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Environmental Accounting Reporting and the Financial Performance of Oil & Gas Industries in Nigeria

Okafor Fidelis Nwobodo[1], Prof. Robinson O. Ugwoke[2] & Dr. Mrs. Obioma Ugwoke[3]

Abstract

This study investigated Environmental Accounting Reporting and the Financial Performance of Oil & Gas Industries in Nigeria. The specific objectives of the study were to ascertain the impact of environmental remediation costs, environmental pollution prevention costs, and waste management costs on the financial performance of Oil & Gas industries in Nigeria. The study employed an ex post facto research design using panel data. It covered a period of ten years, from 2014 to 2023, with a sample size of ten (10) oil and gas firms. Data were analyzed using multiple regression techniques with the aid of the EViews statistical software package. The findings revealed that environmental remediation costs do not have a significant impact on the financial performance of oil and gas industries in Nigeria. This suggests that expenditures on post-damage environmental repairs or clean-up activities do not materially affect firm profitability in the short to medium term. In contrast, environmental pollution prevention costs were found to significantly and positively influence financial performance, indicating that proactive environmental strategies, such as emission control systems, spill prevention technologies and operational upgrades, yield measurable financial benefits. These investments not only reduce environmental risks and potential fines but also enhance operational efficiency, corporate image and stakeholder confidence. Similarly, waste management costs were observed to have a significant negative effect on financial performance, highlighting the importance of efficient and cost-conscious environmental management practices in reducing financial burdens. The study concludes that the strategic integration of environmental practices into operational and financial decision-making is essential for achieving sustainable financial performance in Nigeria's oil and gas sector. It recommends that firms shift their focus from reactive environmental remediation to proactive pollution prevention and efficient waste management strategies, as these have demonstrated greater financial and environmental benefits. Additionally, regulatory bodies should enforce stricter environmental compliance and ensure that remediation costs accurately reflect the true environmental damage. Firms should also enhance transparency in environmental reporting to build stakeholder trust and support long-term sustainability. Consequently, the study emphasizes that environmental responsibility and financial performance are not mutually exclusive but can be mutually reinforcing when effectively integrated into corporate strategy.

Keywords: *Environmental accounting; Financial performance; Environmental remediation costs; Pollution prevention costs; Waste management costs; Oil and gas industry; Nigeria.*

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Authors	Affiliation
1, 2 & 3	Department of Accountancy, Faculty of Business Administration, University of Nigeria, Enugu Campus, Nigeria

Introduction

Environmental accounting and reporting emerged in response to growing concerns about the environmental impacts of industrial activities and the need for corporate accountability. As firms increasingly contributed to pollution, resource depletion, and climate change, stakeholders began to demand greater transparency regarding environmental practices and costs. This demand was fueled by international environmental agreements, stricter regulations, and rising public awareness of sustainability issues (Gray etal., 2014). One major driver has been regulatory pressure, as governments and international bodies have enacted laws requiring firms to disclose their environmental impacts, such as carbon emissions and waste management practices. For instance, the Global Reporting Initiative (GRI) and the Task Force on Climate-Related Financial Disclosures (TCFD) have established frameworks for environmental disclosures (GRI, 2023; TCFD, 2022). Additionally, investors and consumers are increasingly incorporating environmental, social, and governance (ESG) factors into decision-making, compelling firms to integrate environmental costs into their financial reporting (Sullivan & Gouldson, 2021). Failure to do so may damage corporate reputation or restrict access to capital. Thus, environmental accounting has evolved as a tool to measure, report, and reduce ecological impacts, enabling firms to align with sustainability goals and enhance stakeholder trust.

Globally, environmental accounting and reporting practices, as a branch of accounting, have gained significant acceptance due to their ability to improve organizational financial performance through both financial and non-financial disclosures relating to the use of key natural resources (Adebayo & Adegbie, 2023). Stakeholders are now increasingly interested in the implications of corporate responsibilities and their impacts on the environment. Consequently, environmental accounting and reporting practices are now required globally, like other accounting practices, to align with regulatory and mandatory reporting frameworks. These requirements may be supplemented by voluntary disclosures for corporate image enhancement and risk avoidance. Voluntary environmental disclosure is perceived as a defensive step to avoid negative regulatory and legislative pressures in the future (Obida et al., 2019).

Undoubtedly, environmental accounting has recently developed into a significant area of accounting due to the severity of environmental damage and growing stakeholder concern (Enekwe et al., 2019). However, environmental accounting is not widely recognized or given adequate consideration in some parts of Africa, including Nigeria. Ifurueze et al. (2013) noted that businesses are increasingly focusing on environmental expenses due to rising global environmental awareness and the need for sustainable economic development. They further observed that environmental expenditures have expanded to include worker training, research and development, recycling, and disassembly, in addition to product sustainability and environmentally friendly process design. Hence, there has been increased awareness of the interaction between firms and the environment in which they operate. This awareness has been heightened by concerns over resource depletion, resource scarcity, environmental degradation, and corporate activities that contribute to ozone layer depletion, thereby causing imbalances in the environmental system (Adediran & Alade, 2013). The growing concern over environmental degradation, resource depletion, and the sustainability of economic activities has made environmental accounting and reporting an area of significant interest in Nigeria.

Environmental accounting practices such as environmental remediation costs, pollution prevention and waste management significantly affect the financial performance of oil and gas industries in Nigeria. These industries operate in ecologically sensitive environments, such as the Niger Delta, where the consequences of oil spills, gas flaring, and habitat destruction are profound. Implementing environmental accounting enables firms to identify, measure, and manage environmental costs more effectively, potentially reducing long-term liabilities and enhancing operational efficiency. Environmental remediation costs, including oil spill cleanup and land restoration, directly affect profit margins. However, proactive environmental strategies, such as pollution prevention and effective waste management, can reduce future costs and regulatory penalties. Ezeagba et al. (2017) posited that firms investing in sustainable practices tend to achieve higher levels of stakeholder trust and enhanced market valuation. Although waste management costs and energy efficiency initiatives may initially increase operational expenses, they often improve performance by optimizing resource use and minimizing disruptions. Environmental fines for non-compliance, on the other hand, significantly erode profitability and damage corporate reputation. Therefore, effective environmental accounting serves as a strategic tool for risk mitigation, regulatory compliance and value creation in Nigeria's oil and gas sector (Abiola & Adedoyin, 2021).

Festus and Akinselure (2017) noted that awareness of environmental issues among stakeholders is not new; nevertheless, it has recently received increased scholarly and practical attention. Numerous studies have examined environmental accounting because the demand for companies to adopt environmental accounting practices is now considered critical for environmental preservation and improved organizational performance. Seyitoğulları et al. (2021) submitted that environmental accounting involves pollution prevention and continuous re-evaluation of firms' production processes, which often create opportunities for innovation through strategic process modifications and the recycling of by-products that would otherwise be discharged into the natural environment.

Environmental accounting rules or pollution cost guidelines for communicating information to different stakeholder groups are largely unavailable for Nigerian companies; however, government efforts have been made toward enacting laws to promote environmental sustainability (Olushola, 2020). These include the Environmental Impact Assessment Act (2004), the Environmental Guidelines and Standards for the Petroleum Industry Act (2002), and the National Environmental Standards and Regulations Enforcement Agency Act (2004). Nevertheless, corporate entities that practice environmental accounting often adopt principles derived from the Global Reporting Initiative (GRI) Guidelines. Consequently, environmental accounting information in Nigeria is largely voluntary, which may not sufficiently enhance financial performance. Alhashi et al. (2018) revealed that environmental sustainability reporting information lacks value relevance. Based on this background, this study examines the effect of environmental accounting on the financial performance of oil and gas industries in Nigeria.

Statement of the Problem

Environmental protection has become a global concern, requiring managers to focus attention on the production of biodegradable and recyclable products. However, in many developing nations, the level of understanding and commitment differs, largely due to weak government regulations, inadequate organized pressure groups, and low consumer awareness capable of influencing corporate behavior. Environmental expenditures, when effectively managed, can serve as a viable cost-reduction approach that enhances profitability. Thus, environmental costs provide a framework for linking environmental responsibility with corporate financial performance. The extent to which environmental costs influence firms' financial performance depends on several factors, including community development costs, environmental taxes and fines, training costs, recruitment costs, and canteen costs.

The Nigerian oil and gas industry, while central to the nation's economy, has contributed significantly to environmental degradation through gas flaring, oil spills, and improper waste disposal. Despite growing awareness of environmental sustainability, many firms in the sector continue to treat environmental costs as peripheral to core financial operations. Practices such as environmental remediation, pollution prevention and waste management are often underreported or inconsistently integrated into financial reporting systems. This raises concerns about the true financial health of these firms and the long-term sustainability of their operations. Moreover, the absence of standardized environmental accounting frameworks in Nigeria has resulted in limited transparency and comparability regarding how environmental costs affect corporate performance. Consequently, stakeholders including regulators, investors, and host communities face challenges in evaluating the financial and environmental responsibility of oil and gas firms. Empirical studies examining the relationship between environmental accounting practices and financial performance in Nigeria remain limited and fragmented. Therefore, there is a pressing need to investigate how environmental accounting practices influence profitability, cost efficiency, and reputation management in the industry. Without robust environmental accounting systems, the sector risks regulatory sanctions, stakeholder distrust, and long-term economic unsustainability in an increasingly environmentally conscious global economy.

Environmental accounting provides financial information for both internal and external use. Internally, it generates environmental data to support managerial decision-making related to pricing, overhead control, and capital budgeting. Externally, it involves the disclosure of environmental information of interest to the general public and the financial community. International business activities have increasingly interconnected societies and their environmental outcomes in pursuit of sustainable development. However, environmental challenges often transcend national boundaries and pose serious threats to global ecological wellbeing. The development of effective environmental laws and regulatory frameworks worldwide has helped to redirect economic growth toward environmental sustainability. As financial globalization continues, international financial reporting has become an increasingly important instrument for economic integration.

Over the years, the Nigerian business environment has experienced challenges related to raw material extraction and the exploitation of natural resources, which have progressively degraded the environment. The central problem addressed in this study is the relationship between environmental reporting practices and financial performance in Nigerian oil and gas firms. Specifically, the study seeks to determine the extent of adherence to Global Reporting Initiative (GRI) requirements, environmental accounting reporting standards, and their effects on the financial performance of oil and gas industries in Nigeria.

Objectives of the Study

The main objective of the study is to investigate the impact of environmental accounting reporting on the financial performance of Oil & Gas Industries in Nigeria.

The specific objectives of the study are to:

i. Ascertain the impact of environmental remediation costs on the financial performance of Oil & Gas Industries in Nigeria.
ii. Determine the impact of environmental pollution prevention costs on the financial performance of Oil & Gas Industries in Nigeria.
iii. Assess the impact of Waste management cost on the financial performance of Oil and Gas Industries in Nigeria.

Research Questions

The research questions are:

i. What is the impact of environmental remediation costs on the financial performance of oil and gas industries in Nigeria?
ii. How do environmental pollution prevention costs affect the financial performance of oil and gas industries in Nigeria?
iii. To what extent does waste management costs affect the financial performance of oil and gas industries in Nigeria?

Hypotheses of the Study

The following null hypotheses guided the study:

i. Environmental remediation costs have no significant impact on the financial performance of oil and gas industries in Nigeria.
ii. Environmental pollution prevention costs do not significantly influence the financial performance of oil and gas industries in Nigeria.
iii. Waste management costs do not have a significant effect on the financial performance of oil and gas industries in Nigeria.

Scope of the Study

This study focuses on examining the impact of environmental accounting reports on the financial performance of oil and gas companies in Nigeria between 2014 and 2023. The content scope covers key environmental accounting components, including environmental remediation costs, pollution prevention costs and waste management costs. The geographical scope is limited to Nigeria, where oil and gas activities have significant environmental and financial implications, particularly in the Niger Delta region. The study evaluates how environmental expenditures and reports affect Return on Assets (ROA). By focusing on a ten-year period, the study captures trends and policy shifts in environmental regulation and accounting disclosures within the industry. Ten (10) oil and gas companies listed on the Nigerian Stock Exchange were studied. The companies considered include MRS Oil Nigeria Plc, Oando Plc, Seplat Energy Plc, TotalEnergies Nigeria Plc, Japaul Gold and Ventures Plc, Eterna Oil & Gas Plc, Ardova Plc, Conoil Plc, Mobil Oil Nigeria Plc, and Capital Oil Plc.

Review of Related Literature

Conceptual Review

Environmental Accounting Reporting

Environmental accounting reporting refers to the process through which firms identify, measure, and disclose environmental costs and performance in financial and sustainability reports. According to Schaltegger and Burritt (2022), environmental accounting reporting involves the integration of environmental data into conventional accounting frameworks to support environmentally responsible decision-making. Gray et al. (2019) define it as the systematic approach of disclosing environmental impacts, such as pollution and resource consumption, alongside financial outcomes to improve transparency and accountability. Adekoya and Oboh (2021) emphasize that environmental reporting helps organizations communicate their environmental policies, impacts, and performance to stakeholders, enhancing trust and regulatory compliance. Chukwu and Ezeabasili (2020) describe it as the presentation of environmental activities and expenditures in financial statements to reflect the true costs associated with environmental degradation and conservation. Finally, Yusuf and Olayemi (2023) view environmental accounting reporting as a strategic tool for aligning corporate operations with sustainable development goals, by ensuring the inclusion of environmental liabilities and mitigation measures in corporate disclosures. These perspectives underscore the importance of environmental reporting in ensuring that companies account for their environmental responsibilities while promoting long-term sustainability.

Environmental Remediation Costs

Environmental remediation costs refer to the expenses incurred by firms in restoring polluted or contaminated environments to acceptable conditions. These costs typically arise from the need to comply with environmental regulations, repair ecological damage, or prevent further degradation of natural resources. According to Adegbie and Nwobodo (2020), remediation costs include activities such as soil decontamination, groundwater purification, site restoration, and hazardous waste disposal. They argue that these costs are essential for minimizing long-term liabilities and maintaining regulatory compliance in environmentally sensitive industries, such as oil and gas. Usman and Ibrahim (2022) note that environmental remediation costs are increasingly being recognized as critical accounting items that impact a firm's financial performance. Their study of Nigerian oil firms reveals that remediation expenditures often affect profitability in the short term but contribute positively to corporate sustainability and reputation in the long run.

Environmental Pollution Prevention Costs

Environmental pollution prevention costs refer to the expenditures made by organizations to reduce or eliminate waste and emissions before they are created. These costs are proactive, aiming to avoid environmental degradation rather than responding to it after the fact. According to Okon and Essien (2021), pollution prevention costs include investments in cleaner technologies, employee training, eco-friendly materials, and redesign of production processes to minimize waste. They argue that these costs are essential for oil and gas firms operating in sensitive ecological zones like the Niger Delta, where environmental risks are high. Adewuyi and Jimoh (2022) emphasize that pollution prevention costs should be considered strategic business investments. Their study found a positive relationship between pollution prevention efforts and long-term financial performance in Nigeria's petroleum sector. They maintain that firms that invest in prevention not only reduce regulatory risks but also enhance operational efficiency and corporate reputation.

Similarly, Chukwu and Ezeabasili (2020) highlight that pollution prevention costs play a crucial role in ensuring compliance with environmental laws and international sustainability standards. They observed that companies actively managing pollution risks face fewer environmental fines and enjoy increased trust from investors and host communities. Thus, pollution prevention costs are not only environmentally responsible but also financially beneficial in a competitive and regulation-driven industry like oil and gas.

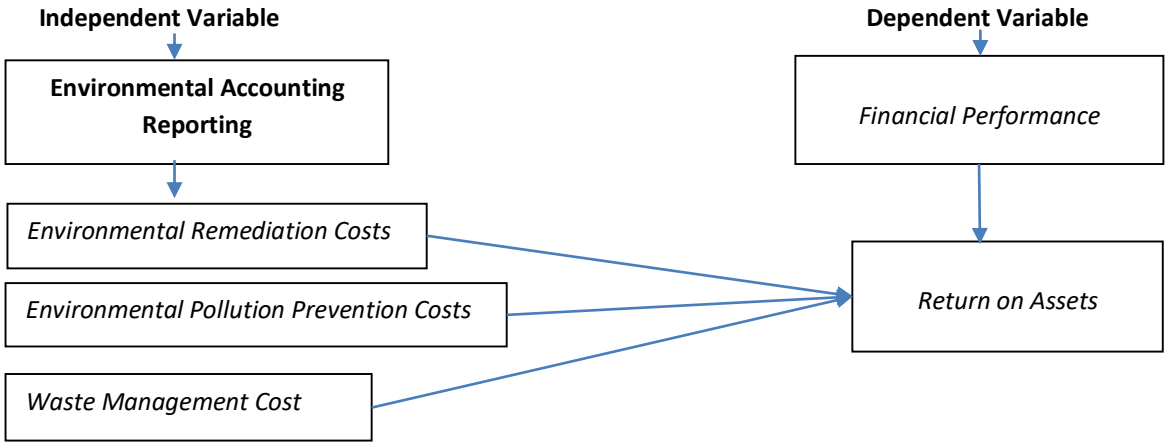
Waste Management Costs

Waste management costs refer to the expenditures incurred by firms to collect, treat, recycle, and dispose of waste materials generated during production or service delivery. These costs are essential for maintaining environmental standards, ensuring regulatory compliance, and promoting corporate sustainability. According to Oladipo and Eze (2021), waste management costs in the oil and gas industry are significant due to the hazardous nature of industrial by-products such as drilling muds, chemical effluents, and gas flares. They assert that effective waste management enhances operational safety and minimizes environmental liabilities.

Agbo and Nwachukwu (2022) highlight that companies that invest in proper waste disposal systems and recycling infrastructure tend to experience improved stakeholder trust and long-term cost savings. They stress that waste management is not merely a regulatory obligation but a strategic tool for achieving environmental performance and competitiveness in global markets. In a related study, Ibrahim and Yusuf (2023) examined waste management costs and financial performance among selected Nigerian oil firms. Their findings reveal a strong correlation between structured waste management programs and reduced legal penalties, operational disruptions, and environmental cleanup costs. They recommend continuous monitoring of waste-related expenses and integration of waste minimization practices in corporate planning. In essence, waste management costs, when strategically managed, contribute significantly to environmental sustainability and improved financial outcomes.

Furthermore, Nwachukwu and Umeh (2023) suggest that environmental fines can incentivize firms to adopt cleaner technologies and enhance their environmental accounting practices. They note that proactive environmental management reduces the likelihood of penalties, thereby improving operational efficiency and corporate social responsibility profiles. In summary, environmental fines play a critical role in regulating industrial behavior, particularly in high-impact sectors like oil and gas. Effective compliance and sustainability strategies are essential to mitigate the risk of such fines.

Figure 1
Conceptual Framework of Environmental Accounting Reporting and Financial Performance



Note. Author's Compilation (2025).

Theoretical Review

This study adopts the Stakeholder Theory as its theoretical foundation to examine the effect of environmental accounting practices on the financial performance of Nigerian oil and gas firms.

Stakeholder Theory was propounded by R. Edward Freeman in 1984 through his seminal work *Strategic Management: A Stakeholder Approach*. The theory challenges the traditional notion that a firm's sole responsibility is to maximize shareholder value, proposing instead that businesses must consider and balance the interests of all parties affected by their operations referred to as stakeholders.

The core assumptions of the theory emphasize that organizations exist within networks of relationships that include shareholders, employees, customers, suppliers, government agencies, communities, and the environment. These stakeholders have legitimate claims on the organization, and their interests should be reflected in corporate decision-making. Value creation is co-produced through interactions with all stakeholders, and long-term business success depends on managing these relationships ethically and effectively. Firms are also assumed to have moral and social responsibilities alongside economic obligations, with legitimacy, trust, and cooperation from stakeholders being essential for sustainable performance.

Stakeholder Theory has evolved into a normative framework, emphasizing fairness, accountability, and inclusive governance. It has been widely applied in environmental accounting, corporate social responsibility, and strategic management, particularly in industries like oil and gas, where external stakeholder interests are strongly impacted.

The theory is highly relevant to this study because it provides a framework for understanding how the interests of multiple stakeholder groups such as host communities, regulators, environmental agencies, investors and employees shape corporate behavior and influence financial outcomes. In Nigeria's oil and gas sector, environmental issues such as gas flaring, oil spills, and poor waste management have caused social unrest and damaged corporate reputations.

Applying Stakeholder Theory, firms are viewed not merely as profit-maximizing entities but as organizations with moral and social responsibilities. Environmental accounting practices such as pollution disclosures, environmental cost reporting, and sustainability audits serve as mechanisms through which companies demonstrate accountability to stakeholders. By integrating stakeholder interests into environmental strategies, firms can build community goodwill, reduce conflicts and litigation, attract socially responsible investors, and ultimately enhance financial performance. Conversely, neglecting stakeholder concerns can lead to reputational risks, regulatory penalties, and loss of investor confidence, negatively affecting profitability.

Thus, Stakeholder Theory supports the study's premise that environmental accounting practices are both ethical imperatives and strategic tools for improving financial performance through effective stakeholder engagement.

Empirical Review

Dan Patrick et al. (2025) explored the green accounting and financial performance of listed Oil and Gas Companies in Nigeria. The study employed unit root testing and descriptive statistics, and it used Panel data regression for the test of hypothesis with the help of E-view statistical software version 9. The study's independent variable is green accounting, as measured by the costs of environmental sustainability, waste management, and environmental cleanup, while the dependent variable is financial performance, as measured by return on capital employed, earnings per share (EPS), and net profit margin (NPM). The study's conclusions showed that there is no substantial correlation between the costs of environmental sustainability, environmental cleanup, and waste management and return on capital invested, earnings per share, and net profit margin. The study came to the conclusion that green accounting influences the financial performance of Nigerian listed oil companies. It suggested that quoted oil and gas companies increase the amount of economic activity related to the environment and disclose this in their annual reports in order to improve their financial performance and long-term corporate sustainability when making investment decisions. Additionally, the government and authorities must to firmly enforce the disclosure of green accounting in oil corporations' annual reports.

Afolabi et al. (2024) evaluated the environmental accounting disclosures and financial performance of listed oil and Gas Companies in Nigeria: An Application of Driscoll-Kraay Standard Errors Approach. We investigated eight oil and gas companies that are publicly traded on the Nigerian Stock Exchange Market (NGX) as of January 17, 2022, from 2011 to 2022. The study employs Driscoll- Kraay standard errors and reveals that environmental accounting had significant effects on returns on assets, earnings per share, and liquidity ratio. The study revealed that the implementation of environmental accounting practices had diverse effects on the performance oil and gas companies in Nigeria. The findings encourage policymakers and stakeholders in the sector to utilize the insights and design more effective regulations and incentives that promote environmental corporate responsibility. Also, valuable insights into the potential benefits and challenges associated with adopting environmental accounting

practices, and influencing the decision-making processes of corporate stakeholders were provided to ensure sustainability in terms of improved financial performance of the oil and gas sector in Nigeria.

Janah et al. (2024) described the implementation of Environmental Accounting at Bumdes Pandawa Jaya in Rengas Pendawa Village which is implemented by Bumdes Pandawa Jaya. This research uses a qualitative method with a descriptive approach. Data collection techniques are carried out by means of observation, interviews and documentation. The research results show that BUMDES Pandawa Jaya has not implemented environmental accounting explicitly but only implemented environmental accounting implicitly through the waste management unit by incurring costs aimed at the environment. The implementation of environmental accounting is not yet optimal because costs incurred on the environment are not clearly detailed in the Bumdes financial reports and are still combined with other expenses. This is because Bumdes still uses a conventional or general accounting system which only classifies Bumdes performance income and expenditure, so that environmental costs are not visible.

Doobee et al. (2024) focused on Green accounting practice and listed oil and gas companies' performance metric in Nigeria. Panel data on different types of green accounting practice and Tobin's Q from 2010-2023 were collected from the Nigerian exchange group, annual report of listed oil and gas companies, and federal inland revenue service pro-mass descriptive statistics, panel unit root test Hausaman Test, Multiple Regression Analysis, Panel Cointegration Test, Pairwsie Panel Causality Test and Error Correction Model Test were used in analyzing the data. The results indicate that green accounting practice significantly relate to Tobin's Q; explain about 83.4% of the total variation in Tobin's Q Green Investment, initiatives, activities were each found to significantly relate to Tobin's Q. The study therefore conclude that green accounting practice has the potency to make significant contribution to performance metric and recommends that oil and gas firms should develop sustainability strategies aligned with their business goals, prioritize green investments with high Tobin's Q, involve stakeholders in decision-making, monitor and measure impact, collaborate with partners, and communicate effectively.

Odum & Arinomor (2023), examined the effect of green accounting cost on return on equity, shareholders' funds, earnings per share, profit after tax, and net profit margin of selected oil and gas companies. The study covered thirteen (13) years from 2020 to 2022. The researchers employed an ex-post facto research design with the aid of the Panel ordinary least square (POLS) and Granger causality techniques to analyze the data. The result of the Granger causality test revealed that green accounting cost has no significant effect on the return on equity, shareholders' funds, earnings per share, and net profit margin of oil and gas companies. Given the findings, the researchers suggested that the management of oil and gas companies in Nigeria should develop a well-articulated environmental costing system to guarantee a conflict-free corporate atmosphere for improved return on equity.

Damieibi (2023) investigated the effect of environmental accounting practices on net profit of quoted oil and gas companies in Nigeria. The study used environmental accounting practices (pollution cost accounting, waste management cost accounting and drainage cost accounting) to represent environmental accounting. The annual audited financial accounts/reports of quoted oil and gas companies in Nigeria for ten (10) years (2012-2021) were used as key data. Multiple regression analysis of ordinary least square estimation was used to test the hypotheses formulated in the study. All the analyses were computed by using statistical package for social sciences (SPSS) version 22.0. The results obtained from the empirical analyses show that that pollution cost accounting has positive significant effect net profit of quoted oil and gas companies; that waste management cost accounting has insignificant effect on net profit of quoted oil and gas companies; and that drainage cost accounting has negative significant effect on net profit of quoted oil and gas companies. The study concluded that environmental accounting practices affects net profit of quoted oil and gas companies; and with a view to nudging oil and gas firms towards organizational transformation, recommends that management of oil and gas companies in Nigeria should pay particular attention to waste management accounting to enhance their operating environment and their net profit.

Charles & Muyiwa (2022) examined the Corporate Social Responsibility and Financial Performance of Family-Owned Companies in Nigeria. The data analysis in the study applied Ordinary Least Squares methods together with descriptive statistics. According to the study, financial success of the chosen companies correlates with the cost of restoration. While health and safety expenditures have a positive and notable impact on the financial performance of the companies, community development costs have the same. The study found that the only expenses related to health and safety would improve the performance of family-owned companies.

Nicholas (2021) investigated the link between environmental accounting and profitability in Nigerian oil and gas companies. The researcher examined secondary data from 2012 to 2017, obtained from these firms' annual reports and accounts, which are available on their websites and on the Nigerian stock market. Regression analysis was used to analyse the data. According to the study's findings, there is no substantial relationship between environmental spending and the net profit of the oil and gas businesses under review in Nigeria. As a result, the study proposed, among other things, that the management of major oil and gas corporations focus on growing and clearly revealing their environmental spending. This technique is considered as a way to increase stakeholder confidence and display better openness in the operations of the company.

Emeke et al. (2021) studied green accounting from the social, economic and environmental accounting points of view. The study explored the use of secondary data and checklists in line with the Global Reporting Initiative index. The study considered the implication of reporting compliance of consumer goods companies that were sensitive to environmental pollution and waste control management. Using 10 selected companies' data obtained from the annual financial reports, the study used inferential statistics and pooled panel data, the study revealed that green accounting practice is significantly required to improve the performance of the companies. The study also found that environmental accounting exerted a significant effect on firm performance for the period investigated.

Igboke et al. (2021) empirically look into the determinants of green accounting and its influence on the performance of companies quoted in Nigeria for a period of 10 years. An expo facto research approach was employed using secondary data collected from the audited and published financial statements of the companies purposively selected. The study considered the influence of corporate compliance with environmental accounting practices on economic and social performance. The study used pooled regression analysis and the Global Reporting Initiative checklist. The study found that economic, social and environmental are the determinants of environmental accounting. The result further showed that companies operating in Nigeria hardly comply with environmental disclosure, hence the level of compliance had a weak significant effect on the performance of the companies.

Ifada (2021) investigated the impact of environmental performances outside of boards and company environmental disclosure. The study's population consists of Indonessa's manufacturing and mining enterprises. 2017 until 2019 is the period. Their research used multiple linear regression with statistical hypothesis testing and selective sampling. Their results revealed relationships between financial performance, corporate size, and environmental performance. Their findings revealed that the financial achievements of the chosen companies show notable environmental performance.

Gap Literature Review

Despite the growing body of literature on environmental accounting reporting and financial performance, significant gaps remain, particularly in the context of Nigeria's oil and gas sector. Many existing studies have focused broadly on corporate social responsibility or sustainability reporting without isolating the specific impact of environmental accounting practices such as environmental remediation costs, pollution prevention costs, and waste management expenditures on financial performance. This represents a content gap, as these practices are distinct and require focused empirical investigation. Furthermore, most prior Nigerian studies have examined financial performance using only limited indicators, such as return on assets (ROA) or net profit margin. This reflects a variable gap in the literature, as it limits understanding of how individual environmental accounting practices influence firm performance over time. By focusing specifically on ROA as a measure of financial performance, this study addresses this limitation while maintaining alignment with established financial metrics. Additionally, much of the existing research employs cross-sectional designs, which do not capture the long-term effects of environmental accounting practices on firm performance, revealing a methodological gap. Geographically, few studies focus exclusively on oil and gas firms listed on the Nigerian Exchange Group, creating a sectoral and geographic gap.

This study seeks to address these gaps by examining the effects of specific environmental accounting practices such as: environmental remediation costs, pollution prevention costs and waste management costs on the financial performance of Nigerian oil and gas firms over a ten-year period (2014–2023) using panel data. By doing so, the study provides a more focused, current, and empirically grounded understanding of the relationship between environmental accounting reporting and firm profitability in the sector.

Methodology

Research Design

This study adopts an *ex post facto* research design to examine the impact of environmental accounting reporting on the financial performance of oil and gas firms in Nigeria. The design is appropriate because the variables under investigation, such as environmental accounting disclosures and financial performance indicators, have already occurred and cannot be manipulated by the researcher. This approach allows the use of historical financial and environmental data from annual reports to establish relationships and draw meaningful inferences without influencing the variables.

Population and Sample Size Determination

The population of the study comprises all oil and gas companies operating in Nigeria during the period under review (2014–2023). A sample of ten (10) oil and gas companies listed on the Nigerian Stock Exchange was purposively selected based on the availability of data. The selected companies are MRS Oil Nigeria Plc, Oando Plc, Seplat Energy Plc, TotalEnergies Nigeria Plc, Japaul Gold and Ventures Plc, Eterna Oil & Gas Plc, Ardova Plc, Conoil Plc, Mobil Oil Nigeria Plc, and Capital Oil Plc.

Nature and Sources of Data

The data used in this study are **secondary** in nature. They were obtained from the annual reports and accounts of the selected companies, available on the official Nigerian Stock Exchange website, covering the period 2014 to 2023.

Techniques of Analysis

The study employed regression analysis to examine the impact of environmental accounting reporting on the performance of oil and gas industries in Nigeria. The key independent variables were environmental remediation costs, environmental pollution prevention costs, and waste management costs, while firm performance served as the dependent variable. Data were analyzed using multiple regression models to determine the extent to which each environmental cost dimension significantly influenced performance. This technique was chosen because it allows for the identification of cause-and-effect relationships, isolates the contribution of each variable, and provides robust statistical evidence to inform policy and managerial decision-making.

Model specification

The model form of panel regression equation as stated in Asteriou and Hall (2017); and Okere et al. (2022) was adopted in the study. The model is specified as follows:

$$ROA_{i,t} = \beta_0 + \beta_1 ERC_{i,t} + \beta_2 EPPC_{i,t} + \beta_3 WMC_{i,t} + \mu_{i,t} \quad \text{.....(i)}$$

Where;

ROA	=	Return on Assets, a proxy for financial performance
ERC	=	Environmental Remediation Costs
EPPC	=	Environmental Pollution Prevention Costs
WMC	=	Waste Management Costs
β_0	=	Intercept.
$\beta_1 - \beta_3$	=	Coefficients (parameters) to be estimated.
μ	=	error term
i	=	firms
t	=	time period

Description of Model Variables

Financial performance: Financial performance refers to the overall assessment of an organization's financial condition over a specified period, allowing for comparisons with other firms in the same industry. For the purpose of this study, financial performance is measured using **Return on Assets (ROA)**, which evaluates how efficiently a company uses its assets to generate profit. ROA reflects management's effectiveness in converting investments into net earnings. The formula is: **ROA = (Net Income ÷ Total Assets) × 100**

Environmental Remediation Costs (ERC): Environmental remediation costs are measured by accounting for all expenses incurred in restoring polluted or contaminated environments to acceptable regulatory standards. These costs include soil and groundwater decontamination, oil spill clean-up, asbestos or hazardous material removal, and site restoration activities.

Environmental Pollution Prevention Costs (EPPC): Environmental pollution prevention costs are measured as the costs associated with reducing or eliminating wastes or pollutants at their sources. They may also include the costs of avoiding, managing, treating, disposing of, or cleaning up environmental pollutants.

Waste Management Costs (WMC): Waste management costs are measured through various direct and indirect expenditures related to the handling, treatment, and disposal of waste materials. These costs include waste collection and transportation, waste segregation and recycling processes, landfill and incineration charges, the purchase and maintenance of waste management equipment, employee training on waste handling, and compliance with environmental regulations.

Data Presentation and Analysis

Table 1. Descriptive Statistics for the Ten Selected Oil and Gas firms

	ROA	ERC	EPPC	WMC
Mean	6.906742	10418.52	7370.315	3561.607
Median	7.000000	9210.510	6540.000	3225.000
Maximum	9.400000	29645.44	18185.00	9582.000
Minimum	4.500000	2107.190	1749.000	1040.000
Std. Dev.	1.387591	6133.784	4513.448	1935.083
Skewness	-0.063473	1.286840	0.558295	0.856865
Kurtosis	1.797612	4.432504	2.229610	3.355078
Jarque-Bera	5.421034	32.17311	6.824348	11.35845
Probability	0.066502	0.000000	0.032969	0.003416
Sum	614.7000	927248.7	655958.0	316983.0
Sum Sq. Dev.	169.4360	3.31E+09	1.79E+09	3.30E+08
Observations	100	100	100	100

Source: Author's Computation from Eviews 10.0 Statistical Software

The descriptive statistics for the 100 panel data observations of the selected oil and gas firms in Nigeria are presented in Table 1. Return on Assets (ROA) ranges from 4.50% to 9.40%, with a mean of approximately 6.91%, which is reasonable for a capital-intensive sector. Environmental Remediation Costs (ERC) span ₦2,107.19 m to ₦29,645.44 m, Environmental Pollution Prevention Costs (EPPC) range from ₦1,749.00 m to ₦18,185.00 m, and Waste Management Costs (WMC) vary between ₦1,040.00 m and ₦9,582.00 m, with means of ₦10,418.52 m, ₦7,370.32 m, and ₦3,561.61 m, respectively. The wide dispersion in environmental costs, particularly ERC, reflects the heterogeneity of the sample, which includes both integrated major firms and smaller marketers, highlighting the need to account for cross-firm differences through firm fixed effects or scaling by total assets or revenue. Skewness values indicate that ROA is approximately symmetric (-0.063), while ERC (1.287), EPPC (0.558), and WMC (0.857) are positively skewed, suggesting that a majority of firms report lower costs with a few high-cost outliers. Kurtosis values show that ERC exhibits a leptokurtic distribution (4.433), whereas the other variables are approximately mesokurtic. The Jarque-Bera test further confirms that ROA is nearly normally distributed ($p = 0.066$), whereas ERC, EPPC, and WMC significantly deviate from normality ($p < 0.05$), implying the need for econometric methods that are robust to non-normal distributions or appropriate data transformations. Hence, the data reveal substantial variation in environmental costs, reasonable financial performance, and distributional characteristics that must be considered in subsequent regression analyses.

Table 2: Panel Least Regression Result for the sampled oil and gas firms in Nigeria

Dependent Variable: ROA
Method: Panel Least Squares
Date: 07/05/25 Time: 15:24
Sample: 2014 2023
Periods included: 10
Cross-sections included: 10
Total panel (unbalanced) observations: 89

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ERC	-1.36E-05	2.50E-05	-0.542813	0.5887
EPPC	0.000165	6.18E-05	2.676714	0.0090
WMC	-0.000620	0.000189	-3.274935	0.0015
C	4.674589	0.228870	20.42462	0.0000

R-squared	0.709431	Mean dependent var	6.906742
Adjusted R-squared	0.691927	S.D. dependent var	1.387591
S.E. of regression	0.770173	Akaike info criterion	2.380631
Sum squared resid	49.23275	Schwarz criterion	2.548404
Log likelihood	-99.93809	Hannan-Quinn criter.	2.448256
F-statistic	40.52939	Durbin-Watson stat	0.213886
Prob(F-statistic)	0.000000		

Source: Author's Computation from Eviews 10.0 Statistical Software

The panel least squares regression results in Table 2 show the effect of environmental costs on the financial performance (ROA) of selected oil and gas firms in Nigeria. The model explains approximately 71% of the variation in ROA, as indicated by the R-squared value of 0.709, and the F-statistic (40.53, $p < 0.001$) confirms that the model is statistically significant. Among the explanatory variables, Environmental Pollution Prevention Costs (EPPC) has a positive and statistically significant effect on ROA (coefficient = 0.000165, $p = 0.009$), suggesting that firms investing in pollution prevention experience higher returns on assets. In contrast, Waste Management Costs (WMC) have a negative and significant effect on ROA (coefficient = -0.000620, $p = 0.0015$), indicating that higher waste management expenditures may reduce short-term profitability. Environmental Remediation Costs (ERC) show a negative but statistically insignificant effect (coefficient = -1.36×10^{-5}, $p = 0.589$), implying that these costs do not have a measurable impact on ROA in the sample period. The intercept ($C = 4.675$, $p < 0.001$) is positive and significant, representing the baseline ROA when environmental costs are zero. Overall, the results suggest that while proactive pollution prevention can enhance financial performance, certain environmental expenditures such as waste management may exert short-term cost pressures on firms' profitability.

Test of Hypotheses

Test of Hypothesis One

Ho: Environmental remediation costs have no significant impact on the financial performance of oil and gas industries in Nigeria.

Hi: Environmental remediation costs have a significant impact on the financial performance of oil and gas industries in Nigeria.

Decision Rule: Reject Ho if p-value < 0.05 at the 5% level of significance; otherwise, accept Ho.

Decision: Based on the regression results (t = -0.5428, p = 0.5887), Environmental Remediation Costs have no significant impact on ROA. The p-value is greater than 0.05, so we fail to reject the null hypothesis. Therefore, H01 is accepted.

Test of Hypothesis Two

Ho: Environmental pollution prevention costs do not significantly influence the financial performance of oil and gas industries in Nigeria.

Hi: Environmental pollution prevention costs do significantly influence the financial performance of oil and gas industries in Nigeria.

Decision Rule: Reject Ho if p-value < 0.05 at the 5% level of significance; otherwise, accept Ho.

Decision: Based on the regression results (t = 2.6767, p = 0.009), Environmental Pollution Prevention Costs have a positive and significant effect on ROA. Since the p-value is less than 0.05, we reject the null hypothesis in favor of the alternate hypothesis. Therefore, H02 is accepted.

Test of Hypothesis Three

Ho: Waste management costs do not have a significant effect on the financial performance of oil and gas industries in Nigeria.

Hi: Waste management costs do have a significant effect on the financial performance of oil and gas industries in Nigeria.

Decision Rule: Reject Ho if p-value < 0.05 at the 5% level of significance; otherwise, accept Ho.

Decision: Based on the regression results (t = -3.2749, p = 0.0015), Waste Management Costs have a significant negative effect on ROA. The p-value is less than 0.05, so we reject the null hypothesis in favor of the alternate hypothesis. Therefore, H03 is accepted.

Discussion of Findings

The findings were discussed as follows

Environmental remediation costs have no significant impact on the financial performance of oil and gas industries in Nigeria.

The findings indicate that Environmental Remediation Costs (ERC) have no significant impact on the financial performance of oil and gas firms in Nigeria. The regression results (t = -0.5428, p = 0.5887) show that ERC does not exert a statistically significant effect on Return on Assets (ROA). This suggests that expenditures on post-damage environmental repairs or clean-up activities do not materially affect firm profitability in the short to medium term. This outcome aligns with prior studies indicating that remediation costs are often non-recurrent or capitalized, thereby exerting minimal immediate impact on financial ratios (Gunarathna et al., 2020). In Nigeria, where environmental damages such as oil spills and gas flaring are common and enforcement is weak, remediation spending is often reactive, fragmented, or underreported (Nwobu, 2021). Empirical evidence also suggests that such costs are less likely to affect firm value unless accompanied by proactive measures or stricter regulatory enforcement (Akintoye et al., 2022).

Environmental pollution prevention costs do not significantly influence the financial performance of oil and gas industries in Nigeria.

The results show that Environmental Pollution Prevention Costs (EPPC) significantly and positively influence the financial performance of Nigerian oil and gas firms (t = 2.6767, p = 0.009), as measured by ROA. This suggests that firms investing in proactive environmental management practices such as emission control, spill prevention, and operational upgrades - experience improved profitability. Such expenditures reduce environmental risks, minimize potential fines, and enhance operational efficiency and corporate reputation. These findings are consistent with previous studies showing that pollution prevention investments significantly improve firm profitability (Ofoegbu & Megbuluba, 2020; Onyekwelu & Ugwuanyi, 2019) and align with the Resource-Based View (RBV), which emphasizes that environmentally responsible practices can serve as a source of sustained competitive advantage (Uwuigbe et al., 2022). In high-risk sectors like oil and gas, forward-looking environmental investments enhance stakeholder confidence and long-term financial stability.

Waste management costs do not have a significant effect on the financial performance of oil and gas industries in Nigeria.

The regression analysis indicates that Waste Management Costs (WMC) exert a statistically significant negative effect on the financial performance of Nigerian oil and gas firms (t = -3.2749, p = 0.0015). The negative coefficient (–0.000620) implies that every additional ₦1 million spent on waste collection, segregation, transport, and disposal reduces ROA by approximately 0.062 %. In a capital-intensive industry with an average ROA of around 7%, this effect is economically meaningful. Previous studies support this finding, attributing the decline in profitability to high landfill fees, hazardous waste surcharges, and opportunity costs tied up in non-productive compliance activities (Mamman & Oladele, 2023; Adebisi et al., 2021). Unlike proactive pollution prevention investments, routine waste management expenditures are largely reactive and offer limited scope for strategic advantage. The Resource-Based View (RBV) reinforces this interpretation: preventive systems can evolve into rare and valuable capabilities, whereas routine waste disposal remains a commoditized service. Weak recycling infrastructure in Nigeria further exacerbates costs, as firms rely on third-party contractors and foreign currency-denominated channels (Okafor & Nnadi, 2022). Managerially, the results highlight the need for circular waste management strategies industrial symbiosis, on-site composting, and process redesign to reduce costs and enhance profitability.

Summary of Findings

The following are the findings of the study

i. The findings indicate that ERC have no significant impact on the financial performance of oil and gas firms in Nigeria (t = -0.543, p = 0.589). This suggests that expenditures on post-damage environmental repairs or clean-up activities do not materially affect profitability in the short to medium term.

ii. Environmental Pollution Prevention Costs (EPPC) significantly and positively influence the financial performance of oil and gas firms (t = 2.677, p = 0.009). This implies that firms investing in proactive environmental management practices, such as emission control systems, spill prevention technologies and operational upgrades experience improved profitability. These investments reduce environmental risks, potential fines, and operational disruptions, while enhancing corporate efficiency and reputation.

iii. Waste Management Costs (WMC) have a statistically significant negative effect on financial performance (t = -3.275, p = 0.0015). Each additional expenditure on waste collection, segregation, transport, and disposal negatively affects ROA, highlighting the cost pressure associated with routine waste management activities in the Nigerian oil and gas sector.

Conclusion

This study examined the effect of environmental accounting reporting on the financial performance of oil and gas firms in Nigeria. The findings revealed that Environmental Pollution Prevention Costs significantly and positively influence financial performance, indicating that proactive environmental strategies, such as emission control and spill prevention initiatives, enhance profitability. In contrast, Waste Management Costs exert a significant negative effect, reflecting the financial burden of routine waste handling activities. Environmental Remediation Costs were found to have no significant impact on firm performance, suggesting that reactive post-damage expenditures do not materially affect profitability in the short to medium term. These results underscore the importance of proactive environmental investments, which yield measurable financial benefits, while reactive or compliance-based expenses provide limited economic returns.

The study concludes that strategic integration of environmental practices into operational and financial decision-making is essential for achieving sustainable financial performance in Nigeria's oil and gas industry. Additionally, the study recommends the establishment of stronger regulatory frameworks and transparent environmental reporting standards to enhance accountability and encourage firms to adopt effective environmental strategies.

Recommendations

The following recommendations were made:

i. It is recommended that oil and gas firms in Nigeria shift focus from reactive remediation to proactive environmental prevention strategies, which have demonstrated greater financial benefits. Regulatory bodies should enforce stricter environmental compliance and ensure that reported remediation costs accurately reflect the extent of environmental damage. Additionally, firms should improve transparency in environmental reporting to enhance stakeholder trust and long-term sustainability, even if immediate financial returns from remediation appear minimal.

ii. Given the positive impact of EPPC on financial performance, oil and gas firms should increase investments in proactive environmental technologies and sustainable practices. These initiatives enhance operational efficiency, corporate reputation, and stakeholder confidence. Policymakers should provide incentives, such as tax relief or grants, to encourage pollution prevention efforts. Firms should integrate environmental sustainability into their core strategies to achieve long-term profitability and regulatory compliance.

iii. Considering the significant negative impact of WMC on financial performance, oil and gas firms should adopt cost-efficient and sustainable waste management strategies, including waste minimization, recycling, and circular economy approaches. Firms should invest in technologies that reduce waste generation at the source and explore partnerships for shared waste treatment facilities. Policymakers should support waste-to-value initiatives and provide incentives for environmentally sustainable practices that reduce operational costs while promoting compliance.

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