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Environmental Sustainability Performance Disclosure and Its Impact on Profitability in Listed Consumer Goods Manufacturing Firms in Nigeria

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Abstract: The inadequate disclosure of environmental sustainability performance by polluting firms has led to significant information asymmetry between corporations and stakeholders, which in turn has contributed to investor apathy, diminished economic success, and increased community opposition. This study examines the effects of environmental sustainability performance disclosure on the profitability of firms, specifically focusing on the consumer goods manufacturing sector in Nigeria. The research is anchored in Stakeholder Theory and adopts a correlational research design. Data were obtained from the annual reports of thirteen listed consumer goods manufacturing companies over a period of thirteen years (2012–2024). Feasible Generalized Least Squares (FGLS) regression analysis was employed to test the hypotheses. The results indicate that the disclosure of greenhouse gas (GHG) emissions reduction is positively associated with profitability. Similarly, the disclosure of environmental waste management practices is significantly related to improved corporate profitability. However, the disclosure of water management practices revealed a significant negative relationship with profitability. The findings suggest that the disclosure of environmental sustainability practices, such as GHG emissions reduction, waste management, and water consumption reduction, plays a crucial role in enhancing both environmental sustainability and long-term financial performance. While GHG reduction was found to have a direct financial benefit, waste management strategies necessitate a shift from compliance-based approaches to innovation-driven practices. Water management, on the other hand, requires better alignment with industry-specific realities to effectively contribute to profitability and sustainable growth. These findings underscore the importance of transparent environmental performance disclosure as a driver of both ecological sustainability and financial success for firms operating in the consumer goods manufacturing sector.

Keywords: Environmental performance disclosure; Financial performance; Waste management; Greenhouse gas (GHG) emission; water management

1 Introduction

The conventional economic model of business emphasizes the maximization of shareholder wealth, typically through dividends or capital appreciation. This model has long driven industrial and corporate activity, but it is heavily reliant on the extraction and transformation of natural resources—a process that contributes significantly to environmental degradation and poses risks to human health and biodiversity [1, 2]. It also heightens inequality in the society as communities with relatively low education and income suffer the impact air and water pollution more [3]. These effects transcend present-day implications, potentially undermining the quality of life for future generations [4]. Consequently, the sustainability of business practices has become a focal point of scholarly and policy attention. Modern businesses are increasingly encouraged to operate in a way that minimizes their environmental footprint while still achieving financial goals. The study [5] emphasize that a sustainable business should ensure that its operations do not leave the environment worse off at the end of an accounting period. However, this ideal remains largely unfulfilled, particularly in industrialized and emerging economies. In Nigeria, weak enforcement of

environmental regulations continues to exacerbate environmental degradation through practices such as gas flaring, oil spillage, and illegal waste disposal [6].

The financial implications of environmental neglect are equally significant. While investors are attracted to firms offering high returns, their decisions are also shaped by risk perceptions. A company's ability to manage environmental risks effectively can enhance its appeal to investors by reducing operational volatility and protecting long-term profitability [7]. Thus, integrating sustainable practices into corporate strategy is not merely an ethical obligation—it is a pragmatic financial decision that can foster investor trust and stakeholder confidence.

Disclosure of environmental performance information has emerged as a critical tool in bridging the gap between corporate action and stakeholder expectations. Transparent reporting reduces information asymmetry, enhances investor decision-making, and improves firm legitimacy [8, 9]. Inadequate disclosure can increase perceived risk, potentially reducing access to investment capital and hindering business expansion. Firms that communicate their environmental efforts are more likely to attract investor support and maintain strong relationships with host communities, thereby reducing incidences of conflict, protest, or regulatory intervention [10].

Although there is growing global interest in the relationship between sustainability disclosure and firm performance, the majority of empirical studies have focused on developed economies, with only limited attention given to African contexts. In South Africa, integrated reporting has been mandatory for listed firms, leading to a well-documented positive relationship between sustainability disclosure and financial performance [11, 12]. In Kenya, environmental and social reporting remains voluntary, and studies revealed mixed results on its effect on performance [13]. However, in Nigeria, sustainability reporting is still in its infancy, with most firms treating it as a corporate social responsibility (CSR) issue rather than an integral strategic practice [3]. Moreover, many Nigerian studies on financial performance focus almost exclusively on financial metrics, overlooking the influence of non-financial disclosures, such as environmental performance indicators.

This study, therefore, addresses a significant gap in the literature by investigating the relationship between environmental sustainability performance disclosure and financial performance in Nigeria's consumer goods manufacturing sector—a major contributor to both GDP and environmental pollution. Unlike many previous studies that use broad proxies for sustainability, this study employed specific environmental disclosure indicators, reduction in CO_2 emissions, use of renewable materials, and waste generation and disposal as proxies. Financial performance is measured using Return on Equity (ROE).

By focusing on Nigeria—a country grappling with enforcement challenges and low disclosure rates—this study provides a unique perspective on how environmental reporting can be aligned with profitability in an emerging economy. It contributes to the expanding sustainability accounting literature by offering context-specific insights from a region where the environmental costs of business have been substantial but under-examined in scholarly discourse.

2 Literature Review

2.1 Conceptual Review

2.1.1 Financial performance

Understanding a company's financial performance is essential for evaluating its overall success, growth, and financial health. It involves evaluating various factors, including capital adequacy, liquidity, solvency, efficiency, leverage, and profitability, all of which demonstrate the company's ability to manage its financial resources effectively. Companies continuously work towards improving their financial performance through strategic decision-making, aiming to foster growth and success within their organizations. Researchers and experts often utilize different metrics to analyze financial performance, with ROE commonly used as an indicator in studies. Therefore, this study adopts ROE as the measure of financial performance.

2.1.2 Environmental sustainability performance disclosure

Performance is the result or outcome of a process, decision, action, or operation, measured against predetermined standards, goals, and objectives. According to the Cambridge Dictionary, performance refers to how well a person, machine, etc. carries out a piece of work or an activity. Doing well implies completing tasks and achieving specific goals and objectives.

Environmental sustainability involves maintaining the Earth's environment in its pristine form to continue supporting life and its natural resources. It revolves around protecting and preserving the environment for the present and the future. Environmental sustainability depends on environmentally sustainable practices, where individuals and companies take steps to improve efficiencies, reduce resource consumption and waste, and measure and monitor carbon emissions throughout the entire supply chain.

Environmental sustainability performance is assessed by how well companies are embracing sustainability practices through disclosure. The reporting of actions taken to enhance environmental well-being in a company's annual

report defines environmental sustainability performance disclosure. Global Reporting Initiative (GRI) has provided several indices that measure environmental performance. However, in this study, environmental sustainability performance disclosure is represented by waste management, GHG emission reduction, and water consumption reduction.

2.2 Theoretical Framework

This study is anchored on stakeholder theory. The stakeholder theory has sparked numerous debates and is often referenced in discussions, actions, management science studies, and political analyses. Voluntary social and environmental disclosure plays a crucial role in the communication between organizations and their stakeholders. According to Freeman [14], the stakeholder theory emphasizes that firms are accountable to a wide range of stakeholders beyond just shareholders, including creditors, customers, suppliers, employees, government, community, environment, and future generations. As a result, organizations must balance the expectations and interests of multiple stakeholders in order to be accountable not only to investors but also to those who may be affected by their actions. As highlighted by Ruhana and Hidayah [15], the company's existence is strongly influenced by the support provided by stakeholders. Additionally, disclosing environmental impact information may alleviate stakeholder pressure and opposition, and contribute to business success.

Discussions on environmental sustainability usually attract the attention of various groups and individuals who are interested in achieving a sustainable environment. In Nigeria, there is a loud and increasing cry against gas flaring, water stress, and huge tons of waste churned out on a daily basis and disposed of in unauthorized locations. These variables are of interest to host communities, regulators, customers, environmental groups, and the general public. It is expected that a company will continue to pursue its profit objective, which is essentially shareholder-centric. In doing so, however, the company (especially a polluting firm) must consider the stakeholders who share environmental resources with the entity and are interested in resolving environmental challenges. This is possibly why stakeholder expectations drive environmental disclosure [16], and stakeholder perspective in business engagements contributes to long-term profitability [17]. This study is based on stakeholder theory, as it sheds light on the significance of stakeholders in business success and growth.

2.3 Empirical Review

Financial reporting has evolved beyond traditional metrics to encompass a broader spectrum of information, including environmental performance. Stakeholders—particularly investors, regulators, and communities—are increasingly attentive to the impacts of corporate environmental practices on financial outcomes [18]. In response to this growing concern, a significant body of research has emerged, examining the link between environmental sustainability disclosure and financial performance. However, the findings remain inconclusive. While some studies report a positive association, others find no significant relationship or a negative relationship. These conflicting results are evident across both developed and developing economies, reflecting differences in regulatory frameworks, reporting standards, and firm-level environmental strategies.

Menike [18] investigated environmental accounting disclosure as a factor that influences financial performance. Findings of the study established a significant positive relationship between environmental accounting disclosure and profitability. Asuquo et al. [19] also examined the effect of sustainability reporting on the corporate performance of selected quoted brewery firms in Nigeria. To determine the association between sustainability reporting and corporate performance, the researchers retrieved data from the audited financial statements of the three brewery firms under study from 2012 to 2016. The result of the study showed that economic performance disclosure (ECN), environmental performance disclosure (ENV), and social performance disclosure (SOC) have no significant effect on return on asset (ROA) of selected quoted firms in Nigeria. The result of the study, however, may suffer from problem of generalization as it is based on a few firms. On the other hand, several related studies have found a positive relationship between sustainability performance disclosure and firm performance [20–23].

2.4 Hypotheses Development

2.4.1 GHG reduction and profitability

There has been a long-standing argument on whether or not businesses benefit from expenditures on environmental investments and protection. Delmas et al. [24] investigated the association between greenhouse emissions reduction and financial performance in the U.S., focusing on the time horizon over which positive changes in environmental performance will positively impact financial performance. Using longitudinal data spanning the period from 2004 to 2008 for 1,095 firms, the study documented that during the study period, improvement in environmental performance was negatively associated with financial performance. However, the study further noted that there was potential improvement in financial performance arising from enhancement in environmental performance over a long-time horizon, based on Tobin's Q. In a similar study on environmental performance, Lyng et al. [25] examined the effect of GHG on firm value, and reported a "negative coherence between reduction of GHG and profitability".

Gregory [26] reported a negative relationship between the level of GHG and firm value, suggesting that reduction in GHG emissions will lead to increased profitability. These inconsistent findings lead to the first null hypothesis as follows.

H_1: *There is no significant relationship between greenhouse gas reduction disclosure and return on assets of consumer goods firms in Nigeria.*

2.4.2 Waste management and profitability

The generation of solid waste has led to adverse environmental impacts such as rising ground-level temperatures and contaminations from leaching toxic chemicals, resulting in deadly health hazards in the society [27, 28]. Accordingly, the issue of waste management is a central environmental issue worldwide, and an increasing number of firms have started implementing various waste reduction and recycling strategies to enhance long-term environmental and business sustainability. There is inconclusive evidence from prior studies regarding how waste management is associated with firm financial performance. Some studies have documented that investing in waste management technologies and activities will divert scarce firm resources from critical revenue generation expenses, and this will negatively affect profitability.

Using a sample of 14,601 firm-year observations, drawn from 41 countries from 2002 to 2019, Gull et al. [27] reported a significantly positive association between waste recycling and corporate performance, suggesting that firms actively engaged in waste management are able to obtain better financial performance. The results of the study are consistent irrespective of the type of waste (hazardous or non-hazardous), and the measures of financial performance and waste, as well as sub-samples in the study. Bogdan et al. [29] also found a positive and statistically significant relationship between the disclosure of waste management information and financial performance. The study was based on data from listed manufacturing companies in Romania. However, Yang et al. [30] reported a statistically significant negative relationship between environmental information disclosure and financial performance, while corporate internationalization has a positive moderating effect on this relationship. On the other hand, in a related study on waste management cost disclosure in Nigeria's oil industry, Kornom-Gbaraba and Chukwuemeka [31] reported that the disclosure of waste management cost had an insignificant (negative) relationship with profitability. Given these inconsistent findings, this study presented the second hypothesis in the null form as follows:

H_2: *Environmental waste management disclosure is not significantly associated with financial performance of consumer goods firms in Nigeria.*

2.4.3 Water management and financial performance

Water reduction is an important strategic goal of many industrial companies. A number of food and beverage firms recognize the importance of water and how to economically utilize this key resource often shared between the firm and the community. For instance, Guinness Nigeria Plc (a food and beverage firm in Nigeria) regards water as a central resource and has developed a strategic water blueprint to improve water efficiency in their various operations. Reduction in industrial water consumption leads to less energy usage and saves costs [32], and efficiency in water usage will lead to an increase in financial performance. This fact is consistent with the findings of Dzemonda and Fatoki [33], who documented a positive relationship between water sustainability and market value, using panel data from 32 South African firms over a period of 8 years. There is no doubt that water reduction is a good strategy, as it reduces operational risks and benefits communities sharing water resources with industrial firms. However, direct water reduction can have adverse unintended consequences for industrial firms and host communities. One such consequence is that as water usage is reduced, there will be an increase in the volume of effluent and in the concentration of pollutants [34]. Dealing with these consequences may constrain the financial resources of the firm and lead to poor financial performance. As a result of this discussion, the third hypothesis is formulated in the null form as follows:

H_3: *Water consumption reduction is not significantly related to the financial performance of consumer goods firms in Nigeria.*

3 Methodology

3.1 The Data and Model

The research utilized secondary data, with environmentally disclosed information obtained from annual reports through content analysis. The highest level of environmental disclosure items was found in sustainability reports, followed by CEO reports, vision, mission, and value statements. Financial data was extracted from the annual financial statements of companies studied, spanning from 2012 to 2024. The study encompassed twenty-one (21) consumer goods industries listed on the Nigerian stock market, with a sample size of thirteen (13) companies. These companies were specifically selected using a judgmental sampling technique from the 21 listed companies, based on their capital bases, the availability of data for thirteen years (2012–2024), and consistent sustainability of listing on the NGX throughout the study period.

In this study, the environmental sustainability performance disclosure index serves as the independent variable, while the perceived financial performance of firms—measured by ROE—constitutes the dependent variable. The environmental sustainability disclosure index comprises three key components: GHG emission reduction, waste management disclosure (WSTM), and water management disclosure (WATM). These dimensions reflect the extent to which firms publicly report their efforts on how they mitigate environmental impacts, providing a composite measure of environmental accountability and transparency. Firm size and leverage were introduced as control variables.

The analytical model is as follows:

$$\mathrm{ROE}_{it} = \beta_0 + \beta_1 \mathrm{GHG}_{it} + \beta_2 \mathrm{WSTM}_{it} + \beta_3 \mathrm{WATM}_{it} + \beta_4 \mathrm{FMSZ}_{it} + \beta_5 \mathrm{FLEV}_{it} + \varepsilon_{it}$$

where,

ROE = Return on equity;
GHG = Green house gas emission reduction;
WSTM = Waste management disclosure;
WATM = Water management disclosure;
FMSZ = Firm size =Natural log of total assets-control variable;
Flev = Financial leverage-control variable;
β_0 = Value of the intercept;
β_1, β_2, β_3 = Coefficient of the explanatory variables;
e = Error term.

$$\text{The environmental sustainability performance disclosure index} = \sum_{j=0}^{n} dj$$

where,

$dj = 0$ if the j information item is not disclosed in the annual reports;
$dj = 1$ if the j information item is poorly disclosed in the annual reports;
$dj = 2$ if the j information item is moderately disclosed in the annual reports;
$dj = 3$ if the j information item is comprehensively disclosed in the annual reports;
$n =$ the total of information items which a firm is expected to disclose;
$i = i$-th company.

4 Results

4.1 Descriptive Statistics

This section presents the descriptive statistics of the variables in the study. As shown in Table 1, the number of observations is 169, which is made up of 13 listed consumer goods firms and 13 years covered by the study.

Table 1. Descriptive statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
roe	169	-0.8980551	0.134	14.41108	-186.96	2.93
ghg	169	1.313609	1	0.8809448	0	3
wastm	169	1.393491	1	0.9098758	0	3
watm	169	1.331361	1	0.9077831	0	3
fsz	169	17.80492	18.1	2.045828	0.41	21.12
flev	169	0.9215385	0.65	1.865243	-0.16	20.85

Table 1 presents the descriptive statistics for the variables employed in the study, including measures of firm performance (ROE), environmental disclosure indices (GHG, WSTM, WATM), and firm-specific attributes (FSZ and FLEV). ROE exhibits extreme variation, with a mean value of –0.898 and a median of 0.134. The substantial negative minimum value (–186.96) and a standard deviation of 14.41 suggest that while a number of firms deliver positive equity returns, others record substantial losses relative to shareholder equity, possibly due to high leverage or volatile earnings. These findings indicate that ROE may serve as a useful measure of financial performance in the context of environmental disclosures [35].

Regarding environmental sustainability practices, the average scores for GHG disclosure (GHG = 1.31), waste management disclosure (WSTM = 1.39), and water management disclosure (WATM = 1.33) all fall slightly above 1 on a scale of 0–3. Median values of 1 for each variable suggest that most firms engage in basic or moderate levels of environmental reporting, while a few firms achieve higher levels of disclosure. The standard deviations

(ranging between 0.88 and 0.91) indicate moderate variation in reporting practices. This evidence suggests that sustainability disclosure is still growing among Nigerian consumer goods firms, with wide disparities in the extent of reporting [36].

Firm-specific characteristics also show interesting patterns. The average business size (FSZ) is 17.80 (log of total assets), with a median of 18.1, indicating that the majority of companies in the sample are comparatively large; however, there is considerable variation (minimum = 0.41, maximum = 21.12). Larger firms may be more visible and have greater resources to implement and disclose sustainability practices, consistent with prior findings that firm size positively influences environmental reporting [36]. Financial leverage (FLEV) has a mean value of 0.92, indicating that firms, on average, maintain a moderate level of debt relative to equity. However, the maximum value of 20.85 and a high standard deviation of 1.86 reveal that some firms are highly leveraged, which may increase financial risk and explain the wide dispersion in ROE values [37].

The wide dispersion in variables such as ROE and FLEV may also indicate heteroskedasticity, where the variance of the error term is not constant across observations. Heteroskedasticity, if uncorrected, leads to inefficient estimates and unreliable hypothesis testing because standard errors are biased [38, 39]. This study adopts FGLS regression to overcome the problem of heteroscedasticity.

Overall, the descriptive statistics suggest three key insights. First, equity-based profitability (ROE) is highly volatile due to extreme cases of negative performance. Second, sustainability disclosures in areas such as GHG emissions, waste, and water management remain generally low to moderate, with substantial variation across firms. Finally, firm attributes such as size and leverage vary considerably, with implications for both financial performance and sustainability reporting. These results highlight the heterogeneity of Nigerian consumer goods manufacturing firms and point to the importance of considering firm-specific characteristics when evaluating the relationship between sustainability practices and financial performance [35, 39].

From a broader perspective, these findings also help define the research gap. While prior studies in developed economies report relatively higher and more standardized levels of environmental disclosure, Nigerian firms appear to lag, as reflected in their modest average disclosure scores. This limited transparency raises concerns about whether sustainability practices in the Nigerian consumer goods sector are substantive or merely symbolic. Furthermore, the combination of modest profitability, high leverage for some firms, and uneven disclosure practices, underscores the need to investigate whether and how sustainability reporting contributes to financial performance in this context. By addressing these gaps, the present study provides empirical insights into the dynamics of profitability, firm characteristics, and sustainability disclosures in an emerging market setting.

4.2 Diagnostic Tests

Since the data exhibit time series and cross-sectional attributes, the study opted to apply the panel data regression technique. It checked the existence of the heteroscedasticity problem, cross-sectional dependency, and serial correlation. The null hypothesis is that there is no heteroscedasticity problem, cross-sectional dependency, or serial correlation, respectively. Table 2 presents the results. From Table 2, it's observed that panel-level heteroscedasticity and cross-sectional dependency were observed, as the p-value of the chi-squared statistics was not greater than 0.05. Consequently, the study used the FGLS estimation as recommended by Cameron and Trevidi [40] to address the problem.

Table 2. Results of diagnostic test

Test	Chi-Square	p-Value	Remark
Wald test for groupwise heteroscedasticity	7074.90	0.0000	Reject Null Hypothesis
Pesaran's test of cross-sectional independence	6.582	0.0000	Reject Null Hypothesis
Serial Correlation (Wooldridge, Test)	0.153	0.7026	Accept Null Hypothesis

4.3 Results of Regression Analysis

This section presents the empirical results derived from the regression equations formulated for the study.

Table 3 presents the results, indicating that the coefficient for GHG stands at 14.39358 (p = 0.000). This result suggests a positive association between GHG and the dependent variable, and it is statistically significant at the 1% level. This indicates that companies that implement more effective strategies for managing their GHG emissions are likely to achieve superior returns on equity. Accordingly, hypothesis 1, which states that "there is no significant relationship between GHG reduction disclosure and ROA of consumer goods firms in Nigeria," is not supported.

The coefficient for waste management (WSTM) is 0.1982007 (p = 0.0000), which is positive and highly significant at the 1% level. This suggests that waste management activities are associated with enhanced shareholder returns.

Accordingly, hypothesis 2, which states that "environmental waste management disclosure is not significantly associated with financial performance of consumer goods firms in Nigeria," is not supported.

The coefficient for water reduction disclosure (WATM) is -14.87406 (p = 0.000), which is negative and statistically significant at the 1% level. By this result, there is insufficient statistical evidence to support hypothesis 3, which states that water consumption reduction is not significantly related to the financial performance of consumer goods firms in Nigeria.

Table 3. Regression results

ROE	Coef.	Std. Err.	z	p-Value
GHG	14.39358	0.071232	202.07	0.000
WASTM	0.1982007	0.0338692	5.85	0.000
WATM	-14.87406	0.0712865	-208.65	0.000
FSZ	0.032754	0.0133375	2.46	0.014
FLEV	0.0969796	0.0169761	5.71	0.000
Year effect	Yes	Yes	Yes	Yes
Cons	-9.220504	0.2753955	-33.48	0.000
Model Summary				
Number of obs: 169				
Number of groups: 13				
Time periods: 13				
Wald chi2(17): 1183111				
Prob > chi2: 0.0000				

In the case of control variables, firm size (FMSZ) has a coefficient of 0.032754 (p = 0.014), which is positive and significant at the 5% level. This suggests that larger firms tend to have higher ROE, which may be due to scale economies, stronger market power, or resource availability that allows them to absorb environmental costs more effectively [41]. While financial leverage (FLEV) has a coefficient of 0.0969796 (p = 0.000), which is positive and statistically significant. This suggests that in this sample, capital structure does strongly affect shareholder returns once environmental practices are considered.

The robust regression results indicate that GHG management exerts a positive and significant effect on ROE, suggesting that proactive environmental practices enhance shareholder value. Similarly, waste management disclosure (WSTM) is positive and significantly associated with ROE, reflecting cost savings and gains available in the circular economy. Water management disclosure (WATM) is significant but negative, showing the financial burden that may arise from water management as stakeholders will resist water reduction. Overall, the findings highlight that environmental responsibility—especially GHG reduction and waste management—positively contributes to shareholder wealth, as they are consistent with stakeholders' interests.

4.4 Discussion of Findings

The findings from the analytical model provide important insights into the relationship between environmental practices and firm performance in the Nigerian consumer goods sector. First, the positive and significant relationship between GHG management and profitability supports the view that environmental responsibility enhances shareholder value, possibly through efficiency gains, innovation, and reputational benefits [42, 43]. This is consistent with Clarkson et al. [44], who showed that proactive carbon management enhances both accounting- and market-based performance, and with the findings of Gregory [26], who reported a negative relationship between the level of GHG and firm value, suggesting that reduction in GHG emissions will lead to increased profitability. The Nigerian evidence reinforces this trend: environmental performance positively impacts financial outcomes [10, 45]. These findings suggest that, in line with stakeholder theory, Nigerian firms that align with global environmental standards and regulatory frameworks—such as the Nigerian Exchange Group's Sustainability Disclosure Guidelines and the IFRS/ISSB roadmap [46]—gain legitimacy and trust, which translates into improved operational efficiency and shareholder value.

Waste management also shows a notable positive impact on ROE. The expenses tied to regulatory waste treatment may result in higher operational costs for companies in the short run [47], which could decrease short-term profitability. However, in the long run, the firm could benefit from cost savings available in the circular economy and the link between innovativeness and profitability. Gull et al. [27] reported a significantly positive association between waste recycling and corporate performance, suggesting that firms actively engaged in waste management are able to obtain better financial performance. Effective waste management also affects future financial performance [48]. From the lens of stakeholder theory, this suggests that despite the financial costs introduced by environmental actions, firms

creating waste management approaches that are consistent with stakeholders' expectations will reap reputational gains and obtain the benefits in the circular economy, which translates to increased profitability.

Water management shows a significant negative impact on profitability in the consumer goods industry in Nigeria. Water reduction is generally a good strategy, as it reduces operational risks and benefits communities sharing water resources with industrial firms. A number of firms in Nigeria adopt strategies to manage the water stress in communities sharing water resources with them. The negative coefficient of WATM could be because in Nigeria firms are responsible for providing water for their operations. A reduction in the quantity of water a firm generates could constrain production. Residents from host communities to the firm usually obtain water free of charge from firms. This is seen as part of CSR. Therefore, managing water so as to reduce its availability could elicit negative reactions from host communities. Such a reaction could manifest in residents blocking the gates of firms or disrupting the operational activities of firms. The negative impact could also possibly be due to limited cost savings or longer payback periods [49]. Also, water management can have some adverse, unintended consequences for industrial firms and host communities. One such consequence is that as water usage is reduced, there will be an increase in the volume of effluent and in the concentration of pollutants [34], which will in turn negatively affect profitability.

The control variables further illuminate firm-specific dynamics. Firm size is positively associated with ROE, suggesting that larger firms are better positioned to convert sustainability initiatives into shareholder value. This supports the resource-based view [50] and aligns with the basic understanding that larger firms possess more resources that can be deployed to manage environmental challenges and resources. Larger firms can effectively communicate their sustainability performance to capital markets and gain greater market valuation, but smaller firms may struggle to achieve similar reputational or financial benefits. Leverage exerts a significant and positive effect on ROE, underscoring the fact that increases in creditors—salient stakeholders in financially constrained environments—may restrict managerial opportunism to the benefit of the entity.

Overall, the results underscore a dual narrative. On one hand, GHG management generates tangible financial benefits, reflecting the convergence of stakeholder expectations and disclosure regimes that reward firms for addressing climate risks. Waste management is also positively associated with profitability, possibly because of the cost savings involved in the circular economy and other financial benefits that may arise therefrom. On the other hand, water management is negatively associated with profitability, possibly because of the high cost of water provision in water-stressed communities in Nigeria sharing water resources with firms and the adverse environmental consequences of reducing volume in communities ravaged by environmental pollution. The role of firm size and leverage further reveals that firm characteristics may affect the degree to which stakeholder pressures translate into financial outcomes. By evaluating Nigerian evidence, this study challenges the stakeholder theory as it presents evidence that managing environmental variables to coincide with stakeholder expectations may not always support the financial performance of the company.

5 Conclusions

This study examined the relationship between environmental practices and firm performance in the Nigerian consumer goods sector from 2012 to 2024 using FGLS regression to overcome the problem of heteroscedasticity and autocorrelation, as well as provide more robust parameter estimates. The results provide several important insights. First, the positive and significant effect of GHG management on ROE lends support to the view that proactive environmental responsibility can generate measurable financial benefits.

Second, the positive and significant relationship between waste management and firm performance underscores the benefit of the circular economy in the consumer goods industry and leads to the recommendation that governments at all levels and regulators should embrace and develop the circular economy in Nigeria.

Third, the negative and significant relationship between water management and firm performance points to the severity of water stress in Nigeria, and the fact that investments to effectively manage water resources will take a long time to break even. Efforts to provide water and reduce water stress in host communities must continue to cater for host community needs and reduce suffering. Government at all levels should reactivate moribund public water facilities to assist the society in addressing the financial burden of water provision and conservation in Nigeria.

Put together, disclosing environmental sustainability performance, such as GHG emission reduction, waste reduction, and water consumption reduction, is crucial for environmental sustainability and the long-term profitability outlook of consumer goods manufacturing firms in Nigeria. GHG reduction creates tangible financial benefits, waste management creates similar benefits, possibly by shifting from compliance to innovation, and tapping the benefits of the circular economy. Water management strategies, on the other hand, must be better aligned with industry realities to gradually reduce their negative impact on profitability.

Innovative strategies to benefit from water management should be considered and implemented in host communities. Investments in GHG reduction, waste management, and water management should be disclosed in five-to-ten-year health, safety, and environmental performance reports in the annual financial statements of all con-

sumer goods manufacturing companies. This will scale up environmental responsibility and increase stakeholder awareness of corporate investments in the environment.

Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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