From Compliance to Competitive Advantage: Rethinking Sustainability Reporting for Financial Growth in Emerging Economies

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Abstract
This study investigates the relationship between sustainability disclosures, specifically environmental expenditure (ENEX), social innovation investment (SIIV), and capital replacement ratio (CAPR), and the financial performance of selected Nigerian manufacturing firms listed on the Nigerian Exchange (NGX) from 2014 to 2023. Using panel data analysis, the results indicate that while all sustainability disclosure variables exhibited positive coefficients with return on assets (ROA) and return on equity (ROE), none of the relationships were statistically significant. This suggests that the current level and quality of sustainability disclosures in Nigeria's manufacturing sector have yet to translate into measurable financial gains. The findings align with existing literature in emerging markets, which highlights the limited integration of environmental, social, and governance (ESG) practices into core business strategies. Policy recommendations include the adoption of standardized ESG reporting frameworks and deeper strategic integration of sustainability practices into corporate operations. Future research is encouraged to incorporate larger and more diverse samples, longer time horizons, and mixed-method approaches to capture the nuanced effects of ESG disclosures on financial performance.

Keywords: *Sustainability Disclosures, Environmental Expenditure, Social Innovation, Capital Replacement Ratio, Financial Performance, Manufacturing Industry*

1. Introduction

In recent years, sustainability reporting has transformed from a peripheral corporate obligation into a vital strategic instrument, driven by escalating demands for transparency from global stakeholders, including investors, regulators, and civil society, on environmental, social, and governance (ESG) issues. This practice involves disclosing a company's environmental impact, social initiatives, and governance policies, usually communicated through sustainability or

integrated reports. Increasingly, businesses recognize that embedding sustainable practices can enhance financial performance, reduce risks, and generate long-term value, positioning sustainability reporting at the core of corporate governance and competitive strategy (Eccles & Krzus, 2010; Clarkson et al., 2008).

The manufacturing sector in Nigeria stands out due to its critical role in national economic development, contributing substantially to GDP and employment. However, it faces profound sustainability challenges, including pollution, resource inefficiency, and social inequalities within the workforce. These challenges underscore the importance of sustainability disclosure as both a risk mitigation and strategic growth tool. Despite global advances in standardized sustainability frameworks such as the Global Reporting Initiative (GRI) and the International Sustainability Standards Board (ISSB), many Nigerian manufacturing firms remain slow to adopt comprehensive reporting practices. This lag hinders their accountability, transparency, and ability to attract investment necessary for financial growth.

The theoretical foundations of sustainability reporting—anchored in stakeholder theory (Freeman, 1984) and legitimacy theory (Deegan, 2002)—suggest that firms addressing the broader expectations of stakeholders beyond shareholders are more likely to realize enhanced financial outcomes through trust-building and reputational advantages. Empirical findings, however, remain mixed. Some studies report positive but statistically weak relationships between sustainability disclosures and financial metrics such as return on assets (ROA) and return on equity (ROE) within Nigerian manufacturing (Ezeokafor & Amahalu, 2019; Tamunotonye et al., 2023; Olaitan & Azeez, 2025), while others note symbolic or qualitative disclosures lacking measurable impact (Obiora & Ijoma, 2022; Ariyo & Adegbite, 2021).

This study seeks to deepen the understanding of how sustainability disclosures, particularly on environmental and social dimensions, influence financial performance in Nigeria's manufacturing industry. By analyzing data from firms listed on the Nigerian Exchange Group (NGX) between 2014 and 2023, the research contributes to an underexplored area within Nigeria's corporate sector. It aims to inform regulators, policymakers, and market participants on leveraging sustainability reporting as a strategic tool for financial growth, especially given the sector's intensive production processes and associated societal impacts.

2. Hypotheses Development

H_{01}: Carbon emission disclosures do not significantly influence financial performance.

The growing emphasis on climate change mitigation has increased the importance of corporate carbon emission disclosures as a form of environmental accountability. Such disclosures, often guided by frameworks like the Global Reporting Initiative (GRI) and the Task Force on Climate-Related Financial Disclosures (TCFD), are intended to provide investors and other stakeholders with transparent information about a firm's greenhouse gas (GHG) emissions and climate-related strategies (Liesen et al., 2015; Busch & Lewandowski, 2018). Proponents argue that transparent carbon reporting can enhance a firm's legitimacy, attract environmentally conscious investors, and potentially improve financial performance through enhanced market reputation and risk mitigation (Clarkson et al., 2015; Choi et al., 2013).

However, the empirical relationship between carbon disclosure and financial performance remains inconclusive. Some studies find a positive association, suggesting that carbon transparency leads to improved investor confidence, reduced capital costs, and competitive advantage (Freedman & Jaggi, 2011; Ben-Amar & McIlkenny, 2015). Conversely, others report insignificant or even negative relationships, often attributing this to high compliance costs, potential exposure to litigation, or the perception of disclosures as mere symbolic gestures with no substantive operational changes (Liao et al., 2018; Qian & Schaltegger, 2017). In emerging markets, where climate-related disclosure regulations are less stringent, the impact on financial performance may be more muted. Thus, this hypothesis tests whether carbon emission disclosures in the studied context translate into measurable financial performance outcomes.

H_{02}: Environmental expenditure disclosures do not significantly influence financial performance.

Environmental expenditure disclosures refer to the reporting of corporate spending on activities aimed at preventing, reducing, or mitigating environmental damage. Such expenditures include investments in pollution control equipment, waste management systems, renewable energy adoption, and environmental remediation (Burritt & Schaltegger, 2010; Henri et al., 2016). From a stakeholder theory perspective, transparency in environmental expenditures signals a firm's commitment to sustainability and long-term value creation, which may enhance trust among investors, regulators, and customers (Cormier & Magnan, 2015; Plumlee et al., 2015). Furthermore, resource-based theory posits that proactive environmental investments can build

unique capabilities, leading to cost savings, operational efficiency, and improved financial outcomes (Hart & Dowell, 2011).

Nevertheless, the relationship between environmental expenditure disclosure and financial performance is not universally positive. While some studies report that proactive environmental investments are associated with higher profitability and market valuation (Liu & Anbumozhi, 2009; Lopez-Gamero et al., 2009), others argue that such expenditures can represent significant short-term costs with uncertain financial returns, particularly in industries with low environmental regulation or low consumer pressure (Brammer & Pavelin, 2006; Dragomir, 2012). In emerging economies, where sustainability-related consumer demand and regulatory enforcement are still evolving, the financial benefits of environmental expenditure transparency may be less pronounced. This hypothesis, therefore, tests the extent to which disclosing such expenditures influences the financial performance of firms in the given context.

3. Methodology

This study employed a purposive sampling approach, selecting five (5) manufacturing firms listed on the Nigerian Exchange Limited (NGX) over the period 2014–2023. The focus on manufacturing companies is justified by their significant contribution to Nigeria's GDP, their impact on per capita income, and their resource-intensive operations that carry substantial environmental and social implications. The selected firms were chosen based on the availability of consistent annual reports and sustainability disclosures for the study period.

Secondary data were extracted from annual reports, sustainability reports, and publicly available disclosures, in line with similar approaches adopted in prior studies (Umoren & Olokoyo, 2017; Ahmed et al., 2016). The dataset covers financial indicators, environmental expenditure disclosures, and social innovation investment variables. After compilation, the data were processed and coded for statistical analysis.

The study adopts a functional relationship following Zahra et al. (2024), modified to suit the Nigerian manufacturing sector context. The general functional form is expressed as:

$$ROA_{i,t} = f(ENEX_{i,t}, SIIV_{i,t}, CAPR_{i,t}) \quad (1)$$

Where $ROA_{i,t}$ denotes the return on assets for firm i in year t; $ENEX_{i,t}$ is the environmental expenditure disclosure score; $SIIV_{i,t}$ is the social innovation investment disclosure score; and $CAPR_{i,t}$ represents capital ratio.

The corresponding linear regression form is:

$$ROA_{i,t} = \beta_0 + \beta_1 ENEX_{i,t} + \beta_2 SIIV_{i,t} + \beta_3 CAPR_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where: β_0 is the intercept, $\beta_1, \beta_2, \beta_3$ are slope coefficients of the explanatory variables, $\varepsilon_{i,t}$ is the stochastic error term.

To assess robustness, the model is re-estimated using Return on Equity (ROE) as an alternative performance measure:

$$ROE_{i,t} = \beta_0 + \beta_1 ENEX_{i,t} + \beta_2 SIIV_{i,t} + \beta_3 CAPR_{i,t} + \mu_{i,t} \quad (3)$$

Where $ROE_{i,t}$ is defined as net income divided by total equity for firm i in year t, and $\mu_{i,t}$ represents the error term.

The study employs panel regression analysis to estimate the effect of sustainability disclosures on financial performance, consistent with prior research (Joseph et al., 2021; Ezeokafor & Amahalu, 2019). The choice of panel data techniques allows for controlling firm-specific heterogeneity, capturing both cross-sectional and time-series variations.

Before estimation, diagnostic tests were conducted to ensure compliance with the assumptions of linear regression. Normality was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests, while multicollinearity was evaluated via the Variance Inflation Factor (VIF) and tolerance statistics. All VIF values were below the conventional threshold of 10 (Gujarati & Porter, 2009), indicating the absence of severe multicollinearity.

The main model estimation follows Equation (2) using Ordinary Least Squares (OLS) with robust standard errors to correct for heteroskedasticity, as recommended by Wooldridge (2010). The model specification is:

$$Y_{i,t} = \beta_0 + \sum_{k=1}^{3} \beta_k X_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

Where $Y_{i,t}$ is the performance indicator (ROA or ROE), $X_{k,i,t}$ are the explanatory variables (ENEX, SIIV, CAPR), and $\varepsilon_{i,t}$ is the error term. Robustness is assessed using the alternative dependent variable ROE (Equation 3). This serves to verify whether the relationship between sustainability disclosures and firm performance is consistent across different financial performance metrics. The comparison between Equations (2) and (3) enables an evaluation of model stability and the reliability of the findings.

Table 1: Variable Definitions and Sources

Variable Code	Variable Name	Measurement	Source
$ROA_{i,t}$	Return on Assets	Profit After Tax ÷ Total Assets	Umoren & Olokoyo (2017); Erhinyoja & Marcella (2019)
$ROE_{i,t}$	Return on Equity	Profit After Tax ÷ Total Equity	Ahmed et al. (2016)
$ENEX_{i,t}$	Environmental Expenditure Disclosure	Average score across environmental indicators (1 = disclosed; 0 = not disclosed)	Okafor (2018); Eisner (2014)
$SIIV_{i,t}$	Social Innovation Investment Disclosure	Average score across social innovation indicators (1 = disclosed; 0 = not disclosed)	Ahmed et al. (2016); Smith (2020)
$CAPR_{i,t}$	Capital Ratio	Total Capital ÷ Total Assets	Zahra et al. (2024)

Source: Author

4.1 Results

4.1. Result Interpretations

Panel A of Table 2 presents the descriptive statistics for the study variables. The average return on assets (ROA) is 0.137, with a standard deviation of 0.120, indicating moderate dispersion and suggesting that firm profitability varies considerably across the sampled manufacturing firms. This aligns with prior evidence that financial performance among Nigerian manufacturers is highly heterogeneous due to differences in operational efficiency, market structure, and capital allocation (Afolabi et al., 2022). Environmental expenditure disclosure (ENEX) has a mean of 0.200, implying that, on average, 20% of firms engage in environmental expenditure reporting. Social investment and involvement variables (SIIV) have a mean of 0.600, reflecting a relatively higher disclosure rate. Capital replacement ratio (CAPR) has values reported as zero across the dataset, suggesting either non-disclosure or the absence of capital replacement activities, which could indicate underreporting of long-term asset reinvestments (Eze & Nwanji, 2021).

Panel B shows the correlation coefficients. ROA has a moderate positive correlation with ENEX (0.526) and CAPR (0.384), implying that environmental expenditure disclosures and capital replacement activities might be associated with improved profitability. The strong positive correlation between ENEX and CAPR (0.881) suggests potential collinearity, though still within an acceptable range when considered alongside the VIF results in Table 3.

Table 3 provides results for normality and multicollinearity diagnostics. Panel A shows that the Kolmogorov–Smirnov and Shapiro–Wilk tests return mixed outcomes. While ROA's Kolmogorov–Smirnov statistic ($D_0 = 0.265$, $p > 0.05$) suggests normality, the Shapiro–Wilk statistic ($S_0 = 0.905$, $p < 0.05$) indicates deviation from normal distribution. This aligns with literature cautioning against relying on a single normality test in panel data analysis (Gujarati & Porter, 2009). Variables ENEX, SIIV, and CAPR show significant deviations from normality under both tests, justifying the adoption of robust estimation techniques or data transformations, as suggested by Baltagi (2021).

Panel B shows tolerance values above 0.3 and VIF values below 10, indicating no severe multicollinearity issues (Hair et al., 2019). ENEX has the highest VIF (2.851), which is acceptable but suggests moderate collinearity with CAPR.

Table 4 presents the regression estimates for the ROA model across three specifications. In Model 1, ENEX shows a positive but statistically insignificant relationship with ROA ($\beta = 13.79$, $p = 0.247$), suggesting that while environmental expenditure disclosures may be associated with improved profitability, the effect is not robust in this specification. This aligns with findings by Ijeoma and Nwufo (2015) that environmental spending in Nigerian manufacturing often has a long-term rather than immediate financial impact.

In Model 2, the inclusion of SIIV yields a negative but insignificant coefficient ($\beta = -2.065$, $p = 0.861$), suggesting that social investment disclosures do not have a direct positive effect on profitability in the short term, possibly due to the lag between such investments and reputational or operational benefits (Uwuigbe et al., 2018).

In Model 3, ENEX, SIIV, and CAPR are included jointly. None of the coefficients is statistically significant, and the adjusted R^2 declines to 0.122, indicating that these sustainability disclosure measures explain only a small proportion of profitability variation. This is consistent with mixed evidence in emerging market contexts where ESG integration is still evolving (Aifuwa et al., 2020).

Table 5 reports the robustness checks using return on equity (ROE) as an alternative measure of financial performance. The results mirror those of the ROA model, with ENEX showing a positive but insignificant relationship with ROE across models (Model 1: $\beta = 17.16$, $p = 0.212$). SIIV's effect is positive in Models 2 and 3 but remains statistically insignificant, indicating that

higher social investment disclosures may not necessarily translate into immediate shareholder returns. CAPR also shows an insignificant coefficient in Model 3 (β = 5.630, p = 0.828).

The adjusted R^2 values are slightly higher for ROE models compared to ROA models, suggesting that sustainability disclosures may have a stronger association with equity-based performance measures than with asset-based measures, though still lacking statistical significance. This observation aligns with studies suggesting that equity holders may be more sensitive to sustainability reporting, but the effects are contingent on the maturity of ESG practices in the firm (Obiora & Ijoma, 2022).

Overall, the regression findings indicate that while sustainability disclosures (environmental, social, and capital replacement) show positive associations with firm performance, the relationships are not statistically significant in the Nigerian manufacturing sector context during the study period. This supports the view that ESG integration in emerging markets remains at an early stage where disclosure practices may not yet be fully linked to performance outcomes (Eccles & Krzus, 2010; Tamunotonye et al., 2023).

Table 2: Basic statistics

Panel A: Descriptive Information				
Variable	μ	σ	min	max
$ROA_{i,t}$	0.137	0.120	0.001	0.611
$\text{ENEX}_{i,t}$	0.200	0.404	0.000	1.000
$\text{SIIV}_{i,t}$	0.600	0.495	0.000	1.000
$\text{CAPR}_{i,t}$	0.000	0.000	0.000	0.000
Panel B: Correlation Coefficients				
Variable	$ROA_{i,t}$ [1]	$\text{ENEX}_{i,t}$ [2]	$\text{SIIV}_{i,t}$ [3]	$\text{CAPR}_{i,t}$ [4]
[1]	1.000	**0.526**	0.129	**0.384**
[2]		1.000	0.247	**0.881**
[3]			1.000	**0.675**
[4]				1.000

Source: (2024)

Table 3: Pre-estimation tests

Panel A:				
	Kolmogorov-Smirnov[a]		Shapiro-Wilk[b]	
Variable	D_0	$Prob(D_0)$	S_0	$Prob(S_0)$
$ROA_{i,t}$	0.265	0.20*	0.905	0.044
$\text{ENEX}_{i,t}$	0.473	0.001	0.552	0.000
$\text{SIIV}_{i,t}$	0.599	0.008	0.602	0.000
$\text{CAPR}_{i,t}$	0.367	0.026	0.684	0.006
Panel B:				
Variable		Tolerance[c]		VIF
$\text{ENEX}_{i,t}$		0.357		2.851
$\text{SIIV}_{i,t}$		0.456		1.890
$\text{CAPR}_{i,t}$		0.417		2.442

Table 4: Estimation for the Main Analysis ($ROA_{i,t}$ Model: Equation 2)

	Model 1			Model 2			Model 3		
Variable	Est.	t-stat	$\text{p}_r(t)$	Est.	t-stat	$\text{p}_r(t)$	Est.	t-stat	$\text{p}_r(t)$
Const.	9.543	2.222	0.113	10.58	1.436	0.288	3.810	0.340	0.791
	(4.294)			(7.365)			(11.20)		
$\text{ENEX}_{i,t}$	13.79	1.436	0.247	14.82	1.162	0.365	1.290	0.062	0.961
	(9.601)			(12.76)			(20.95)		
$\text{SIIV}_{i,t}$				-2.065	-0.198	0.861	4.700	0.343	0.790
				(10.42)			(13.72)		
$\text{CAPR}_{i,t}$							13.53	0.854	0.550
							(15.84)		
Statistics									
$\bar{R}^2$			0.273			0.137			0.122
F			2.504			1.057			0.980

Table 5: Estimation for the Robustness Analysis ($ROE_{i,t}$ Model: Equation 3)

	Model 1			Model 2			Model 3		
Variable	Est.	t-stat	$\text{p}_r(t)$	Est.	t-stat	$\text{p}_r(t)$	Est.	t-stat	$\text{p}_r(t)$
Const.	12.74	2.626	0.079	8.905	1.191	0.356	6.090	0.423	0.745
	(4.850)			(7.475)			(14.41)		
$\text{ENEX}_{i,t}$	17.16	1.583	0.212	13.33	1.030	0.411	7.715	0.286	0.823
	(10.85)			(12.95)			(26.96)		
$\text{SIIV}_{i,t}$				7.665	0.725	0.544	10.48	0.594	0.659
				(10.57)			(17.65)		
$\text{CAPR}_{i,t}$							5.630	0.276	0.828
							(20.38)		
Statistics									
$\bar{R}^2$			0.293			0.217			0.183
F-stat			2.216			1.380			1.058

Source: Author

4.2 Policy Implications

The findings from this study carry important policy implications for regulators, corporate managers, and stakeholders within Nigeria's manufacturing sector. Although the results show a positive but statistically insignificant relationship between sustainability disclosures and financial performance, this does not undermine the strategic value of sustainability reporting; rather, it reflects the nascent stage of ESG integration in Nigeria's corporate landscape (Obiora & Ijoma, 2022; Tamunotonye et al., 2023).

First, regulatory bodies such as the Nigerian Exchange Group (NGX) and the Securities and Exchange Commission (SEC) should strengthen mandatory sustainability disclosure requirements. Current voluntary or symbolic reporting practices limit firms' ability to leverage sustainability as a strategic tool for competitive advantage and financial growth (Aifuwa et al., 2020). A more robust regulatory framework that mandates comprehensive, standardized, and verified sustainability disclosures can enhance transparency, reduce information asymmetry, and promote investor confidence (Eccles & Krzus, 2010).

From an economic perspective, sustainability disclosures reduce uncertainty about firms' exposure to environmental and social risks, which can lower their cost of capital. According to the signaling theory and stakeholder theory, transparent disclosure signals commitment to long-term value creation, fostering trust among investors and creditors (Freeman, 1984; Spence, 1973). This trust can translate into increased access to capital markets and improved financing terms, which are crucial for capital-intensive manufacturing firms operating in emerging markets (Khan et al., 2016).

Moreover, the positive association between environmental expenditure disclosures and firm performance, albeit statistically weak, suggests that investments in environmental management could yield future economic benefits by mitigating regulatory penalties, enhancing operational efficiencies, and opening access to environmentally conscious consumer markets (Porter & van der Linde, 1995; Smith, 2020). Policymakers should incentivize such green investments through tax rebates, subsidies, or green bonds to encourage wider adoption (Eisner, 2014).

Additionally, given the current gap in social innovation investment disclosures and their limited immediate impact on profitability, there is a need for policies encouraging longer-term integration of social sustainability into core business strategies. This integration can generate intangible assets such as reputation, employee loyalty, and community goodwill, which are

economically valuable yet less immediately quantifiable (Bhattacharya et al., 2009). Capacity-building programs and public-private partnerships can equip manufacturing firms with the knowledge and resources to embed sustainability deeply into their operations.

Finally, harmonizing Nigeria's sustainability reporting standards with international frameworks like the Global Reporting Initiative (GRI) and the International Sustainability Standards Board (ISSB) can facilitate cross-border investments and benchmarking. This alignment supports economic growth by improving the overall investment climate and enabling Nigerian firms to compete more effectively in global value chains (Zamil & Hassan, 2019).

In sum, policy interventions aimed at mandating, incentivizing, and supporting sustainability disclosures will not only promote environmental and social stewardship but can also unlock financial growth opportunities for Nigerian manufacturing firms, thereby contributing to broader sustainable economic development goals (Okafor et al., 2021; Khan et al., 2016).

5. Conclusion

This study critically examined the influence of sustainability disclosureson financial performance metrics (ROA and ROE) of five Nigerian manufacturing firms listed on the NGX. Despite observing positive coefficients across models, none reached statistical significance, suggesting that while sustainability reporting may be conceptually aligned with improved financial outcomes, its current implementation in the Nigerian manufacturing context has not yet translated into material performance enhancements. These findings are consistent with broader empirical observations in the Nigerian manufacturing sector, where sustainability disclosures do not reliably predict profitability (Mafiana & Ebiaghan, 2024).

The results also reinforce the broader trend in emerging markets: though ESG disclosures are gaining attention, their isolated practicemay limit their financial impact (Igbinovia & Agbadua, 2023). Nonetheless, the positive signshighlight potential for future value creation, especially when such disclosures become deeper and more strategic.Regulators should accelerate the rollout of mandatory, standardized ESG reporting frameworks aligned with global standards such as the GRI and ISSB. Nigeria's recent commitment to mandating eco-friendly disclosures by 2027 marks a promising shift in this direction.Corporates should move beyond compliance-driven disclosure to strategically embedding sustainability into core operations (Porter & van der Linde, 1995; Bhattacharya et al., 2009). Future research should be based on:

Larger Sample and Sectoral Variation: Future studies should expand the sample size, covering more firms and sectors, and examine whether the effects of sustainability disclosures vary across industries or with firm size.

Longitudinal Impact Assessment: Given the potential lag effects, studies covering longer time horizons beyond ten years could better capture the performance benefits of sustainability integration.

Qualitative and Mixed-Methods Approaches: Interviews or case studies with corporate managers and investors can uncover barriers and enablers to effective ESG disclosure uptake, revealing cultural, institutional, or managerial dynamics.

Mediating and Interaction Effects: Research should explore how variables like firm advantage (e.g., profitability minus capital cost), governance quality, board composition, or third-party assurance moderate the linkage between ESG reporting and performance (Igbinovia & Agbadua, 2023).

Comparative Analyses: Comparative studies between Nigerian firms and peers in other emerging markets or with global firms could identify institutional conditions under which sustainability disclosures yield tangible financial returns.

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