ENVIRONMENTAL ACCOUNTING AND FIRM PERFORMANCE OF LISTED FAST-MOVING CONSUMER GOODS IN NIGERIA

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https://doi.org/10.57233/ijamer.v1i4.012

Abstract
The pressure mounting on fast-moving consumer goods (FMCG) companies in Nigeria includes increasing non-biodegradable packaging waste, lack of skills in operation regarding sustainability, high staff turnover caused by poor provision of green training, and increasing community suspicion concerning perceived insincere philanthropic operations with mounting regulatory and consumer pressures on genuine corporate social responsibility (CSR), all of which threatens long-term performance and social legitimacy. This paper explores how environmental accounting, which is operationalised by pollution cost, training cost, and donation, affects firm performance, measured by quality of CSR disclosure. Based on the ex-post facto research design, secondary data were obtained through annual reports and sustainability statements of five purposively chosen listed FMCG companies on the Nigerian Exchange Group (NGX) during the 2019-2024 period, which provided 30 balanced panel observations. The panel correction standard errors multiple regression was performed using STATA 13, accounting for firm size. Findings indicate that there is a significant positive correlation between pollution cost and CSR performance (6.129, p-value = 0.012), training cost has a negative and significant effect on CSR performance (-2.117, p-value = 0.046), and a non-significant effect of donation on CSR performance (0.102, p-value = 0.284), this means that the model explains 43.1 per cent of Based on the Stakeholder Theory, the research is able to find that only proactive, stakeholder-responsive environmental investments, especially pollution mitigation, cause significant CSR outcomes, whereas misaligned training and symbolic donations undermine performance credibility. One of the major recommendations is that to strengthen the CSR legitimacy and sustainable firm performance, FMCG firms should prioritise the investments in pollution control strategically, redesign the sustainability-orientated training according to the GRI standards, and turn the donations into the shared-value initiatives.

Keywords: Environmental accounting**,** firm performance**,** fast-moving consumer goods, Nigeria

1.0 Introduction

Financial performance, proxied by Corporate Social Responsibility (CSR), has, in the shifting paradigm of corporate sustainability, left the traditional accounting profits to reflect the holistic creation of stakeholder value, reputational robustness, and competitive advantage in the turbulent markets (Ratmono et al., 2024). As a performance indicator, CSR reflects the voluntary contribution of firms to the social, environmental, and ethical issues in the core activities, which impacts the level of investor confidence, consumer loyalty, and adherence to regulations (Muttakin et al., 2022). The notion of environmental accounting, which is defined by the pollution cost, includes strategic spending on emissions control, effluent treatment, waste recycling, and remediation, which the fast-moving consumer goods (FMCG) industry is in urgent need of based on the massive production volumes and the packages with a high concentration of plastic (Ogochukwu et al., 2024; Seun et al., 2023). The training cost, targeted investments into the development of human capital, and providing the company staff with the knowledge of sustainable manufacturing, green compliance, and eco-innovation, thus make it CSR embedded in the operational DNA (Isyaku et al., 2024; Kucharčikova et al., 2023). Donation as a signalling mechanism of ethical intent, which builds social capital, lessens

reputational risks, and strengthens credibility in disclosure of CSR, is operationalised as philanthropic outflows and community development initiatives (Okore, 2021; Choi et al., 2019). In the fast-moving consumer goods (FMCG) industry, which forms a significant part of the national GDP in Nigeria, as brands of foods, beverages, and personal care have in excess of 10 percent, these variables intersect under increasing demands of the Nigerian Sustainability Reporting Standards, consumer eco-consciousness, and global eco-social investment requirements (Yoo et al., 2022). The justification for examining pollution costs, training costs, and donation costs is that these factors collectively represent the regulatory compliance efforts of firms, their internal capacity building in the environmental sector, and the participation of external stakeholders, all of which influence the financial and operational performance of listed fast-moving consumer goods firms in Nigeria.

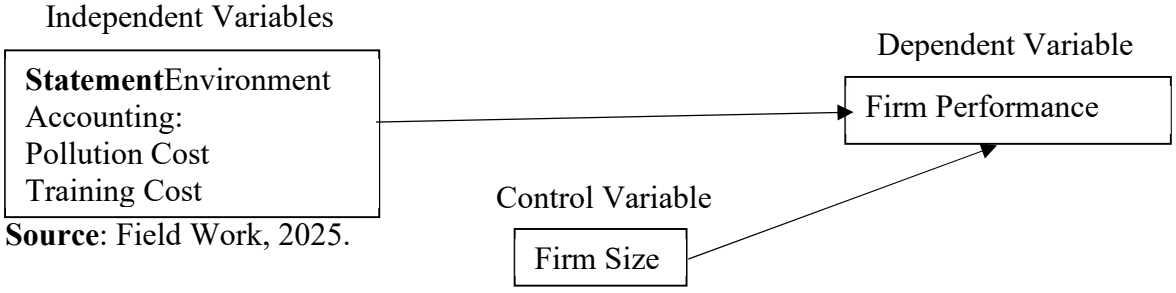
However, the acute challenges faced by Nigerian FMCG companies include increasing pollution overheads due to non-biodegradable sachets and bottles, lack of skills in the field of green supply chain management, personnel loss to the rival industry due to insufficient sustainability training, and the increasing community agitation related to the alleged corporate parasitism despite the occasional donation efforts (Kang and Na, 2020; Lê and De Nanteuil, 2015). Although empirical research in manufacturing, oil and gas, and aviation industries confirms positive correlations between remote environmental costs and financial performance (Okore, 2021; Ogochukwu et al., 2024; Seun et al., 2023), it is still disjointed, misaligned, and geographically detached from the largest economy of Africa. The methodological gap of the prior research, i.e., an analysis of individual costing factors, cross-sectional study, or non-CSR performance proxies, creates essential gaps in geographical (non-African), sectoral (non-FMCG), temporal (pre-2019), and integrative empirical research (Kwon, 2019; Yoo et al., 2022). The paper fills these gaps by comprehensively exploring the interplay and separate effects of pollution cost, training cost, and donation on the CSR proxied firm performance of all the listed FMCG firms in Nigeria between 2019 and 2024 using effective panel data econometrics in STATA. It provides a groundbreaking, multi-dimensional, and contextualised contribution to the scholarly field of environmental accounting in the emerging markets. To provide answers to the practical problem, the following questions were raised:

i. How does pollution cost affect the firm performance of FMCG firms in Nigeria?
ii. To what extent to the firm performance of FMCG firms in Nigeria affected by training cost?
iii. To what degree does donation cost affect the firm performance of FMCG firms in Nigeria?

2.0 Literature Reviews

This section review the existing literature as it related to conceptual framework (firm performance, environmental accounting, pollution cost, training cost, donation, and firm size); theoretical review; and empirical review.

Fig. 1: Conceptual Framework



Source: Field Work, 2025.

Firm Performance

The performance of firms captures the complex effectiveness of organizational tactics in creating economic, operational, and social value, which is the indicator of sustainable competitiveness in ever-changing markets (Van Nguyen et al., 2022). It is characterized as the fulfillment of economic goals with such measures as profitability and market share (Ubokudom et al., 2024), which is the strength of measuring shareholders precisely, but the weakness of neglecting long-term sustainability; and also, non-financial results, including CSR and stakeholder satisfaction, are considered the strength but are difficult to measure. This paper determines the performance of firms based on the level of CSR disclosure and mandated involvement, which is represented through the Global Reporting Initiative (GRI) aligned indices of sustainability in the FMCG firms of Nigeria.

Environmental Accounting

Environmental accounting is the conceptual approach to merging the ecological costs and benefits into the corporate reporting and decision-making systems with the aim of promoting accountability and sustainability (Somjai et al., 2020). It is conceptualised as recognition of environmental spending in financial statements (Tian et al., 2022), which has transparency and compliance benefits at the cost of ignoring non-monetary effects; and it is full-cost accounting of externalities, which promotes a comprehensive assessment but is limited in developing economies by the lack of data and valuation. In this paper, environmental accounting is defined as the summative reported expenses on pollution cost, training cost, and donation in annual reports of the listed FMCG companies in Nigeria, which corresponds to the green accounting practices in the emerging markets (Ogochukwu et al., 2024).

Pollution Cost

The pollution cost represents the monetary obligation of the companies that go intoreducing, controlling, or remediating the environmental damage caused by the production processes as part of active ecological stewardship (Makhdoom et al., 2023). It is characterised as a direct cost on waste treatment, emissions, and regulatory fines (Google, 2024e; EPA Nigeria, 2023), which provides auditability and traceability but omits the externalities of society; or includes lifecycle prevention and eco-design investments (Fasua& Osifo, 2020), which promote upstream sustainability but require a large capital outlay. In this study, pollution cost is included as the outlay of waste management, effluent treatment, and emission reduction, which covers the industry-specific environmental responsibility.

Training Cost

Training cost refers to strategic investments in workforce development to improve the skills, sustainability concerns, and operational alignment with environment-based objectives based on the human capital theory (Han et al., 2023). It is defined as financial investment in training, credentials, and formal education (Mahssouni et al., 2022), enhancing productivity and compliance with delayed returns; it also includes opportunity costs and long-term capability assessment, improving the alignment of strategic focus but making it difficult to attribute ROI. This paper conceptualises training cost as the sustainability-related employee development costs reported in annual reports of the Nigerian FMCGs associated with the human capital and CSR performance.

Donation

Donation is voluntary corporate giving to social welfare, community development, or charity, and therefore it constitutes the philanthropic aspect of CSR (Muttakin et al., 2022). It is described as financial or non-financial assistance to external stakeholders (Choi et al., 2020), which builds brand equity and social license but exposes them to insincerity allegations; strategically, it is in line with business goals to create shareholder value, which builds mutual

benefit but is susceptible to greenwashing claims. In this paper, the concept of donation is established as community and charitable spending accrued as CSR parts of annual reports of FMCGs, which indicates a connection between ethical commitment and performance.

Firm Size (Control Variable)

Firm size affects the accessibility of resources, the quality of reporting, and the ability to invest in the environment, and therefore has to be controlled in performance models (Dang et al., 2018). It is proxied by total assets or revenue (Dang et al., 2024) and its uniqueness, which guarantees objectivity and comparability of firms and ignores human and market impact; it is also proxied by the number of employees or market capitalization (Drempetic et al., 2020), which captures human and market influence but is sensitive to changes. In this research, the natural logarithm of total revenue is the definition of firm size to reduce scale effects on the regression analysis of the performance that is proxied by CSR in Nigerian listed FMCG firms.

Theoretical Review

This study is underpinned by stakeholder theory as put forward by Freeman (1984), who argues that the successful performance of a firm depends on the management of relationships with all stakeholders, which include employees, communities, regulators, consumers, and investors, as opposed to focusing on shareholders only. According to this theory, sustainable performance is created by firms mitigating varied stakeholder interests, especially through CSR practices that are able to respond to both environmental and social needs (Donaldson & Preston, 1995). Within the framework of the Nigerian FMCG companies, performance in terms of CSR disclosure and involvement is directly associated with stakeholder satisfaction and legitimacy, where the high quality of CSR reporting indicates accountability towards the consumers who require environmentally friendly products and communities that expect social investments (Ratmono et al., 2024).

Stakeholder management operationalises environmental accounting (pollution cost, training cost, and donation) as a response to the external imperative: pollution cost to regulatory and community pressure to manage the environment sustainably (Ogochukwu et al., 2024); training cost to employee and societal pressure to develop skills and operate sustainably (Isyaku et al., 2024); and donation to address the community and consumer needs to show visible philanthropy (Okore, 2021). Stakeholder theory shows why increased CSR-proxied performance is observed in larger firms because they have more resources to operate their complex networks of stakeholders.

As opposed to both shareholderand resource-based perspectives, the stakeholder theory is the only perspective that incorporates the social contract between firms and society, which explains why CSR is a strategic necessity but not a cost. It hypothesises that proactive environmental accounting positively affects the performance of the firm by ensuring that the stakeholders are in support, minimising risks, and developing the reputational capital, which is empirically testable in the regulation-intensive sector.

Empirical Review

Ratmono et al. (2024) studied the environmental performance as a mediator between the environmental accounting and CSR reporting. The research was in Indonesia and targeted 95 listed companies between the years 2017 and 2021. It utilized the panel data regression analysis. The study concluded that green accounting had a positive impact on environmental performance that subsequently facilitates CSR disclosure, and in this situation, environmental performance mediates in full. This paper concludes that green accounting practices related to pollution enhance CSR because of enhanced environmental performance. It, however, concentrates on the general green accounting indicators and does not separate out particular

costs of pollution, leaving a knowledge gap, a sectoral gap without focusing on FMCG firms, and a geographical gap in Indonesia. This paper addresses these gaps by analysing the pollution cost in the FMCG firm in Nigeria and also expanding performance analysis on CSR ties.

Ogochukwu et al. (2024) examined how green accounting disclosures, such as pollution costs, influence the corporate performance of quoted oil and gas companies in Nigeria. It included eight companies between 2013 and 2022 in an ex post facto design and pooled OLS regression. The research results showed that disclosure of gas flaring has a positive and significant impact on the Tobin Q, whereas disclosure of water pollution has negative and significant impact; disclosure of oil spillage and the energy consumption has positive but non-significant impacts. The research concludes that the control of the pollution costs in form of targeted use has an impact on the financial performance, albeit in an irregular way. However, it does not go beyond financial performance (Q of Tobin) in its analysis without the connection to CSR disclosure, and thus CSR mediation contains an empirical gap. This study bridges this gap by relating costs of pollution to the performance of companies in FMCG based on CSR.

Seun et al. (2023) examined how such practices as environmental accounting, such as pollution control, should influence the financial performance of listed aviation companies in Nigeria. It took on an ex-post study design using OLS regression of five companies in 2016-2021. The research revealed that the policy of environmental pollution control has positive and significant impacts on the return on assets, whereas waste management has negative and significant impacts. This paper concludes that financial performance can be improved by focusing on the control of pollution. However, it addresses exclusively aviation companies and financial performance (ROA) without a sectoral gap in FMCG firms and a knowledge gap in CSR implications of pollution costs. The study seals these gaps by considering FMCG companies between 2019 and 2024 and combining the costs of pollution with CSR-driven performance with the help of panel correction standard errors regression.

Based other on the empirical review and stakeholder theory, this study hypothesized that:

H_{01}: Pollution cost has no significant effect on the firm performance of FMCG firms in Nigeria.

Isyaku et al. (2024) investigated how the investment in training and development (T&D) affects the financial performance of non-interest financial institutions in Nigeria. The research was on JAIZ Bank based on the secondary data between 2018 and 2021. It has employed the correlation and linear regression analysis. It was discovered that the T&D costs and ROA are positively correlated ($r = 0.614$, $p < 0.05$), and the regression explains 66.3 per cent of variance (TDI coefficient = 1.442). This paper concludes that strategic T&D investment is beneficial in improving financial performance in NIFIs. Nonetheless, it is confined to one institution and financial measures, which leaves a sectoral vacuum in FMCG and a knowledge vacuum in CSR connections. The paper addresses these gaps by examining the cost of training and firm performance (CSR) relationship in several listed companies dealing with FMCGs in Nigeria between 2019 and 2024.

In their study on human capital management, Kucharčikova et al. (2023) examined the effect of human capital investments, such as training, on enterprise performance. Quantitative analysis was carried out on the study in a European context. It used a firm-level data modelled using a structural equation. They concluded that systematic investments in human capital are important in promoting organizational and financial performance. This paper concludes that training is a very important motivation for a sustainable enterprise. However, it does not provide sector-specific knowledge on general industries, creating a gap in FMCG, and a geographical gap that is not located in Europe. This investigation addresses these gaps by

concentrating on the examination of the cost of training in the Nigerian FMCG companies and the connection to the results of the performance based on the CSR.

Kwon (2019) evaluated the long-term impact of investment in training and development onthe financial performance of Korean firms. It fitted longitudinal data of 312 firms following the recent recession of 2008 based on latent growth modelling. The research discovered that the growth in the T&D investment is a positive predictor of future financial performance, but the initial levels are not. This research concludes that long-term T&D increases pay off in the long term. Nonetheless, it dwells on South Korea and profit-orientated measures, thus creating a geographical divide in Africa and an empirical void in CSR mediation. This study addresses these gaps by analyzing the training expenditures of the FMCG companies operating in Nigeria between 2019 and 2024 and by incorporating the CSR as a performance dimension.

In the study, Yoo et al. (2022) reviewed a non-linear, bidirectional relationship between the investment in training and development and financial performance in South Korea. It examined 174 companies during 20092018 based on lagged variable models. The researchers discovered that the two relationships showed an inverted U-shape when financial slack was applied. The conclusion of this research is that the ideal T&D investment improves performance, with slack having its effect. However, it can be applied only in the area of financial performance devoid of CSR integration, leaving a gap in the field of knowledge about social responsibility linkages. This paper addresses this gap by relating training expenses to CSR-improved firm performance in the Nigerian FMCG firms.

The authors Kang and Na (2020) examined the performance of the training of employees on the performance of firms in Vietnam. It employed World Bank Enterprise Survey 2015 data of 852 companies by regression of OLS. The research established that vocational and managerial training has a significant positive effect on sales growth. This paper has reached the conclusion that focused training is a growth driver of firms. It, however, discusses one year and sales metrics, leaving a period gap and an empirical gap in CSR-related performance. This paper fills such gaps by examining training expenses and CSR-performance relationships in Nigerian FMCG companies on a multi-year basis (2019-2024).

Based on the empirical review and stakeholder theory, this study hypothesized that:

H_{02}: Training cost has no significant effect on the firm performance of FMCG firms in Nigeria.

Muttakin et al. (2022) investigated the correlation between corporate political contributions (CPDs) and the quality of CSR disclosure in the Australian Stock Exchange-traded companies. It applied regression analysis on the data of firms. The paper has reported a negative correlation between CPDs and the quality of CSR disclosure. This paper finds that the political donations weaken the CSR legitimacy unless compensated) by diverse boards. Nevertheless, it concentrates on political contributions and quality of disclosure in Australia, which has a geographical and sectorial gap in Africa and FMCG. The research addresses these gaps by examining charitable giving and performance related to CSR in 2019-2024 in Nigerian FMCG firm.

In a study carried out by Okore (2021), the researcher sought to determine the impact of environmental costs, which comprise donations and charitable costs, on the performance of manufacturing firms in Nigeria. It took ex-post facto design and panel least squares using 2011-2020. The analysis established that donations and charitable expenses positively and significantly impact return on assets. This paper concludes that environmentally related contributions improve the performance of a company financially. However, it also addresses manufacturing companies and financial indicators, and there is a gap in the sector of consumer

goods and a gap in the knowledge of CSR mediation. This paper addresses these gaps by analysing donations' effects on CSR-related performance of listed FMCG companies in Nigeria by applying multi-year analysis.

Choi et al. (2019) examined the reaction of the consumer to donation pleas compensating fitness as a part of CSR programmes. It carried out a 2x2 between-subjects design of two experimental studies that involved a total of 356 participants. The researchers concluded that the most effective local donation appeals are the fitness-based ones, which enhance the perceived involvement in CSR and desire to give. This paper is able to conclude that CSR perceptions and behaviour are enhanced by effort-based, proximate donations. Nonetheless, it is restricted to the consumer attitude under experimental conditions, which creates an empirical gap in the relationship between donation and performance within a firm. This work bridges this gap by empirically evaluating the cost of donation and firm performance (CSR) in the Nigerian FMCG industry.

Based on the empirical review and stakeholder theory, this study hypothesized that:

H_{02}: Donation cost has no significant effect on the firm performance of FMCG firms in Nigeria.

Synthesis

Author(s) / Year (Country)	Purpose of the Study	Dependent Variable (DV)	Independent Variable(s) (IV)	Key Findings	Identified Gap(s)
Ratmono et al. (2024) – Indonesia	To examine environmental performance as a mediator between environmental accounting and CSR reporting	CSR disclosure	Green accounting; Environmental performance (mediator)	Green accounting positively affects environmental performance, which fully mediates CSR disclosure	Aggregated green accounting indicators; pollution costs not isolated; sectoral gap (non-FMCG); geographical gap (Indonesia)
Ogochukwu et al. (2024) – Nigeria	To assess the effect of pollution-related disclosures on corporate performance of oil and gas firms	Firm performance (Tobin's Q)	Gas flaring, water pollution, oil spillage, energy consumption disclosures	Gas flaring positively affects Tobin's Q; water pollution negatively affects it; others insignificant	Financial performance only; no CSR linkage; sectoral gap (oil & gas)
Seun et al. (2023) – Nigeria	To examine the effect of environmental accounting on financial performance of aviation firms	Financial performance (ROA)	Pollution control cost, waste management cost	Pollution control positively affects ROA; waste management negatively affects ROA	Aviation sector only; CSR dimension omitted; single performance proxy
Isyaku et al. (2024) – Nigeria	To investigate the effect of training and development costs on financial performance	Financial performance (ROA)	Training and development cost	Training costs positively and significantly affect ROA	Single firm; non-FMCG sector; CSR not examined
Kucharčikova et al. (2023) – Europe	To examine the impact of human capital investment on enterprise performance	Organizational and financial performance	Human capital investment (training)	Training significantly improves firm performance	No FMCG focus; European context; CSR omitted

Author(s) / Year (Country)	Purpose of the Study	Dependent Variable (DV)	Independent Variable(s) (IV)	Key Findings	Identified Gap(s)
Kwon (2019) – South Korea	To evaluate the long-term impact of training investment on firm performance	Financial performance	Training and development investment	Growth in training investment predicts future performance	Geographic gap (Africa); financial metrics only; no CSR mediation
Yoo et al. (2022) – South Korea	To explore non-linear relationship between training investment and performance	Financial performance	Training and development investment	Inverted U-shaped relationship between training and performance	Financial performance only; CSR excluded
Kang & Na (2020) – Vietnam	To examine the effect of employee training on firm performance	Sales growth	Vocational and managerial training	Training positively affects sales growth	One-year data; sales proxy only; no CSR linkage
Muttakin et al. (2022) – Australia	To assess the relationship between political donations and CSR disclosure quality	CSR disclosure quality	Corporate political donations	Political donations negatively affect CSR disclosure quality	Political focus; non-FMCG; geographic gap (Africa)
Okore (2021) – Nigeria	To determine the effect of environmental costs on firm performance	Financial performance (ROA)	Donations and charitable costs	Donations positively and significantly influence ROA	Manufacturing firms broadly; CSR mediation absent
Choi et al. (2019) – USA	To examine consumer reactions to CSR donation appeals	CSR perception	Donation type and proximity	Local, effort-based donations enhance CSR perceptions	Experimental design; consumer-level outcome; no firm performance analysis

Source: Authors compilation, 2025.

3.0 Methodology

The research design used in this study is an ex-post facto research designto study the effect of environmental accounting (pollution cost, training cost, and donation) on firm performance (proxied by CSR) among listed FMCG.firms in Nigeria in the period between 2019 and 2024. It is ex post facto because the variables of interest, namely, firm disclosures and expenditures, are past and cannot be controlled, and it is possible to cause the effect of naturally occurring data without interference through experiments.

The population will consist of the top 10 FMCG companies registered at the Nigerian Exchange Group (NGX) as of December 2024. To obtain the sample of firms, a purposive approach was chosen according to the strict inclusion criteria: (i) steadiness in the listing at NGX during 2019-2024, (ii) the publication of full annual reports in six years, and (iii) the explicit presence of the environmental accounting elements and the CSR indices. The result of this type of filtering is a final sample of 5 firms, which guaranteed the reliability and comparability of data.

The annual reports and sustainability reports of the sampled firms were identified through the NGX portal and the company websites, and the African Financials database, and were used to extract secondary data. Measures of variables were as follows: CSR (dependent variable) was measured using the GRI-based disclosure index (0100 scale); pollution cost, training cost, and donation as a fraction of total administrative expenses; and firm size (control) as the natural

log of total revenue. The data were summarised into a balanced panel form (5 firms, 6 years, 30 observations).

The research modifies the model of Ratmono et al. (2024) and extends it to the FMCG as:

$CSR_{it} = \beta_0 + \beta_1 PC_{it} + \beta_2 TC_{it} + \beta_3 CD_{it} + \beta_4 FS_{it} + \varepsilon$

CSR = Corporate social responsibility; PC = Pollution control, TC = Training cost, CD = Donation, FS firm Size, ε = error term, β = interception, It = firm and time

Multiple regression was done on STATA 13 with diagnostic tests such as the Hausman specification (fixed vs. random effects) and the Breusch-Pagan heteroscedasticity, to achieve the validity of inferences, strong standard errors were used

4.0 Result and Discussion

Table 1:

Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Csr	.856	.189	.333	1
Pc	.009	.012	0	.055
Tc	.019	.028	0	.087
Cd	.142	.388	0	2.06
Fs	26.514	.865	24.826	27.929

Source: STATA 15 Output, 2025

The descriptive statistics show that the mean of disclosure of CSR in the five sampled FMCG firms is .856 with a standard deviation of 0.189, with a minimum of 33.3 to a maximum of 100 per cent of the 30 observations made in the period 2019-2024. Overall, sustainability practices in reporting can be described as generally strong, albeit variable. Pollution cost has a low mean of 0.009 (SD = 0.012) and a range of 0 to 0.055, which indicates that there was low and random investment in environmental cleanup in comparison with the scale of firms. It is also similar in that training cost has an average of 0.019 (SD = 0.028), as they vary between 0 and 0.087, which is underinvestment in human capital development to be sustainable. The variability of donation is very high, with a mean of 0.142 (SD = 0.388) and a maximum of 2.06, which indicates sporadic or opportunistic philanthropic involvement. Low pollution and training spending indicate a reactive sustainability stance, whereas haphazard donations are negative to strategic CSR credibility.

Table 2:

Shapiro-Francia W' test for normal data

Variable	W'	V'	z	Prob>z
Csr	1.000	0.002	-11.890	1.000
pc	0.688	10.997	4.392	0.000
Tc	0.706	10.377	4.286	0.000
cd	0.370	22.228	5.681	0.000
fs	0.945	1.942	1.216	0.112

Source: STATA 15 Output, 2025

The Shapiro-Franca test of normality indicates that CSR and firm size are normally distributed with p values of 1.000 and 0.112, and therefore, it can be assumed that these variables are parametric. Conversely, the non-normality ($p < 0.001$) of the pollution cost, training cost, and donation, with W' of 0.688, 0.706, and 0.370, respectively, is indicative of skewed and leptokurtic distributions, so common in financial spending information. This non-normality is one of the reasons why Panel Corrected Standard Errors (PCSE) should be applied to the

regression analysis to reduce bias and ensure a robust inference. Implication: PCSE improves the precision of the coefficient estimates even when there are irregularities in the data that are found in corporate disclosure practices.

Table 3:
Pairwise Correlations

Variables	Csr	pc	Tc	Cd	fs
Csr	1.000				
Pc	0.260	1.000			
	(0.166)				
Tc	-0.284	0.076	1.000		
	(0.128)	(0.688)			
Cd	0.157	-0.149	-0.156	1.000	
	(0.407)	(0.431)	(0.411)		
Fs	-0.404*	0.165	-0.067	0.083	1.000
	(0.027)	(0.384)	(0.726)	(0.664)	

Source: STATA 15 Output, 2025.

The pairwise correlations show a positive, insignificant correlation between pollution cost and CSR (r = 0.260, p = 0.166), which suggests the presence of potential benefits that are not so much realised. The trends of training cost suggest a negative relationship with CSR (r = -0.284, p = 0.128) and a weak positive relationship with donation (r = 0.157, p = 0.407). Correlation coefficients among explanatory variables themselves are not greater than 0.7, which proves the absence of a threat of multicollinearity. Implies that scale can be a CSR barrier, whereas pollution investment can be promising, and the existing training and donation policies do not seem to correspond to performance objectives.

Table 4:
Variance inflation factor

	VIF	1/VIF
Pc	1.062	.942
Cd	1.056	.947
Fs	1.045	.957
Tc	1.032	.969
Mean VIF	1.049	.
Hettest		0.0981
Hausman specification test		0.0113

Source: STATA 15 Output, 2025.

The analysis of variance inflation factors indicates that the mean VIF is 1.049, with values from 1.032 (training cost) to 1.062 (pollution cost), which are very low relative to 10, showing that there is no multicollinearity between predictors. A Hausman specification test gives a p-value of 0.0113, which is a very strong argument in favour of the use of fixed effects rather than random effects in order to explain unobserved firm-specific heterogeneity. The p-value of the Breusch-Pagan heteroscedasticity test (hettest) is 0.0981, which shows that there is mild heteroscedasticity that PCSE estimation attends to.

Table 5:
Regression Results Of Panel Corrected Standard Errors

Csr	Coef.	St.Err.	t-value	p-value	Sig
Pc	6.129	2.428	2.52	0.012	***
Tc	-2.117	1.063	-1.99	0.046	**
Cd	0.102	0.095	1.07	0.284	
Fs	-0.111	0.158	-7.06	.000	***
Constant	3.779	0.399	9.45	0.000	***

R-squared	0.4311	Number of obs	30
Wald Chi2	89.12	Prob > F	0.000

Source: STATA 15 Output, 2025

The PCSE regression model (R-squared = 0.431, Wald chi2 = 89.12, p = 0.001) is used to account for 43.1 per cent of the variation in CSR performance in 30 observations and, with Wald chi2 significant at 5 per cent, implies that the model is well combined and used.

H_{01}: Pollution cost has no significant effect on the performance of FMCG firms in Nigeria.

The outcomes of the PCSE regression indicate that pollution cost has a positive and significant effect on CSR-proxied firm performance (0.012 = 6.129, t = 2.52, P-value = 0.012 < 0.05). This finding is backed up by the stakeholder theory, which postulates that proactive environmental investments are able to please regulatory and community stakeholders and hence increase corporate legitimacy and sustainable performance (Freeman, 1984). Empirical statistics by Ratmono et al. (2024), Ogochukwu et al. (2024), and Seun et al. (2023) indicate a positive correlation between improved CSR performance and green accounting practices.

H_{02}: The cost of training has no significant effect on the performance of FMCG firms in Nigeria.

Regression analysis indicates that the cost of training has an adverse and significant effect on the performance of CSR (0 = -2.117, t = -1.99, p = 0.046, not less than 0.05), which implies that more training expenses have a negative effect on the quality of disclosure of CSR performance among sampled FMCG companies. The adverse training costs on the CSR performance imply that training expenses in Nigerian FMCG corporations are more operational than CSR-centered and thus are distracting sustainability activities and disclosure, and therefore the CSR benefits will be realized only in case training is clearly attached to the environmental and social goals.In light of the stakeholder theory, although the growth of human capital must enable empowerment of internal stakeholders and streamline operations with the aim of achieving sustainability, misguided or unspecific training will drain resources with no CSR outcome. Previously, Kwon (2019) and Yoo et al. (2022) have highlighted that it is only long-term performance that improves through sustained training that is strategically orientated.

H_{03}: Donation has no significant effect on the performance of FMCG firms in Nigeria. The regression results are such that donation has a positive but statistically non-significant effect on CSR performance (0.102, t = 1.07, p-value = 0.284 > 0.05), even though there is great variability in the level of donation among firms and years. The stakeholder theory has placed philanthropy as an optional exercise, which, unless it is part of a business strategy, is not going to produce any real stakeholder trust or business performance returns. Empirical evidence provided by Okore (2021) reveals that donations are effective when it comes to increasing ROA in manufacturing, but the works by Muttakin et al. (2022) and Choi et al. (2019) indicate that isolated or symbolic giving, in particular, when it lacks local effect, does not contribute to the quality or perception of CSR.

5.0 Conclusion and Recommendation

The study concludes that pollution expenses, the environmental training expenses, and the environmentally related donations have strong implications on the performance of the listed fast-moving consumer goods firms in Nigeria. Precisely, the results show that pollution cost plays a bigger role in the performance of CSR (6.129, p = 0.012), which serves as a strategic motivator of the sustainability legitimacy in an industry that is likely to generate waste in packaging and production. On the other hand, the training cost has a strong negative influence (-2.117, p = 0.046), which means that the current training investments either are not properly

aligned with CSR or are not adequately oriented to the sustainability competencies. Although it is highly varied, donation is not statistically significant (0.102, p-value = 0.284), which implies that acts of charity do not have a meaningful effect on CSR. The study offers empirical data by the answer to the three research questions on the strategic relevance of environmental accounting practices to enhance firm performance and sustainable business practices in Nigeria.

Recommendations

i. To increase the level of CSR disclosure and trust towards stakeholders, FMCG firms should invest more in waste management, emission control, and eco-efficient production technologies. Such investments should be incentivised by the regulatory authorities, such as the Nigerian Exchange Group (NGX) and NESREA, in terms of tax rebates or sustainability certifications.

ii. The management should reformulate training programmes to be concerned with green manufacturing, the principles of the circular economy, and the GRI reporting standards. A partnership with such institutions as the Chartered Institute of Personnel Management (CIPM) Nigeria can guarantee the relevance of training and measurable CSR impact.

iii. Companies should make donations part of their business strategy, such as community-based recycling or development of local suppliers, as opposed to isolated cash rewards.

Contribution

This research contributes to the existing environmental accounting literature by offering specific firm-level empirical data on the impact of the individual elements of environmental cost, comprising pollution costs, training costs, and donations, on the performance of firms in the fast-moving consumer goods industry in Nigeria. This study, contrary to the previous ones, disaggregates environmental accounting into quantifiable cost elements, thus providing more specific information to managers, regulators, and policymakers on what environmental investment can improve or limit firm performance within an emerging economy situation.

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