



Carbon Emissions and Waste Management Disclosure on Firm Value of Quoted Manufacturing Companies in Nigeria

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Abstract

This study looks at how carbon emissions disclosure and waste management disclosure affect the firm value of Nigerian manufacturing companies that are publicly traded. The study used Random Effect, Fixed Effect, and Two-Way Fixed Effect (Driscoll–Kraay) estimate methodologies with panel data of 45 manufacturing firms collected from sustainability report and financial statement in Nigeria stock exchange group from 2015 to 2025. The results from the analysis revealed that carbon emission disclosure exhibits inconsistent but negligible associations across models, while waste management disclosure has a negative but statistically inconsequential impact on firm value. According to the study's findings, Nigerian environmental disclosure policies are still developing and do not yet have a major impact on market valuation. The paper suggests standardized reporting standards and enhanced regulatory enforcement.

Keywords: Carbon emission, Waste management, and Firm value.

Introduction

The growing environmental problems brought on by industrial activity have made environmental sustainability a top priority for governments, investors, and businesses. Inappropriate disposing of waste and growing carbon emissions is two of the main environmental issues that contemporary businesses must cope with. These issues have a big impact on both the environment and long-term economic viability. As a result, corporate environmental disclosure has gained prominence as an important mechanism through which firms communicate their

environmental performance and responsibilities to stakeholders. Environmental disclosure allows firms to provide information about their environmental impacts, policies, and management practices, thereby enhancing transparency, accountability, and corporate reputation (Onyebuenyi & Ofoegbu 2022).

In recent years, stakeholders such as investors, regulators, and host communities have increasingly demanded that companies disclose information relating to their environmental practices, particularly those associated with waste management and

carbon emissions. Waste management disclosure refers to the reporting of corporate activities related to the collection, treatment, recycling, and disposal of waste generated from business operations (Azeez, Grace, & Joel 2025). Effective waste management practices help organizations minimize environmental pollution, reduce operational inefficiencies, and demonstrate environmental responsibility. Companies that transparently disclose their waste management activities are often perceived as environmentally responsible, which may enhance their credibility and attractiveness to investors (Perkumiene, Atalay, Safaa & Grigiene)

Similarly, carbon emission disclosure has become an important component of corporate environmental reporting. Carbon emissions, primarily in the form of carbon dioxide and other greenhouse gases, are widely recognized as major contributors to climate change and global warming (Yauri & Widianingsih 2023). Industrial and manufacturing activities are among the largest contributors to carbon emissions due to their heavy reliance on fossil fuels and energy-intensive production processes. Consequently, companies are increasingly expected to report their carbon emission levels, mitigation strategies, and environmental commitments. Such disclosures provide stakeholders with information needed to assess corporate environmental risk exposure and sustainability performance.

From a financial perspective, the relationship between environmental disclosure and firm value has attracted significant attention in academic research. Firm value represents the market's perception of a company's overall worth and future profitability. Transparent environmental disclosure, particularly regarding waste management and carbon emissions, may influence firm value through several channels (Sayuti, Mohammed & Amirrudin 2025). On one hand, firms that demonstrate responsible environmental

practices may gain reputational benefits, improved stakeholder trust, and increased investor confidence, which can enhance firm valuation. On the other hand, inadequate environmental practices or failure to disclose environmental impacts may expose firms to regulatory penalties, reputational damage, and financial risks that could negatively affect firm value (Suhartini, Tjahjadi & Fayanni 2024). In the Nigerian context, environmental concerns are particularly relevant due to the rapid expansion of industrial and manufacturing activities, which generate substantial waste and contribute to increasing carbon emissions. Manufacturing firms, in particular, produce significant industrial waste and greenhouse gases during production processes, making them key actors in environmental sustainability discussions. Despite the growing global emphasis on environmental reporting frameworks such as the Global Reporting Initiative (GRI) and the International Sustainability Standards Board (ISSB) sustainability disclosure standards, the extent to which Nigerian firms disclose information on waste management and carbon emissions remains relatively limited (Dobre, Baba, Anton, Zamfirache & Aldea 2025)

Furthermore, Nigeria is gradually aligning with global sustainability reporting practices following the introduction of sustainability disclosure standards, including IFRS S1 and IFRS S2, which emphasize climate-related financial disclosures. These developments highlight the increasing importance of environmental transparency for corporate organizations. Consequently, understanding how specific environmental disclosures, particularly waste management and carbon emission disclosures, influence firm value has become an important area of research. Against this backdrop, this study investigates the effect of waste management disclosure and carbon emission disclosure on the firm value of quoted manufacturing companies in Nigeria.

Statement of the Problem

Environmental degradation resulting from industrial waste and carbon emissions has become a major global concern. Manufacturing companies, which play a critical role in economic development, are also significant contributors to environmental pollution through the generation of industrial waste and greenhouse gas emissions. As environmental awareness increases worldwide, stakeholders now demand greater transparency regarding how companies manage environmental impacts, particularly those relating to waste management and carbon emissions.

Despite the growing emphasis on environmental accountability, many companies in developing economies, including Nigeria, still provide limited or inconsistent environmental disclosures. In particular, disclosures relating to waste management practices and carbon emissions are often incomplete, non-standardized, or presented in ways that make it difficult for stakeholders to evaluate a firm's true environmental performance. This lack of transparency raises concerns regarding the credibility of corporate environmental reporting and its ability to influence stakeholders' investment decisions.

In addition, the relationship between environmental disclosure and firm value remains inconclusive in existing literature. While some studies suggest that environmental disclosure enhances firm value by improving corporate reputation, reducing information asymmetry, and strengthening investor confidence, other studies report negative or insignificant relationships due to increased compliance costs, regulatory pressures, and differences in disclosure quality. These mixed findings indicate that the effect of environmental disclosure on firm

value is still subject to debate. Therefore the absence of comprehensive empirical evidence on how waste management and carbon emission disclosures influence the firm value of quoted manufacturing companies in Nigeria constitutes a significant research gap. This study seeks to fill this gap by examining the effect of waste management disclosure and carbon emission disclosure on the firm value of quoted manufacturing firms in Nigeria.

Objective of the Study

The specific objectives are to investigate the effect of:

- (i) Waste management disclosure on the firm value of quoted manufacturing firms in Nigeria
- (ii) Carbon emission disclosure on firm value of quoted manufacturing firm in Nigeria

Research Hypotheses

H₀₁: waste management disclosure has no significant effect on the value of the quoted firms in Nigeria; and

H₀₂: carbon emission disclosure has no significant effect on the value of the quoted firms in Nigeria

Review of Related Literature

Waste management

Waste management disclosure refers to the practice of companies publicly reporting their waste management activities and performance, which is increasingly recognized as vital for transparency and accountability in environmental stewardship. Companies that disclose waste management practices enhance their credibility and foster trust among stakeholders, including investors and consumers (Ab-Aziz et al., 2023). Research indicates a positive correlation between waste management disclosure and financial metrics, such as return on assets and equity, suggesting that better disclosure can lead to improved

financial outcomes (Bogdan et al., 2022). Effective waste management disclosure is associated with superior waste performance, indicating that firms with robust waste management practices tend to provide more comprehensive environmental disclosures (Benjamin et al., 2022).. waste management disclosure is crucial for promoting sustainable practices, some argue that the quality of such disclosures can be inconsistent, often influenced by the competitive landscape and the varying levels of regulatory enforcement across industries. This inconsistency can undermine the overall effectiveness of waste management strategies (Antwi & Ofori-Nyarko, 2023).

Carbon Emissions

Carbon emissions denote the discharge of carbon dioxide (CO₂) and various other carbon-based gases into the atmospheric environment. Such emissions predominantly arise from anthropogenic activities, including the combustion of fossil fuels for energy generation and various industrial operations (Emissions and Sinks: 1990–2022). Upon their release, these gases encapsulate thermal energy within the atmosphere, thereby exacerbating the greenhouse effect and contributing to global warming (Amanda 2023). The green house emission or carbon disclosure rating serves as an evaluative metric concerning the environmental sustainability of an organization, predicated on the voluntary disclosures made by the organization itself. This practice is designed to assist investors who seek to integrate environmental, social, and governance (ESG) considerations into their investment decision-making frameworks concerning carbon emissions (Okeke, Ifurueze & Nwadiaro (2021).

Carbon emissions released into the atmosphere are linked to greenhouse gas emissions, which represent the principal factor driving climate change (ecolife.com).

The emissions of CO₂ have been observed to escalate periodically across global, regional, national, and localized scales. This phenomenon can be attributed to the increasing reliance on energy derived from organic materials like fossil fuels alterations in land use, and occurrences of forest fires, accompanied by a rise in anthropogenic activities (Researcher Lapan in Jannah, 2014). The burning of coal, oil, and natural gas for energy is another source of CO₂ emissions globally (Cheng, 2024). Manufacturing and production operations, especially in industries like plastics, rubber, and metal also contribute to carbon emission.

Firm Value

Firm value, represents the overall economic worth of a company, encompassing its assets, liabilities, and potential for future earnings. It reflects the market's perception of the company's success and future prospects, often tied to its stock price and other financial metrics. Essentially, it's a measure of how much a company is worth, both in terms of its tangible assets and its intangible value like brand reputation and future growth potential. Accurate financial reporting, including operational and investment data, is essential for determining firm value. A robust model links these reports to market perceptions, suggesting that transparency enhances firm valuation (Abreu, 2015). The valuation of a firm is delineated as a market value that is intricately linked to stock prices, thereby providing investors with a comprehensive understanding of the potential risks and future opportunities associated with the company (Oktarina 2018).

Tobin's Q constitutes a financial indicator employed to evaluate corporate valuation. This metric yields valuable insights regarding the operational efficacy of publicly traded companies relative to their capital investments in assets. A Tobin's Q exceeding one signifies that the market assigns a value to the firm that

surpasses the cost associated with its assets, thereby implying favorable growth projections.

Theoretical Underpinning

The theoretical foundation of this study is anchored on the Stakeholder Theory, which provides a strong framework for explaining why firms disclose environmental information and how such disclosures influence firm value. Stakeholder theory was originally developed by R. Edward Freeman in 1984. The theory posits that organizations are not only responsible to shareholders but also to a wide range of stakeholders who are affected by the firm's activities. These stakeholders include investors, employees, customers, suppliers, government, host communities, and environmental advocacy groups. According to the theory, firms must manage their relationships with these stakeholders effectively in order to sustain their operations and maintain long-term organizational success ((Vola et al., 2025)

In the context of environmental disclosure, stakeholder theory suggests that companies voluntarily disclose environmental information to meet the expectations and information needs of their stakeholders. Environmental issues such as waste generation and carbon emission affect the welfare of society and the environment. Consequently, stakeholders increasingly demand transparency regarding how corporate activities influence environmental sustainability. Firms that respond to these expectations by providing detailed environmental disclosures demonstrate accountability and social responsibility, which can enhance stakeholder trust and confidence (Cahyono et al., 2024)).

Therefore, this study adopts stakeholder theory as its underpinning theory because it explains how environmental disclosure practices influence the perceptions and decisions of stakeholders, which in turn affect

firm value. By focusing on stakeholder expectations and corporate accountability, the theory provides a suitable lens for examining the relationship between environmental disclosure dimensions and the value of quoted manufacturing companies in Nigeria.

Empirical Review

the impact of waste management cost disclosure on corporate financial performance of quoted oil companies in Nigeria was carried out by Kornom-Gbaraba, M., C., and Chukwuemeka, J (2024) with data sourced from Nigeria stock exchange factbooks and was analyzed using regression analysis and descriptive statistics. According the the result, waste management disclosure exert a negative relationship on corporate performance.

Aniebiet, J.E., Emmanuel, O.E., and Ediomomo, N.E (2024) examined environmental waste management disclosure and financial performance of listed consumer goods firms in Nigeria using data collected from Nigeria exchange group from 2017 to 2022. Panel least square regression was used to analyzed the data and from the result, waste management disclosure had a negative insignificant effect on financial performance.

Environmental accounting disclosure and firm value of industrial goods companies in Nigeria examined by Godwin Egberioyinemi and Abiola (2019) using data collected from annual financial statements listed on the Nigerian exchange group from 2007 to 2016. Multiple regressions were used to analyzed and from the result, waste management disclosure had a positive relation with firm value.

Eke, Ogheneborhie, And Ogunbayo (2024) investigated the impact of environmental disclosure on the performance of listed brewery companies in Nigeria. Data collected for the period of the study, from 2023 to 2022 was analyzed using descriptive and regression. The observation from the result show that waste management disclosure has no

significant relationship with performance of the companies under review

Mohammad, Aisa and Indah (2020) examined the effect of carbon emission disclosure on firm value in Indonesian using data collected from collected from sustainability reports, financial statements, and other relevant disclosures made by the companies. data was analyzed using multiple linear regression and result from the finding shows that carbon emission had a positive relationship on firm value

Carbon management and financial performance of quoted oil and gas firms in Nigeria was

examined by Nwokeogu, Okafor, and Okafor (2024). Data was collected from oil and gas companies listed in nigeria exchange group from 2008 to 2023 and analyzed using descriptive statistics, random effects and panel least square regression. The result from the findings shows that carbon emission has a positive significant relationship with financial performance

Yang, et., al, (2025) examined the simultaneous association between corporate [carbon emissions](#), carbon disclosure and organizational performance. a sample of 62 UK Financial Times Stock Exchange

(FTSE) 100 firms in carbon-sensitive sectors during 2010–2017 was analyzed and from the result, carbon emissions are negatively associated with organizational performance

Research Gap

Despite the advent of international frameworks like IFRS sustainability standards (IFRS S1 and S2), environmental disclosure policies in Nigeria are still immature, non-standardized, and laxly enforced. As a result, there is not enough empirical data to determine how these changing disclosure standards affect economic value in Nigeria's manufacturing industry (Wahyoeni, Azizah, Fredy. and Fakhira 2025). The literature has a methodological flaw. Panel data problems like heterogeneity, autocorrelation, and cross-sectional dependence are not sufficiently addressed by many previous investigations, which rely on simple regression techniques. As a result, estimation bias may affect their results. There is potential for increased empirical rigor due to the restricted application of more reliable estimators, such as the Two-Way Fixed Effect model with Driscoll–Kraay standard errors (Oguzhan, Alain and Giovanni, 2021)

Model Specification

This study adopts a model modified from the study of Ukpeh 2025. The model adopted for the study is shown below:

Tobin's Q = f (WM, CE,) -----equation (3.1)

Tobin's Q = $\beta_0 + \beta_1 WM_{it} + \beta_2 CE_{it} + \epsilon_{it}$ -----equation (3. 2)

Wheree:

Tobin's Q	=	Tobin's Q firm value
WM	=	Waste management
CE	=	Carbon emission
β_0	=	intercept
β_1 to β_2	=	coefficient of independent variables
ϵ_{it}	=	error term

Analysis of Data

Table 4.1; descriptive statistics summary

Variables	Obs	Mean	Std. Dev.	Min	Max
TOBINSQ	450	1.631	1.593	-.31	12.69
WM	450	.065	.129	0	.5
CE	450	.075	.184	0	1

Source; Authors' Computation (2026)

From the table 4.1 above, Tobin's q disclose a mean value of 1.63 suggesting that on average, market value is greater than book value during the review period, indicating investor confidence and growth expectations within the industry. However, the relatively large standard deviation (1.59), alongside a wide range from -0.31 to 12.69, points to serious heterogeneity in firm value across the sampled firms over time. This dispersion is

consistent with prior Nigerian empirical evidence of Oshadare & Olanrewaju, (2024), and Gwar, Angahar, & Upaa, (2025) who document that manufacturing firms differ markedly in profitability. Waste management and carbon emission show a mean value of 0.0646 and 0.0755 respectively indicating generally weak disclosure intensity among Nigerian manufacturing firms

Table 4.2 Normality of Data Result

Variable	Obs	W	V	Z	Prob > z
TOBINSQ	450	0.62379	114.190	11.330	0.00000
WM	450	0.93183	20.692	7.245	0.00000
CE	450	0.83307	50.667	9.387	0.00000

Source; Authors' Computation (2026)

The results show that the probability values (Prob > z) for TOBINSQ, WM, and CE are **0.00000**, which are all less than the conventional significance level of **0.05**. According to the decision rule of the

Shapiro-Wilk Test, when the probability value is less than 0.05, the null hypothesis of normal distribution is rejected. This indicates that the data for TOBINSQ, WM, and CE are not normally distributed.

Table 4.3 Spearman's Rank Correlation Result

	TOBINSQ	WM	CE
TOBINSQ	1.0000		
WM	-0.1734	1.0000	
CE	-0.1667	0.6518	1.0000

Source; Authors' Computation (2026)

Table 4.2 shows that there is a negative relationship of -0.1734 of waste and -0.1667 of carbon emission with Tobin's q suggesting

that higher levels of disclosure on waste-related matters tend to coexist with slightly lower market valuation.

Table 4.4 Regression Analysis

Variables	Random Effect Model	Fixed effect Model	Two- Way FE (Driscoll-Kraay)
WM	-0.8896 (0.6184)	-0.7804 (0.6072)	-0.6839 (0.4926)
CE	-0.0487 (0.4022)	0.2321 (0.3943)	0.1768 (0.1733)
Observation	446	446	446
R ²	0.0810	0.1109	0.1503
wald /f-statistic	14.70	16.55	107178.59
Prob > F /Chi	0.0021	0.0000	0.0000

Sources: Authors computation, 2026

From Table 4.3 presents above, the R² values are 0.0810 (Random Effect), 0.1109 (Fixed Effect), and 0.1503 (Two-Way Fixed Effect). This implies that the explanatory variables account for approximately 8.1%, 11.1%, and 15.0% of the variations in firm value respectively. The relatively low R² suggests that other factors not included in the model may also influence firm value. The Wald/F-statistics (14.70, 16.55, and 107178.59) indicate that the models are jointly significant, meaning that the independent variables collectively contribute to explaining changes in firm value.

Discussion of the Findings

The findings show that across all estimation models, waste management transparency has a negative but statistically negligible connection with value for the company. This implies that waste management practice disclosure may indicate environmental responsibility; it does not immediately improve market value. Investors in the Nigerian market can put short-term financial performance ahead of environmental transparency, which is one possible rationale. Additionally, the short-term perceived benefits of waste management methods may be outweighed by the expenses of adopting and reporting them, which would put downward pressure on company value. This finding is in line with the work of Kornom-Gbaraba and Chukwuemeka (2024), Aniebiet,

Emmanuel and Ediomomo, (2024) that observes a negative relationship of waste management on firm value. This finding contradicts Oladutire, and Olonite (2024) which reports a positive relationship between waste management and firm value.

From a theoretical standpoint, Stakeholder Theory is only partially supported by this observation. According to stakeholder theory, companies that actively address stakeholder expectations through open environmental disclosure should see improvements in their reputation, trust, and, eventually, firm value. When making investment decisions, stakeholders in Nigeria's manufacturing sector might not give waste management declarations much weight, according to the study's insignificant relationship. The low level of environmental awareness and lax implementation of disclosure norms in developing nations like Nigeria are two reasonable explanations for this result. In such contexts, investors may prioritize short-term financial performance indicators over non-financial disclosures like waste management practices. Furthermore, stakeholder views may not be sufficiently influenced by the caliber and reliability of provided environmental information. Firms that make significant investments in waste management systems and disclosure procedures may have to pay more for operations and compliance, which could impact their market valuation and short-term profitability.

In a similar vein, results on the disclosure of carbon emissions show inconsistent but statistically negligible effects on business value. The Fixed Effect and Two-Way Fixed Effect models indicate a positive link, whereas the Random Effect model displays a negative relationship. The positive coefficients suggest that by increasing corporate openness, lowering information asymmetry, and boosting investor trust, carbon emission disclosure may increase firm value.. This study is in line with the study of Mohammad, Aisa & Indah (2020), Nwokeogu, Okafor, and Okafor (2024) which observes positive linkage between the carbon emission and firm value. However, the lack of statistical significance suggests that these advantages are still insufficient to significantly affect market pricing. This result (Yang, Xiaoyan, Jessica, Andreas and Nada, 2023) can be the result of inconsistent disclosure quality among Nigerian companies, lax regulatory enforcement, or low investor awareness of environmental risks

In line with stakeholder theory, increased transparency in carbon reporting may be well received by market players, according to certain models' positive coefficients. However, the absence of statistical significance suggests that firm valuation is not much impacted by this favorable view. This could be a result of Nigeria's weak sustainability reporting procedures and investors' comparatively low level of environmental consciousness.

Conclusion

The study concludes that there is no statistically significant relationship between environmental disclosure and firm value of manufacturing companies, especially when it comes to waste management and carbon emission reporting. The overall impact of carbon emission disclosure is still minimal, notwithstanding some encouraging trends. According to the findings, Nigerian

environmental reporting methods are still in stages of development and do not yet have a substantial impact on investor decision-making..

Recommendations

- (i) Firms should make their environmental disclosures more credible and of higher quality to boost investor trust and confidence.
- (ii) standardized sustainability reporting frameworks such as IFRS S1 and S2. Should be enforced by regulatory agency
- (iii) Investors should be sensitized to the importance of environmental information in decision-making.

Contribution to Knowledge

- (i) This study contributes to knowledge by using robust panel estimating approaches, such as the Driscoll–Kraay estimator, to overcome methodological shortcomings in earlier investigations.
- (ii) It also provides a more detailed measurement of environmental disclosure by combining various aspects of waste management and carbon emissions

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