



Environmental Accounting and Financial Performance of Manufacturing Firms in Nigeria

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Abstract

Environmental accounting practices have gained prominence as manufacturing firms navigate growing regulatory pressures and stakeholder demands for ecological accountability. In Nigeria's manufacturing sector, the financial implications of such practices remain inadequately understood. This study examines how environmental cost disclosure and waste management expenditures influence profitability metrics net profit margin and earnings per share among ten firms listed on the Nigerian Exchange Group over a decade (2015–2024). Panel regression analysis, guided by Hausman specification tests, reveals statistically insignificant relationships: environmental cost disclosure correlates negatively but weakly with both performance indicators ($p > 0.60$), while waste management costs show positive yet non-significant associations ($p > 0.59$). The findings suggest that environmental accounting in this context operates primarily as a legitimacy mechanism rather than a short-term profit driver. Financial returns from sustainability investments appear deferred, potentially materializing through enhanced reputation, risk mitigation and operational efficiencies beyond conventional reporting horizons. The research contributes empirical evidence on the sustainability–performance nexus in an emerging market setting and underscores the importance of long-term evaluation frameworks for environmental accountability initiatives.

Keywords: *Environmental accounting, environmental cost disclosure, waste management cost; financial performance, earnings per share*

Introduction

Corporate operations inevitably affect the environment through resource consumption, emissions, and waste generation. Conventional accounting systems, however, typically neglect the financial implications of these ecological impacts. Unaccounted environmental costs may result in regulatory penalties, higher operating expenses, and reputational harm, all of which can impair corporate performance (Abdullah, 2018). Integrating environmental factors into strategic planning enables firms to mitigate risks, enhance resource efficiency, and pursue sustainable operations (Al-Mawali, 2021). Environmental accounting addresses this gap by incorporating ecological considerations into decision-making and reporting, offering a more holistic assessment of organizational performance.

Environmental accounting encompasses the identification and reporting of ecological expenditures including waste handling, pollution mitigation and green technology investments alongside their disclosure to stakeholders (Abdul Rahman, Yusoff, & Wan Mohamed, 2020). This practice supports

efficient resource use, waste reduction and cost optimization while promoting transparency (Adegbie, Ogidan, Siyanbola, & Adebayo, 2020). Prudent management of waste-related expenses not only demonstrates environmental stewardship but also enhances operational efficiency and profitability. Furthermore, transparent disclosure of environmental initiatives fosters stakeholder confidence, signals corporate accountability, and may positively influence investment decisions and financial outcomes (Agboola & Orege, 2019; Almaliki, 2020).

Performance reflects a firm's ability to efficiently convert resources into value and generate shareholder returns (Adewoye, Olaoye, & Ogundipe, 2018). This study assesses performance using two key metrics: Net Profit Margin (NPM), which indicates operational efficiency and cost control and Earnings per Share (EPS), which measures profitability from a shareholder perspective (Agboola & Orege, 2019; Agyemang et al., 2021). Both are reliable indicators for evaluating how environmental accounting practices affect financial outcomes (Ahmad et al., 2018). While environmental initiatives may raise short-term costs, strategic environmental management often yields long-term gains such as improved resource efficiency, lower risk exposure and stronger stakeholder trust which can enhance NPM and EPS (Akintoye et al., 2019; Alhashi, Nobanee, & Khare, 2018). For instance, effective waste management cuts disposal costs, and transparent environmental reporting can boost investor confidence and market valuation (Al-Waeli, Ismail, & Khalid, 2020). In Nigeria, environmental accounting adoption remains inconsistent. Large firms and multinationals often maintain structured reporting, whereas smaller companies provide minimal disclosure on waste management, environmental costs, or green investments largely due to varying regulatory enforcement, resources and management awareness (Anselm & JaneFrances, 2020; Amosun, Owolabi, & Odunlade, 2022). This disparity highlights a research gap regarding the actual financial impact of environmental accounting in the Nigerian context. Accordingly, this study examines how environmental cost disclosure and waste management expenditures influence NPM and EPS among Nigerian firms, providing empirical insight into whether environmental accountability translates into measurable financial performance.

Research Problem

Despite growing awareness of environmental accounting, its adoption among Nigerian manufacturing firms remains limited, with unclear implications for financial performance. Many firms provide inconsistent or minimal disclosure of environmental costs, making it difficult to assess how practices like environmental cost disclosure and waste management cost influence profitability metrics (Anselm & JaneFrances, 2020; Ayu, Gamayuni, & Urbaniski, 2020). High implementation costs, limited managerial expertise, weak regulatory enforcement and the intangible nature of environmental costs further hinder effective integration (Chiamogu & Okoye, 2020; Dike & Micah, 2018; Ekemezie & Okafor, 2020). Existing studies on environmental accounting in Nigeria often lack focus on specific cost components and their direct financial outcomes. Few examine how ECD and WMC two critical dimensions of environmental accounting affect NPM and EPS in the manufacturing sector. Moreover, prior research frequently relies on short-term or cross-sectional data, limiting insights into longitudinal trends (Emeke, Olaoye, & Ogundajo, 2021). This study addresses these gaps by investigating the effects of ECD and WMC on NPM and EPS among ten Nigerian manufacturing firms over a ten-year period (2015–2024), using panel regression analysis to provide robust empirical evidence on whether environmental accounting practices translate into measurable financial performance improvements. In line with the issues identified in the study, the study seeks to hypothesize as follows;

- H₁:** environmental cost disclosure does not have significant effect on financial performance of manufacturing firms in Nigeria
- H₂:** waste management cost does not have significant effect on financial performance of manufacturing firms in Nigeria

Conceptual Foundations of the Study

Environmental Accounting

Environmental accounting is a specialized branch of accounting that focuses on quantifying and reporting the financial implications of a company's interactions with the natural environment. Unlike traditional accounting, which primarily tracks revenues, expenses, assets and liabilities, environmental accounting emphasizes the economic consequences of environmental management, including both the

costs of environmentally harmful activities and the investments made to mitigate such effects (Gupta, Saksena & Baris, 2019; Gupta & Gupta, 2020). This includes expenditures on pollution control, emission reduction, waste management, energy efficiency and sustainable resource utilization (Fasua & Osifo, 2020). The purpose of environmental accounting extends beyond mere compliance or regulatory reporting. It serves as a decision-making tool that enables managers to understand how environmental practices influence operational efficiency, cost structures and ultimately, profitability (Eze, 2021).

Cost Disclosure (ECD)

Environmental cost disclosure constitutes a fundamental dimension of environmental accounting, defined as the structured communication of expenditures incurred in managing ecological impacts (Nkwoji, 2021). These outlays typically cover pollution abatement, waste handling, recycling systems, energy conservation measures, natural resource stewardship and regulatory compliance obligations. Through transparent reporting of such costs in financial statements or standalone sustainability disclosures organizations signal both the scale of their environmental investments and their strategic prioritization of ecological responsibility. This transparency serves a dual purpose: it satisfies stakeholder demands for accountability while framing environmental expenditure not as incidental overhead but as intentional resource allocation toward sustainable operations (Marrone, Linnenluecke, Richardson, & Smith, 2020; Nwaimo, 2020).

Waste Management Cost (WMC)

Waste management cost represents the aggregate financial outlays firms allocate to managing operational waste streams from generation through treatment, recycling, or environmentally sound disposal. As a core element of environmental accounting, WMC operationalizes a company's ecological responsibility by quantifying resource commitments to pollution prevention and regulatory adherence (Obida, Owolabi, Enyi, & Akintoye, 2019). These expenditures span direct outlays such as investments in waste treatment infrastructure, recycling technologies, and contracted disposal services and indirect costs, including personnel training, environmental monitoring systems, and administrative overhead for compliance management (Odugbemi & Igbekoyi, 2022). By systematically tracking WMC, organizations not only fulfill statutory obligations but also generate internal data to identify inefficiencies, reduce material losses, and align production processes with circular economy principles.

2.1.2. Corporate Financial Performance (CPF)

Corporate financial performance represents a multidimensional assessment of a firm's effectiveness in transforming resources into sustainable economic value, encompassing operational efficiency, cost management, risk control, and stakeholder value creation beyond mere profit generation (Oyedokun, Egberioyini, & Tonade, 2019). Within this framework, Net Profit Margin serves as a key accounting-based indicator that measures the proportion of revenue retained as profit after all expenses, thereby reflecting a firm's operational efficiency and cost management capabilities, particularly relevant in resource-intensive manufacturing contexts (Abdul Rahman, Yusoff, & Wan Mohamed, 2020; Agyemang et al., 2021). Complementing this, Earnings Per Share functions as a market-oriented metric that quantifies the net income attributable to each outstanding share, offering investors a per-unit measure of profitability and insight into the returns generated for shareholders (Carandang & Ferrer, 2020; Chiamogu & Okoye, 2020). Together, NPM and EPS provide complementary perspectives for evaluating how environmental accounting practices influence both internal operational outcomes and external market perceptions of financial performance in manufacturing firms.

Theory-Based Perspectives

This study is anchored on Stakeholder Theory and Legitimacy Theory, which provide complementary frameworks for understanding the link between environmental accounting practices and corporate financial performance in Nigeria's manufacturing sector. Stakeholder Theory, introduced by Freeman (1984), contends that organizational success depends on creating value for a broad spectrum of stakeholders including investors, employees, regulators, local communities and customers rather than focusing solely on shareholder returns. In manufacturing, where operations generate significant environmental externalities, firms face mounting pressure to demonstrate ecological responsibility. Environmental cost disclosure (ECD) serves as a strategic communication mechanism through which

firms signal transparency and responsiveness to stakeholder concerns, while prudent waste management cost (WMC) practices reflect operational commitment to minimizing environmental harm (Donaldson & Preston, 1995; Clarkson, 1995). These actions can yield financial benefits: efficient waste handling may lower operational expenses and improve net profit margin (NPM), while credible environmental reporting can bolster investor confidence and positively influence earnings per share (EPS) (Gray, Kouhy, & Lavers, 1995). However, Legitimacy Theory, developed by Dowling and Pfeffer (1975) and refined by Suchman (1995), posits that organizational survival hinges on maintaining societal approval by aligning activities with prevailing norms and expectations. Firms perceived as environmentally irresponsible risk sanctions, reputational erosion, and loss of critical resources. To preserve legitimacy, manufacturing companies in Nigeria increasingly adopt environmental accounting practices not merely as regulatory compliance but as strategic tools to demonstrate social conformity. Transparent ECD reassures stakeholders of regulatory adherence, while effective WMC signals operational discipline in addressing ecological impacts (Patten, 1992). These legitimacy-seeking behaviors can translate into financial gains: reduced regulatory penalties and resource wastage may enhance NPM, while strengthened market legitimacy may elevate investor perceptions and support higher EPS. Together, these theories frame environmental accounting as a dual-purpose strategy responding to stakeholder expectations while securing societal legitimacy thereby creating pathways through which ecological accountability can manifest in improved financial performance metrics among Nigerian manufacturers.

Empirical Review

Empirical studies on environmental accounting and financial performance reveal varied outcomes across contexts, with growing evidence supporting positive linkages particularly in emerging economies. Scarpellini et al. (2020) demonstrated that environmental accounting practices enhance circular economy adoption and improve both environmental and financial outcomes in Spanish firms, with stakeholder pressure acting as a key mediator. Similarly, Carandang and Ferrer (2020) found that while environmental disclosures alone showed limited impact on Philippine mining and oil firms, environmental cost reporting significantly improved return on equity and, under certain firm characteristics, net profit margin. Within the Nigerian context, several studies affirm the financial relevance of environmental accounting. Oshiole, Elamah, and Ndubuisi (2020) reported that environmental cost disclosures including waste management expenditures—significantly improved net profit margin among oil and gas firms. Uniamikogbo and Ali (2021) observed that environmental accounting disclosures positively influenced share price, return on assets, and return on equity across 40 Nigerian manufacturing firms. Adegbe et al. (2020) further confirmed that environmental accounting practices significantly enhanced share value in Nigeria's food and beverage sector, reinforcing the investor relevance of sustainability reporting. However, findings are not uniformly positive. Fasua and Osifo (2020) documented a significant positive relationship between environmental accounting and net profit margin but noted a negative association with earnings per share among Nigerian listed firms, suggesting potential short-term trade-offs. Nkwoji (2021) found no significant relationship between environmental expenditure and net profit in Nigerian oil and gas companies, highlighting contextual complexities in translating environmental investments into immediate profitability.

Regarding waste management specifically, Ihenyen and Ikegima (2022) established a significant positive relationship between waste management costs and performance indicators including profit margin in Nigeria's industrial sector. Latifah and Soewarno (2023) further validated waste management's mediating role in enhancing sustainability performance among Indonesian MSMEs. Conversely, Seun et al. (2023) reported that waste management expenditures negatively affected return on assets in Nigerian aviation firms, underscoring sector-specific variations in cost–benefit dynamics. Studies from other jurisdictions provide additional perspective. Al-Mawali (2021) found that environmental cost accounting positively influenced financial performance in Jordanian industrial firms, with environmental performance acting as a mediating variable. Deb, Rahman, and Rahman (2022) similarly confirmed that environmental management accounting significantly improved financial outcomes in Bangladeshi manufacturing firms, particularly when supported by robust information systems and green innovation. Collectively, these studies suggest that environmental accounting particularly cost disclosure and waste management practices can enhance financial performance, though outcomes depend on sector characteristics, implementation quality, time horizon,

and institutional context. Notably, few Nigerian studies have simultaneously examined environmental cost disclosure and waste management costs in relation to both net profit margin and earnings per share within the manufacturing sector using longitudinal panel data. This study addresses that gap by analyzing ten Nigerian manufacturing firms over a decade (2015–2024) to provide robust empirical evidence on these specific relationships.

Research Method

An ex-post facto design is adopted to analyze archival data and establish relationships between environmental accounting variables and financial outcomes without experimental manipulation. The study population comprises NGX-listed manufacturing firms as of December 2024, selected for their mandatory financial reporting requirements, material environmental impacts, and relevance to assessing how environmental cost disclosure and waste management expenditures influence net profit margin and earnings per share. This study analyzed a purposively selected sample of ten manufacturing firms drawn from Nigeria's 71 NGX-listed manufacturing entities. Selection criteria prioritized firms with uninterrupted annual reporting and verifiable environmental disclosures spanning 2015–2024. Secondary data were extracted exclusively from published annual reports and sustainability statements: environmental cost disclosure and waste management expenditures were identified from narrative sections and accounting notes, while net profit margin and earnings per share were computed from income statement figures. The final sample comprised Flour Mills of Nigeria Plc, Nestlé Nigeria Plc, Nigerian Bottling Company Plc, Nigeria Breweries Plc, Guinness Nigeria Plc, Conoil Plc, Clay Industries Nigeria Ltd, Lafarge Africa Plc, Dufil Prima Foods Plc and Unilever Nigeria Plc representing food and beverages, cement, packaging and consumer goods subsectors with significant environmental footprints.

Method of Data Analysis and Analytical Model

Data analysis combines descriptive and inferential techniques. Descriptive statistics summarize variable distributions and trends across the ten years. Pearson correlation assesses the direction and strength of associations among variables before regression estimation. To examine the relationship between environmental accounting practices and financial performance, panel regression analysis is employed, capturing both cross-sectional variation across firms and temporal dynamics over time. The Fixed Effects Model (FEM) and Random Effects Model (REM) are estimated, with the Hausman test determining the appropriate specification based on whether unobserved firm-specific effects correlate with the regressors. Aligned with the study's objectives, the baseline econometric models specify Net Profit Margin (NPM) and Earnings Per Share (EPS) as dependent variables, with Environmental Cost Disclosure (ECD) and Waste Management Cost (WMC) as primary independent variables. This study adopts the multiple regression model used by Agyemang, Yusheng, Kongkuah Musah and Musah (2023) to assess the impact of environmental accounting disclosure on corporate performance in China.

The model for the empirical investigation is specified as follows

$$ROE_{it} = f(EADI_{it}, SIZE_{it}, LEV_{it}) \dots\dots\dots (1)$$

$$QR_{it} = f(EADI_{it}, SIZE_{it}, LEV_{it}) \dots\dots\dots (2)$$

Econometrically, equations (1&2) become:

$$ROE_{it} = \beta_0 + \beta_1 EADI_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \mu_{it} \dots\dots\dots (3)$$

$$QR_{it} = \beta_0 + \beta_1 EADI_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \mu_{it} \dots\dots\dots (4)$$

Where: ROE refers to Return on Equity, while QR represents the quick ratio. P stands for the market value of the firm's shares. EADI is used to indicate the Environmental Accounting Disclosure Index. The size of each firm is captured using the variable SIZE, whereas LEV represents the company's overall level of leverage. In addition, FAGE is used to measure how long the firm has been in operation. Some adjustments have been made to the model to align it with the objectives of this study. In this research, environmental accounting is represented by environmental cost disclosure and waste management cost, while the dependent variable, corporate financial performance of listed manufacturing firms in Nigeria, is measured using Net Profit Margin (NPM) and Earnings Per Share (EPS). These modifications were made to examine the specific contribution of each environmental accounting variable to the financial performance of the firms. Consequently, the functional and linear forms of the model for this study are presented as follows:

$$NPM = f(ECD, WMC) \dots\dots\dots (5)$$

$$\text{EPS} = f(\text{ECD}, \text{WMC}) \dots\dots\dots (6)$$

Econometrically, equations (5 & 6) become:

$$\text{NPM}_{it} = \beta_0 + \beta_1 \text{ECD}_{it} + \beta_2 \text{WMC}_{it} + U_t \dots\dots\dots (7)$$

$$\text{EPS}_{it} = \beta_0 + \beta_1 \text{ECD}_{it} + \beta_2 \text{WMC}_{it} + U_t \dots\dots\dots (8)$$

Where:

NPM = Net Profit Margin; EPS = Earnings per Share; ECD = Environmental Cost Disclosure; WMC = Waste Management Cost

A-priori Expectation

It is anticipated that environmental accounting will have a positive impact on the financial performance of listed manufacturing firms in Nigeria. In other words, higher levels of environmental cost disclosure and effective waste management are expected to be associated with improved net profit margin (NPM) and earnings per share (EPS). This relationship can be expressed mathematically using differential notations as follows:

$$\text{For net profit margin (NPM): } \frac{\partial \text{NPM}}{\partial \text{ECD}} > 0, \frac{\partial \text{NPM}}{\partial \text{WMC}} > 0$$

$$\text{For earnings per share (EPS): } \frac{\partial \text{EPS}}{\partial \text{ECD}} > 0, \frac{\partial \text{EPS}}{\partial \text{WMC}} > 0$$

This expresses that an increase in environmental accounting activities (ECD and WMC) is expected to positively influence the financial performance of manufacturing firms in Nigeria.

Presentation and Analysis of Results

Statistical Description of Variables

	Observed outcomes		predictors	
	<i>NPM</i>	<i>EPS</i>	<i>ECD</i>	<i>WMC</i>
Mean	0.805580	0.006431	3.060581	2.692460
Median	1.010719	0.176091	2.568043	2.176091
Max	1.401401	1.348305	6.623249	6.397940
Mini	-0.376751	-2.000000	1.845098	1.477121
SD	0.478835	0.949167	1.397302	1.474181
Obs	100	100	100	100

Source: Statistical output from EViews version 12 (2026).

Analysis of ten Nigerian manufacturing firms over 2015–2024 reveals notable dispersion in both financial and environmental variables. Net Profit Margin averaged 0.81% but ranged widely (–37.7% to 140.1%), reflecting divergent profitability across firms. Earnings Per Share showed a low mean (₦0.006) relative to its median (₦0.176), indicating that extreme losses by a few firms pulled the average downward. Both profitability measures exhibited negative skewness, suggesting that below-average performance occurred more frequently. Environmental Cost Disclosure (ECD) and Waste Management Cost (WMC) were log-transformed to address scale variation. Their positive skewness indicates most firms reported modest environmental expenditures, while a minority incurred substantially higher costs likely due to regulatory requirements or sector-specific intensity. Jarque-Bera tests confirmed non-normal distributions for all variables ($p < 0.05$), supporting the use of robust panel regression techniques with heteroscedasticity-robust standard errors in subsequent analysis.

Bivariate Correlation Analysis

	Observed outcomes		predictors	
	<i>NPM</i>	<i>EPS</i>	<i>ECD</i>	<i>WMC</i>
NPM	1	0.4269	0.4129	0.4050
EPS	0.4269	1	0.5003	0.4932
ECD	0.4129	0.5003	1	0.6000
WMC	0.4050	0.4931	0.6000	1

Source: Statistical output from EViews version 12 (2026).

Pearson correlation results reveal consistently positive relationships between environmental accounting variables and financial performance metrics. Environmental cost disclosure (ECD) and waste management cost (WMC) each correlate moderately with net profit margin (NPM) and earnings per share (EPS), with coefficients between 0.40 and 0.50 suggesting firms with greater environmental accountability tend to exhibit stronger profitability, though the association is not deterministic. ECD and WMC show the strongest pairwise correlation ($r \approx 0.60$), reflecting their conceptual overlap as sustainability-related expenditures while remaining sufficiently distinct to avoid multicollinearity concerns in regression analysis. The moderate correlation between NPM and EPS ($r \approx 0.43$) further confirms they capture complementary profitability dimensions, operational efficiency versus shareholder returns. These preliminary findings indicate that environmental investments and financial performance move in tandem among Nigerian manufacturers, justifying rigorous panel regression testing to establish causal direction and statistical significance.

Panel Data Estimation Results

Parameter Estimates for Model I

	Pooled OLS		Fixed-Effect		Random-Effect		Hausman Test	
	Co-eff	Prob	Co-eff	Prob	Co-eff	Prob	Chi-Stat	Prob
ECD	6.8862	0.0000	-0.6302	0.4180	-0.3641	0.6349	5.0726	0.0792
WMC	-6.3943	0.0000	0.5985	0.4124	0.3500	0.6267		
C	-3.0540	0.0001	1.1228	0.0081	0.9775	0.0255		
Statistical Fit of the Regression Model								
R ²	0.3255		0.9667		0.0111		Net Profit Margin	
Adj. R ²	0.3116		0.9626		-0.0092		(ECD WMC)	
F-Stat	23.4068	0.0000	232.4892		0.5484	0.5796		

Source: Statistical output from EViews version 25 (2026).

The regression analysis for Model I yields a Hausman test statistic of 5.0726 with a p-value of 0.0792. Since this p-value exceeds the conventional 5% significance threshold, we fail to reject the null hypothesis, which states that the difference between the fixed effects and random effects estimators is not systematic. This implies that the random effects model is both consistent and more efficient, and thus preferred for inference in this study. According to the random effects estimates, Environmental Cost Disclosure (ECD) has a negative but statistically insignificant effect on net profit margin (coefficient = -0.3641 , $p = 0.6349$). Similarly, Waste Management Cost (WMC) shows a positive but insignificant relationship with net profit margin (coefficient = 0.3500 , $p = 0.6267$). These findings suggest that, among listed manufacturing firms in Nigeria between 2015 and 2024, variations in environmental accounting practices, whether through disclosure or waste-related expenditure, do not exert a measurable short-term influence on profitability when firm-specific heterogeneity is properly accounted for.

Parameter Estimates for Model II

	Pooled OLS		Fixed-Effect		Random-Effect		Hausman Test	
	Co-eff	Prob	Co-eff	Prob	Co-eff	Prob	Chi-Stat	Prob
ECD	12.3392	0.0000	-1.6047	0.3354	-0.8497	0.6025	7.5436	0.0930
WMC	-113759	0.0000	1.5288	0.3281	0.8242	0.5904		
C	-7.1297	0.0000	0.8016	0.3685	0.3877	0.6687		
Statistical Fit of the Regression Model								
R ²	0.3751		0.9612		0.0221		Earnings Per Share (ECD WMC)	
Adj. R ²	0.3623		0.9564		0.0019			
F-Stat	29.1219	0.0000	198.5084	0.0000	1.0958	0.3384		

Source: Statistical output from EViews version 12 (2026).

For Model II, the Hausman test produces a chi-square value of 7.54 with an associated probability of 0.093. Because this probability is greater than the 5 percent benchmark, the null hypothesis in favor of the random effects model cannot be rejected. This indicates that the random effects estimator is suitable for the model and provides efficient parameter estimates without evidence of systematic bias. The

regression results indicate that Environmental Cost Disclosure (ECD) carries a negative coefficient, but the effect on earnings per share is not statistically significant ($\beta = -0.8497$; $p = 0.6025$). In contrast, Waste Management Cost (WMC) shows a positive coefficient, though it is also statistically insignificant ($\beta = 0.8242$; $p = 0.5904$). Taken together, the evidence suggests that for Nigerian listed manufacturing firms over the period 2015 to 2024, environmental accounting-related expenditures and disclosures do not exert a significant short-run effect on earnings available to shareholders.

Discussion of Findings

Panel regression analysis of Nigerian manufacturing firms over 2015–2024 reveals that environmental accounting practices exert no statistically significant short-term influence on conventional profitability metrics. The results show that Environmental Cost Disclosure is negatively associated with both measures of financial performance, though the relationships are not statistically significant. Specifically, the random effects estimates indicate that ECD has a coefficient of -0.3641 ($p = 0.6349$) for net profit margin and -0.8497 ($p = 0.6025$) for earnings per share. These outcomes imply that increases in environmental disclosure do not lead to measurable improvements in profitability or shareholder returns within the period considered. The negative coefficients suggest that environmental disclosures may impose additional reporting and compliance costs on firms without generating immediate financial benefits. In the context of Nigeria's manufacturing sector, environmental reporting appears to be driven more by regulatory compliance and reputational considerations than by profit-enhancing motives. This interpretation is consistent with legitimacy theory, which emphasizes that firms disclose environmental information to maintain social approval rather than to achieve short-term financial gains. Empirical evidence from prior studies supports this result. Uwuigbe et al. (2011) observed that environmental reporting had no significant effect on profit-based performance indicators among Nigerian firms. Likewise, Olayinka and Oluwamayowa (2014) found that environmental disclosure did not significantly influence firm profitability, attributing the outcome to weak enforcement and limited investor sensitivity to sustainability information. Similar conclusions were reported by Ezeagba et al. (2017) with respect to earnings per share. However, these findings differ from those in developed markets, such as Clarkson et al. (2011), where environmental disclosure was shown to enhance firm value, underscoring the importance of institutional maturity and market awareness.

The findings further indicate that Waste Management Cost has a positive, but statistically insignificant, relationship with both net profit margin and earnings per share. The estimated coefficients are 0.3500 ($p = 0.6267$) for net profit margin and 0.8242 ($p = 0.5904$) for earnings per share. While the positive signs suggest that waste management investments may support efficiency and risk reduction, the absence of statistical significance indicates that such expenditures do not yield immediate financial rewards. One explanation is that waste management initiatives often involve substantial upfront costs related to technology acquisition, compliance and operational restructuring. These costs may suppress short-term financial outcomes, even if long-term benefits exist. From a stakeholder theory perspective, firms may engage in waste management practices primarily to satisfy regulatory agencies and community expectations rather than to maximize immediate returns. These results are consistent with the findings of Adebayo and Ofoegbu (2018) and Ojo and Oladipo (2020), who reported that environmental expenditures did not significantly affect profitability or shareholder wealth among Nigerian firms. Conversely, the results contrast with the argument advanced by Porter and van der Linde (1995), who posited that environmental investments can enhance competitiveness and profitability, particularly in environments with strong regulatory pressure and innovation-driven responses.

Conclusion

Environmental accounting practices within Nigeria's manufacturing sector demonstrate limited short-term financial traction. Empirical analysis reveals that environmental cost disclosure correlates negatively though insignificantly with both net profit margin and earnings per share, while waste management expenditures show a positive but statistically weak association with these profitability metrics. These patterns suggest that current environmental accounting efforts function primarily as legitimacy-seeking mechanisms rather than profit-maximizing strategies. Firms appear to engage in environmental disclosure and waste management largely to satisfy regulatory expectations and stakeholder pressures, consistent with Legitimacy Theory's premise that organizations align with

societal norms to secure continued operation. The absence of significant immediate financial returns does not, however, invalidate these practices. Instead, their value may materialize indirectly through enhanced corporate reputation, reduced regulatory risk, improved operational discipline, and strengthened investor confidence benefits that often accrue gradually and resist capture in conventional short-term accounting measures. Consequently, environmental accountability in Nigerian manufacturing should be viewed as a strategic investment in long-term resilience rather than a direct driver of quarterly profitability. While such practices reflect responsible corporate citizenship, their financial dividends manifest more in sustained market positioning and risk mitigation than in immediate enhancements to net profit margin or earnings per share.

Recommendations

- i. Given the potential long-term benefits of environmental accounting, manufacturing firms should strategically integrate ECD into their reporting processes. While the immediate financial impact may be limited, consistent and transparent disclosure can enhance stakeholder trust, improve corporate reputation and lay the foundation for sustainable business practices. Firms should also invest in systems and processes that accurately track and report environmental costs to ensure reliability and comparability over time.
- ii. The positive but insignificant relationship between Waste Management Cost and financial performance suggests that firms should adopt proactive and efficient waste management strategies. This includes implementing cost-effective recycling and treatment practices, regular monitoring of waste-related expenses, and aligning waste management initiatives with operational efficiency goals. By doing so, firms can reduce long-term operational risks, comply with regulatory requirements and potentially enhance profitability over time.

Limitation and suggestion for further study

While this study contributes to the sustainability accounting literature by empirically testing disclosure transparency and operational waste expenditure against dual financial metrics within Nigeria's manufacturing sector, its findings are bounded by limitations in time horizon, quantitative scope, and geographical focus. Specifically, the timeframe may not fully capture the deferred, legitimacy-preserving financial returns of green practices, the reliance on hard accounting metrics overlooks intangible non-financial benefits, and the localized focus limits generalizability across other emerging markets. To address these limitations, future research should pursue three key avenues: first, longitudinal designs tracking lagged effects beyond ten years to capture delayed profitability; second, mixed-method approaches combining financial data with stakeholder surveys to uncover qualitative, intangible value; and third, comparative analyses across African manufacturing hubs to determine whether these compliance-driven patterns stem from regional institutional constraints or firm-level strategic choices, ultimately deepening our understanding of how environmental accountability transitions from a cost center to a value driver in resource-constrained economies.

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