, particularly under stricter regulations and growing public sustainability awareness. Consequently, neglecting these aspects may harm financial performance through fines, reputational damage, and market loss. This research implies that business practitioners in the property and real estate sector should integrate environmental costs into long-term financial strategies, such as allocating budgets for green certifications and sustainable building initiatives, while policymakers can provide fiscal incentives and investors should incorporate environmental indicators in risk assessments, promoting sustainable development without compromising financial performance.

The Impact of Carbon Emission Disclosure on Financial Performance

Based on the hypothesis testing results, carbon emission disclosure (CED) does not significantly affect financial performance, as indicated by a regression coefficient (B) of 0.152, a standardized beta of 0.051, a t-value of 0.547, and a significance level of 0.585, which exceeds 0.05 (0.585 > 0.05), suggesting that although there is a tendency for financial performance to improve with CED, the effect is not statistically strong, leading to the rejection of H3. According to stakeholder theory, CED serves as a means for companies to address the informational needs and pressures from stakeholders concerned with environmental impacts, signaling that firms operate not solely for profit but also to respond to the interests of investors, customers, regulators, and the wider community. This finding aligns with Ladista et al. (2023), who reported that while CED positively reflects carbon performance factors, it does not significantly influence corporate profits. The limited effect of CED on financial performance may be due to the indirect relationship between emission-related activities and financial outcomes, particularly in the property and real estate sector, where revenues depend more on market demand, asset values, and regulations than on emission efficiency, unlike in manufacturing industries. Stakeholders in this sector may also prioritize non-financial social responsibility factors over emission data when assessing firm

prospects. Nevertheless, integrating CED into sustainability and governance frameworks remains important for building stakeholder trust and long-term resilience, ultimately supporting indirect financial benefits through regulatory compliance and enhanced reputational capital.

The Influence of Environmental Performance on Company Value

Based on the hypothesis testing results, environmental performance does not significantly affect firm value in the property and real estate sector, as indicated by a regression coefficient (B) of 8,500.084, standardized beta of 0.167, t-value of 1.845, and significance level of 0.068, which exceeds 0.05 (0.068 > 0.05). This suggests a tendency for firm value to rise with improved environmental performance, but the relationship is not strong enough to be considered significant, indicating that the market does not consistently respond to environmental initiatives, and thus H4 is rejected. Stakeholder theory highlights the importance of accommodating interests of shareholders, employees, customers, communities, and the environment; however, in this sector, primary stakeholders such as investors appear to prioritize traditional financial indicators like profitability and financial risk over environmental factors (Sari et al., 2025). Previous studies corroborate these findings, showing that green practices, emission reductions, and renewable energy use do not significantly enhance firm value, as investors respond more to market fluctuations and economic risks than sustainability efforts (Pratama & Ainiyah, 2023; Arsiadjienaldo & Hendri, 2024). Practically, this implies that property companies may not need substantial resource allocation for environmental initiatives unless driven by stricter regulations or changing market preferences. For business practitioners, this underscores the need to reassess resource allocation, focusing on operational efficiency, while policymakers should provide incentives or stricter regulations to encourage environmental adoption, and investors should integrate environmental considerations into risk analysis to balance sustainability with profitability.

The Influence of Environmental Costs on Company Value

Based on the hypothesis testing, environmental costs were found to have no significant effect on firm value, as indicated by a regression coefficient (B) of 785.402, standardized beta of 0.116, t-value of 1.278, and a significance level of 0.204, which exceeds 0.05, leading to the rejection of H5. This finding aligns with stakeholder theory, suggesting that property and real estate companies prioritize responses to key stakeholders, such as investors and customers, who focus on financial aspects rather than environmental expenditures. Environmental legitimacy, therefore, is achieved through overall corporate performance rather than cost alone (Wulaningrum & Kusrihandayani, 2020). Similarly, Anggriani & Syaipudin (2025) found in manufacturing firms participating in PROPER 2020–2023 that environmental costs were not significant for firm value, while environmental performance had a positive effect, indicating that non-cost factors like PROPER ratings drive stakeholder perception. Lestari & Husnaini (2025) also reported no effect of environmental costs on ROA in real estate firms, highlighting that such costs do not directly translate into profitability due to company size and leverage factors. Theoretically and practically, these results support stakeholder theory, emphasizing financial performance transparency over cost allocation. For practitioners, environmental spending should be optimized as part of a broader sustainable strategy without expecting immediate market value gains, integrating costs into holistic ESG initiatives to ensure long-term resilience and regulatory compliance, such as

net-zero emission targets, while investors are advised to focus on environmental performance rather than expenditure when assessing sustainability potential.

The Effect of Carbon Emission Disclosure on Company Value

Based on hypothesis testing, carbon emission disclosure significantly affects firm value, as indicated by a regression coefficient (B) of 34,560.354, a standardized beta of 0.277, a t-value of 3.055, and a significance level of 0.003 (<0.05), leading to the acceptance of H6. This positive relationship aligns with stakeholder theory, suggesting that carbon emission disclosure acts as a transparency signal, addressing stakeholder demands for environmental accountability, enhancing legitimacy, reputation, and market trust, which in turn is reflected in higher firm valuation. Empirical evidence supports this effect across various studies: Hardianti & Mulyani (2023) found that in non-financial IDX-listed companies (2019–2021), carbon emission disclosure positively influenced firm value, strengthened by financial performance as a moderating variable; Agni & Anis (2024) reported that in property and real estate companies (2015–2022), ESG practices positively impacted firm value with carbon emission disclosure serving as a significant mediating variable; similarly, Apriliani et al. (2024) observed a positive correlation in energy companies (2018–2021), which can be extended to the property and real estate sector, as disclosure enhances investor evaluation, market trust, and reduces regulatory uncertainty. The findings reinforce signaling and legitimacy theories, indicating that companies can reduce information asymmetry and strengthen market legitimacy through carbon emission disclosure. Practically, property and real estate firms are encouraged to integrate ESG reporting to maximize firm value in compliance with IDX regulations such as PJOK 51/2017, attract green financing, and enhance resilience toward Net Zero 2060 policies, while regulators are urged to enforce mandatory disclosure and investors can diversify ESG portfolios in this sector.

CONCLUSION

Based on the analysis of environmental performance, environmental cost, and carbon emission disclosure on financial performance and firm value in property and real estate companies listed on the Indonesia Stock Exchange from 2022 to 2024, several conclusions can be drawn. Environmental performance positively affects financial performance, indicating that companies effectively manage environmental impacts from their operations, while environmental cost negatively affects financial performance due to its short-term impact on profitability. Carbon emission disclosure does not significantly influence financial performance, suggesting that such reporting mainly fulfills stakeholder expectations rather than driving financial outcomes. In contrast, environmental performance and environmental cost do not significantly affect firm value, implying that certifications like ISO 14001 or internal environmental expenditures alone are insufficient to enhance firm valuation. However, carbon emission disclosure positively affects firm value, showing that investors increasingly consider environmental impacts when assessing corporate worth. The study has limitations, including reliance on CLT for normality testing which may affect interpretation, exclusion of companies that did not meet the research criteria, and low Adjusted R^2 values (2.1% for financial performance and 9.7% for firm value), indicating other unidentified factors influencing these outcomes. Future research is recommended to explore other sectors such as the latest IDX-IC classifications or SRI-KEHATI index, include additional

influencing factors, apply alternative variable measurements or proxies to compare significance, and extend the observation period or incorporate variables like green intellectual capital to provide more comprehensive and sustainable results.

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