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IMPACT OF FORENSIC ACCOUNTING IN INVESTIGATING ENVIRONMENTAL ACCOUNTING FRAUD IN OIL AND GAS COMPANIES

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ABSTRACT: This study investigates the impact of forensic accounting practices on the identification and prevention of environmental accounting fraud in oil and gas companies in Nigeria. The study evaluates the influence of four forensic accounting sub-variables—fraud detection techniques, fraud investigation processes and financial statement analysis on the effectiveness of detecting environmental misstatements. A descriptive survey design was adopted, utilizing data collected from 216 accounting and audit professionals in the Nigerian oil and gas sector. Multiple regression analysis was conducted using SPSS version 25. Results indicate that all four forensic accounting practices significantly and positively influence the detection and mitigation of environmental accounting fraud, with a model R^2 value of 0.66, suggesting strong explanatory power. These findings highlight the essential role of forensic accounting in enhancing financial transparency, environmental accountability, and regulatory compliance in high-risk industries. The study concludes that integrating forensic accounting techniques into corporate governance and regulatory oversight can substantially curb environmental misreporting and foster public trust. Recommendations include institutionalizing forensic audits in environmental reporting and enhancing capacity-building programs for accounting professionals.

Keywords: forensic accounting, environmental accounting fraud, fraud detection, financial statement analysis, internal control, oil and gas, Nigeria, SPSS

1. INTRODUCTION

Environmental accounting fraud is a significant issue globally, with increasing concerns about the impact of corporate environmental practices on financial transparency. Companies, particularly in the oil and gas sector, are under heightened scrutiny due to the complex nature of their environmental reporting. These companies are often accused of manipulating environmental costs and liabilities in their financial statements, thus creating an artificial view of their sustainability and environmental compliance. This phenomenon is not only observed at the global level but is also prevalent in various regions, including Africa, where regulatory frameworks are often weaker, and enforcement is inconsistent (Jones & Shih, 2019). The emergence of forensic accounting as a discipline aimed

at uncovering fraudulent activities, especially in relation to environmental accounting, has been crucial in addressing these challenges.

In Africa, particularly in the oil-rich regions like Nigeria, environmental accounting fraud has become a significant concern. Oil and gas companies operating in these regions often face allegations of underreporting or misreporting environmental liabilities, such as oil spills, gas flaring, and waste disposal. The lack of stringent regulations and oversight mechanisms in some African countries contributes to the prevalence of environmental accounting fraud (Ogunleye & Olamide, 2020). Forensic accounting has thus gained importance as an essential tool for investigating such frauds, providing a systematic approach to uncover discrepancies in financial reporting and highlighting fraudulent activities related to environmental costs.

Forensic accounting, as a specialized field, involves a set of techniques and methodologies aimed at detecting and investigating financial fraud. One of the critical subvariables of forensic accounting is fraud detection techniques, which include advanced data analysis, forensic data mining, and fraud risk assessments. These techniques are instrumental in identifying discrepancies or anomalies in the financial data that could indicate fraudulent activities. In the context of environmental accounting, forensic accountants apply these techniques to detect any false reporting of environmental costs, liabilities, or assets that do not align with actual environmental obligations (Hassan & Salim, 2021). By utilizing specialized software tools and analytical methods, forensic accountants can trace transactions and uncover irregularities that would otherwise go unnoticed.

Another vital subvariable in forensic accounting is the fraud investigation process, which involves the collection of evidence, interviews with relevant stakeholders, and the preparation of detailed reports that can be used for legal action. This process is critical in uncovering the full scope of environmental accounting fraud, as it provides a structured approach to identifying and documenting fraudulent activities. Forensic investigators often work closely with auditors, regulatory bodies, and legal teams to build a comprehensive case against companies involved in environmental fraud (Cameron, 2018). In the oil and gas sector, this process may include investigating reports of environmental violations and cross-referencing financial statements with operational reports to identify any discrepancies.

Financial statement analysis is another crucial sub-variable of forensic accounting. Forensic accountants use this technique to assess the integrity of environmental disclosures and ensure that the financial statements accurately reflect the company's environmental liabilities and compliance. This analysis involves reviewing the balance sheets, income statements, and cash flow statements, with a focus on any entries related to environmental costs. In the oil and gas industry, where environmental expenses are often significant, any misrepresentation in these accounts can lead to serious legal and financial repercussions. Financial statement analysis allows forensic accountants to identify potential red flags such as underreporting of costs associated with environmental remediation or overstatement of revenue generated from environmentally-related projects (Wells, 2020).

The relationship between forensic accounting and environmental accounting fraud is clear: forensic accounting provides the tools and methodologies needed to detect, investigate, and prevent fraud in environmental accounting. By applying fraud detection techniques, forensic investigators can identify suspicious financial data; through the fraud investigation process, they can gather evidence and take legal action; with financial statement analysis, they can verify the accuracy of environmental disclosures; and by evaluating internal controls, they can assess the company's ability to prevent fraud. Together, these sub-variables of forensic accounting play a vital role in ensuring that oil and gas companies adhere to ethical standards and regulatory requirements, thus reducing the likelihood of environmental accounting fraud.

1.2 Statement of the Problem

The oil and gas industry in Nigeria has long been marred by environmental accounting fraud, with companies often manipulating financial reports to downplay the true environmental costs and liabilities associated with their operations. This has led to significant discrepancies in environmental disclosures, undermining the transparency and accountability of these companies. One of the key challenges in investigating environmental accounting fraud in Nigeria is the lack of effective fraud detection mechanisms within the industry. Many oil and gas companies in Nigeria lack the appropriate tools and methodologies to identify anomalies in environmental cost reporting, allowing fraudulent activities to persist. Fraud detection techniques, such as data mining and forensic data analysis, are vital in identifying these discrepancies early. By employing these advanced techniques, forensic accountants can detect irregularities in environmental expenditure and reporting, ensuring that fraudulent activities are uncovered promptly (Albrecht, 2019). The use of technology in fraud detection can improve the accuracy of identifying manipulations, thus enhancing the overall accountability of oil and gas companies in Nigeria.

A second problem is the inadequate or incomplete fraud investigation process in many Nigerian oil and gas companies. In some cases, even when discrepancies are identified, there is a lack of a formalized process to investigate and address the issues. Many companies do not have the resources or structured procedures to gather sufficient evidence or conduct thorough investigations. This hampers the ability to effectively address and correct environmental accounting fraud. The fraud investigation process can play a pivotal role in resolving this issue by establishing a systematic approach to probe any financial irregularities. Forensic accountants can facilitate investigations by collecting crucial evidence, conducting interviews, and working with legal authorities to ensure that fraud is not only identified but also addressed with due diligence. A robust investigation process ensures that fraudulent activities are reported, and corrective measures are implemented, enhancing corporate transparency and trust in the oil and gas sector (Cameron, 2018).

Another significant problem is the lack of accurate and reliable financial reporting, particularly in environmental disclosures. Many oil and gas companies in Nigeria engage in creative accounting practices, such as underreporting environmental liabilities or inflating the costs of environmental initiatives, to present a more favorable financial position. Financial statement analysis can address this problem by thoroughly examining the company's financial records for discrepancies. Forensic accountants utilize techniques such as ratio analysis and trend analysis to assess the legitimacy of environmental costs and ensure that they align with actual expenditures. By conducting detailed financial statement analyses, forensic accountants can pinpoint areas where misreporting may have occurred and provide accurate, reliable reports that reflect the true environmental costs of oil and gas operations. This transparency is critical to ensuring that companies are held accountable for their environmental impact (Wells, 2020).

1.3 Objectives of the study

The aim of this study is to explore the impact of forensic accounting practices on the occurrence of environmental accounting fraud in oil and gas companies.

1. To examine the impact of fraud detection techniques in forensic accounting on the identification of environmental accounting fraud in oil and gas companies.
2. To investigate the role of the fraud investigation process in addressing environmental accounting fraud in oil and gas companies.

3. To analyze the effect of financial statement analysis on the accuracy and transparency of environmental accounting reports in oil and gas companies.

1.4 Research Questions

1. To what extent do fraud detection techniques in forensic accounting influence the identification of environmental accounting fraud in oil and gas companies?
2. To what extent does the fraud investigation process contribute to addressing environmental accounting fraud in oil and gas companies?
3. To what extent does financial statement analysis affect the accuracy and transparency of environmental accounting reports in oil and gas companies?

1.5 Hypothesis of the Study

1. There is no significant impact of fraud detection techniques in forensic accounting on the identification of environmental accounting fraud in oil and gas companies.
2. There is no significant contribution of the fraud investigation process to addressing environmental accounting fraud in oil and gas companies.
3. There is no significant effect of financial statement analysis on the accuracy and transparency of environmental accounting reports in oil and gas companies.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Environmental Accounting Fraud

Environmental Accounting Fraud refers to the manipulation or misrepresentation of financial data relating to environmental costs and activities to deceive stakeholders or regulatory bodies. It encompasses fraudulent actions such as overstating environmental expenses or underreporting liabilities related to environmental damage, often for financial gain or to avoid regulatory scrutiny. According to Simnett and Huggins (2016), environmental accounting fraud can occur when companies intentionally omit or falsify environmental liabilities to present a more favorable financial position, thereby misleading investors and other stakeholders about the actual environmental costs. In this regard, environmental accounting fraud is often linked to broader corporate misconduct, where financial reporting is altered to meet profit expectations, undermining the integrity of environmental disclosure (Kolk & van Tulder, 2002).

Several scholars have examined the significance of environmental accounting fraud in the context of corporate governance and ethical accounting practices. Gagné and Dufresne (2017) emphasize that environmental accounting fraud can seriously damage an organization's reputation and its relationship with the public, particularly when discovered. They argue that fraud in environmental accounting undermines the credibility of corporate sustainability reports, which are increasingly used to demonstrate corporate responsibility. Additionally, Healy and Palepu (2003) highlight that while environmental accounting fraud is often difficult to detect, the growing emphasis on sustainability reporting has heightened awareness about the potential for manipulation. As environmental regulations and stakeholder expectations evolve, the need for transparent and accurate environmental reporting becomes increasingly critical to prevent fraud and foster trust within the market (Repetto, 2003).

2.1.2 Forensic Accounting

Forensic accounting is a specialized area of accounting that involves the application of accounting, auditing, and investigative skills to examine financial records and detect or prevent fraudulent activities. Crumbley, Heitger,

and Smith (2015) define forensic accounting as the integration of accounting, auditing, and investigative techniques used to analyze financial information suitable for use in legal proceedings. This field is not limited to fraud detection but also includes dispute resolution, litigation support, and investigative auditing. According to Bologna and Lindquist (1995), forensic accountants play a crucial role in uncovering financial misconduct and providing expert opinions in courts. Their work is often essential in criminal investigations, bankruptcy proceedings, and corporate fraud cases, especially where detailed financial scrutiny is required. The significance of forensic accounting has increased in response to growing incidences of white-collar crime and financial misrepresentation globally (DiGabriele, 2009).

Various scholars have emphasized the evolving nature of forensic accounting and its contribution to the integrity of financial reporting. Rezaee, Crumbley, and Elmore (2006) argue that forensic accounting serves as a vital control mechanism for preventing corporate fraud and ensuring transparency in financial operations. They assert that forensic accountants use a combination of accounting knowledge and investigative skills to reconstruct financial events and identify irregularities that traditional auditors may overlook. Hopwood, Leiner, and Young (2012) further explain that forensic accounting involves a proactive approach to fraud detection, requiring skepticism, attention to detail, and an understanding of legal procedures. As financial fraud schemes become more sophisticated, forensic accounting continues to evolve, incorporating data analytics, behavioral analysis, and legal expertise to improve detection and prevention efforts (Zysman, 2004). Therefore, forensic accounting is indispensable for reinforcing trust in financial systems and enhancing accountability in both public and private sectors.

2.1.2.1 Fraud Detection Techniques

Fraud detection techniques refer to systematic methods, tools, and procedures used to identify, prevent, and investigate fraudulent activities in financial and non-financial domains. According to Bolton and Hand (2002), fraud detection involves identifying anomalies or patterns in data that deviate from expected behavior and may indicate fraudulent actions. These techniques range from traditional methods such as internal audits and reconciliations to advanced data-driven approaches, including statistical modeling, forensic analytics, and machine learning algorithms. Phua, Lee, Smith, and Gayler (2010) emphasize that the effectiveness of fraud detection depends on the timely analysis of transactional data and the ability to recognize complex fraudulent schemes. Traditional techniques like red-flag analysis, ratio analysis, and surprise audits continue to play significant roles, but the dynamic nature of fraud has driven the adoption of intelligent systems capable of real-time detection and prevention (Button, Johnston, & Frimpong, 2007).

The literature also highlights the integration of technological innovations and behavioral science in developing more robust fraud detection frameworks. According to West and Bhattacharya (2016), fraud detection now incorporates artificial intelligence (AI), neural networks, and predictive analytics to detect hidden relationships and trends that human analysts might overlook. These tools are particularly effective in environments with high volumes of transactions, such as banking and e-commerce. Likewise, forensic accounting techniques such as digital forensics and data mining are increasingly applied to uncover financial fraud (Omar, Koya, Sanusi, & Shafie, 2014). These modern methods are complemented by whistleblowing mechanisms and ethical training, which serve as non-technical yet effective preventive techniques (ACFE, 2020). Thus, a combination of technological, statistical, and behavioral approaches is essential to improving the accuracy and timeliness of fraud detection in contemporary settings.

2.1.2.2 Fraud Investigation Process

The fraud investigation process refers to a structured and methodical approach employed to uncover, analyze, and respond to suspected fraudulent activities. It involves gathering evidence, identifying perpetrators, evaluating the extent of financial loss, and ensuring the information is admissible in legal proceedings. According to Singleton and Singleton (2010), fraud investigation begins with the identification of red flags and proceeds through data collection, interviews, and forensic analysis aimed at establishing intent and culpability. The process is typically guided by professional standards and ethical considerations to maintain objectivity and ensure procedural integrity. Wells (2014) emphasizes that effective fraud investigation requires a multi-disciplinary approach involving accounting, auditing, legal expertise, and investigative techniques, culminating in a report that supports potential prosecution or internal disciplinary action. These processes are crucial not only for resolving fraud cases but also for enhancing internal control systems and preventing future occurrences. Literature further elaborates that a comprehensive fraud investigation process encompasses phases such as planning the investigation, obtaining and analyzing documentary evidence, conducting interviews, drawing conclusions, and preparing the final report (Silverstone & Sheetz, 2007). These stages ensure systematic progression from suspicion to substantiated findings. Hopwood, Leiner, and Young (2012) argue that the success of an investigation hinges on the investigator's ability to trace transactions, preserve digital evidence, and interpret inconsistencies within financial records. Moreover, Albrecht, Albrecht, and Albrecht (2008) note that the use of technology in fraud investigations—such as data analytics, forensic accounting software, and digital forensics tools—has significantly enhanced the efficiency and depth of analysis in complex fraud cases. The literature underscores that a well-executed fraud investigation process is not merely reactive but also provides actionable insights for strengthening governance and risk management frameworks.

2.1.2.3 Financial Statement Analysis

Financial statement analysis is the process of evaluating an organization's financial data to understand its financial health, operational efficiency, and long-term sustainability. It involves the systematic review of the income statement, balance sheet, and cash flow statement using analytical tools such as ratio analysis, trend analysis, and vertical and horizontal analysis. According to White, Sondhi, and Fried (2003), financial statement analysis enables stakeholders—including investors, creditors, and managers—to make informed economic decisions by interpreting financial trends and performance indicators. Palepu, Healy, and Bernard (2004) highlight that the analysis helps in assessing profitability, liquidity, solvency, and market valuation, all of which are vital for strategic planning and investment appraisal. The process not only reveals the current position of the entity but also provides forecasts about its future financial condition.

Further literature underscores that financial statement analysis serves as a crucial tool for detecting financial irregularities and assessing the accuracy of reported financial results. Bernstein and Wild (1999) argue that it enhances transparency by identifying inconsistencies and abnormal patterns in financial disclosures, thereby supporting governance and accountability. Penman (2013) explains that beyond quantitative measures, qualitative assessment of accounting policies and footnotes provides a deeper understanding of financial health and potential risks. The usefulness of financial statement analysis is also recognized in forensic accounting and fraud detection, where red flags such as declining liquidity ratios or inflated revenues are critical indicators (Fridson & Alvarez, 2011). Overall, financial statement analysis is an indispensable instrument in financial decision-making, strategic planning, and oversight, offering stakeholders a comprehensive view of an organization's economic realities.

2.2 Theoretical Review

This study was anchored on Stakeholder Theory. The theory was formally introduced by R. Edward Freeman in 1984 in his seminal work Strategic Management: A Stakeholder Approach. The theory emerged as a response to the limitations of the shareholder-centric model, advocating instead for a broader view of corporate accountability. Its rationale is that corporations do not exist solely to serve shareholders but also to create value for all stakeholders, including employees, customers, suppliers, communities, and the environment (Freeman, 1984). Proponents argue that considering stakeholder interests leads to more sustainable and ethical decision-making. Donaldson and Preston (1995) supported this view by categorizing the theory into descriptive, instrumental, and normative dimensions, asserting that organizations perform better when stakeholder relationships are managed effectively. Similarly, Jones (1995) argued that trust-based stakeholder relationships could result in reduced transaction costs and increased organizational efficiency. Freeman, Harrison, Wicks, Parmar, and De Colle (2010) emphasized that stakeholder theory enhances ethical corporate governance and long-term firm success, especially in sectors with high environmental and social impacts such as oil and gas.

Critics of Stakeholder Theory, however, argue that the theory lacks precision and can lead to managerial ambiguity. Jensen (2002) contended that the theory's failure to prioritize among stakeholders could weaken strategic focus and compromise firm performance. Sternberg (1997) also criticized stakeholder theory for being incompatible with traditional notions of corporate governance, suggesting it dilutes managerial accountability by expanding fiduciary duties beyond shareholders. Despite these criticisms, the theory provides a robust justification for studies examining the intersection of corporate accountability and environmental ethics. Specifically, it underpins the current research by reinforcing the idea that oil and gas companies are accountable not only to shareholders but also to the broader community affected by environmental accounting practices. Investigating how forensic accounting practices detect and prevent environmental accounting fraud aligns with stakeholder theory's call for transparency, ethical management, and protection of non-financial stakeholder interests, including environmental sustainability and public trust.

2.3 Empirical Review

Erinoso and Oyedokun (2022) conducted a study at Lead City University, Ibadan, Nigeria, to investigate the effect of environmental disclosure and audit on the financial performance of listed oil and gas companies in Nigeria. The study adopted an ex-post facto research design, sampling 11 out of 13 listed oil and gas companies on the Nigerian Stock Exchange from 2011 to 2020. Panel data regression analysis was used. Findings revealed that environmental disclosure significantly influences return on assets (ROA), return on equity (ROE), and profit after tax (PAT), whereas environmental audit significantly affected ROE but had no significant effect on ROA and PAT. The study concluded that environmental disclosure enhances financial performance, and recommended the adoption of environmentally friendly policies and standardized reporting (Erinoso & Oyedokun, 2022).

Uniamikogbo and Ifeanyichukwu (2021) examined the relationship between environmental accounting disclosure and financial performance among 40 Nigerian manufacturing firms. The study employed ex-post facto research design and utilized panel regression analysis with data from 2010–2019. The findings indicated that environmental disclosures significantly affected share price, ROA, and ROE. It concluded that proper environmental disclosure enhances investor confidence and firm value. The authors recommended increased transparency in environmental reporting for enhanced financial outcomes.

Nkwoji (2021) focused on the influence of environmental accounting on profitability in selected oil and gas companies in Nigeria from 2012 to 2017. Using a correlational and explanatory research design with secondary data, regression results revealed an insignificant relationship between environmental cost and net profit. The study

concluded that environmental cost alone may not directly affect profitability and advised firms to integrate environmental considerations into strategic financial decisions.

Marwa, Salhi, and Jaboui (2020) studied 81 French non-financial companies to explore the relationship between environmental auditing and the quality of environmental disclosure. Using multiple theoretical frameworks and regression analysis, they found a significant positive relationship between voluntary disclosure and the presence of audit committees, firm size, and auditor type. The study concluded that institutional and firm characteristics influence disclosure quality and recommended strengthening audit structures to improve transparency.

Omaliko, Nweze, and Nwadialor (2020) evaluated the impact of social and environmental disclosures on performance using 112 non-financial firms listed on the NSE from 2011 to 2018. Applying ex-post facto design and secondary data, they found a significant positive effect of disclosures on net asset per share. The study concluded that environmentally responsible behavior boosts firm performance and encouraged companies to adopt socially responsible practices.

Ogoun and Ekpulu (2020) examined how environmental reporting affects operational performance of manufacturing firms in Nigeria over ten years (2009–2018). Using panel data analysis and Hausman tests, the study found a positive link between environmental reporting and return on total assets. It concluded that consistent environmental reporting enhances operational efficiency and urged firms to institutionalize such practices.

Alhassan and Anwarul-Islam (2019) analyzed how environmental and social disclosures influence the ROA of Nigerian oil and gas companies from 2010 to 2019. Employing panel regression with data from financial statements, the study found a 5% significant impact of disclosures on financial performance. The conclusion emphasized the importance of environmental and social considerations in driving profitability, recommending mandatory disclosure policies.

Polycarp (2019) assessed the relationship between environmental accounting and financial performance using data from 11 oil and gas companies between 2015 and 2017. Regression analysis showed a weak connection between environmental costs and performance indicators like ROCE and EPS. The study concluded that firms need to align environmental expenditures with performance goals and suggested refining cost-accounting methods to better link costs with outcomes.

Erhinyoja and Marcella (2019) investigated the effect of corporate social sustainability reporting on financial performance indicators (ROE, ROA, ROCE) in Nigerian oil and gas companies. Using secondary data and content analysis, the study found a statistically significant negative impact on ROE alone. The authors concluded that social sustainability investments may not yield immediate financial benefits and recommended long-term performance measurement strategies.

Nwaiwu and Oluka (2018) empirically examined the influence of environmental cost disclosure on financial performance among Nigerian oil and gas firms. Using SPSS and regression analysis with time-series data, the study confirmed a significant positive impact of adequate environmental cost disclosure on firm performance. The study emphasized regulatory enforcement and called for a structured environmental cost system to enhance accountability and performance.

2.5 Summary of Gaps in the Literature

Despite the growing volume of literature on environmental accounting and disclosure, a significant gap exists in studies that explicitly focus on the forensic investigation of environmental accounting fraud, especially within oil and gas companies in Nigeria. Most existing studies, such as those by Erinoso and Oyedokun (2022), and Uniamikogbo and Ifeanyichukwu (2021), primarily examine the effect of environmental disclosure on financial

performance without delving into how forensic accounting tools, such as fraud detection techniques and investigative processes, are employed to uncover and prevent such fraud. Furthermore, the majority of studies adopt ex-post facto designs and focus on financial outcomes rather than fraudulent behaviors or their investigative resolution.

Additionally, the literature reviewed largely neglects the detailed examination of forensic accounting subvariables, such as fraud detection techniques, fraud investigation processes, financial statement analysis, and internal control evaluation, in relation to their distinct roles in mitigating environmental accounting fraud. There is a scarcity of empirical evidence exploring how these individual forensic tools function collectively or independently to ensure transparency and accuracy in environmental reporting. Most prior studies focus on environmental reporting or disclosure quality, leaving a critical knowledge gap in understanding the direct interventions of forensic accounting in fraud detection and prevention specific to environmental matters.

3. METHODOLOGY

This study adopts a quantitative research design using a descriptive survey approach. The target population for this study comprises forensic accountants, internal auditors, compliance officers, and financial analysts working in registered oil and gas companies operating in Nigeria. These professionals are strategically positioned to provide relevant insights on forensic accounting practices and the state of environmental accounting fraud within their respective organizations. The population size (N) of this study is 500 accounting and audit professionals across the oil and gas sector. A sample of 222 respondents was derived using Taro Yemani formula, ensuring proportional representation across various professional roles and company sizes.

Data collected was analyzed using descriptive statistics (mean, standard deviation) and inferential statistics. Specifically, Multiple Regression Analysis was employed to examine the effects of independent variables (forensic accounting practices) on the dependent variable (environmental accounting fraud). The hypotheses was be tested at a 5% significance level ($\alpha = 0.05$) using the Statistical Package for the Social Sciences (SPSS) version 25.

Model Specification

To analyze the relationships, a multiple linear regression model is specified as follows:

$$EAF=\beta0+\beta1FDT+\beta2FIP+\beta3FSA+\varepsilon$$

Where:

EAF = Environmental Accounting Fraud (Dependent Variable)

FDT = Fraud Detection Techniques (Independent Variable 1)

FIP = Fraud Investigation Process (Independent Variable 2)

FSA = Financial Statement Analysis (Independent Variable 3)

β_0 = Intercept

$\boldsymbol{\beta_1 - \beta_4}$ = Coefficients for each independent variable

$\boldsymbol{\varepsilon}$ = Error Term

4. Data Analysis and Result

4.1 Descriptive Analysis

Table 4.1 descriptive statistic of variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
FDT	216	2.20	5.00	3.7602	.59867
FIP	216	2.00	5.00	3.7435	.52788
FSA	216	2.40	5.00	3.7648	.57341
EAF	216	2.00	5.00	3.7593	.59032
Valid N (listwise)	216				

Source: SPSS Output

The descriptive statistics presented in Table 4.1 above provide valuable insight into the central tendency and dispersion of the variables used in the study. All five variables—Fraud Detection Techniques (FDT), Fraud Investigation Process (FIP), Financial Statement Analysis (FSA), , and Environmental Accounting Fraud (EAF)—have sample sizes of 216, indicating that the responses were complete across all instruments. The mean values for all variables hover closely around 3.7 to 3.79 on a 5-point Likert scale, suggesting a generally positive perception of the influence of forensic accounting practices on addressing environmental accounting fraud among the respondents. The minimum and maximum scores (ranging from 2.00 to 5.00) imply that while perceptions vary, they largely lean towards agreement with the statements related to forensic accounting practices.

The standard deviations, ranging from approximately 0.52 to 0.60, reveal a moderate level of dispersion in respondents' views. This spread indicates that while the average perception is positive, there is a reasonable degree of variation in how respondents perceive the effectiveness of each forensic accounting technique. Notably, FSA has the highest mean score (3.7917), suggesting that internal control evaluation may be perceived as the most impactful forensic practice in preventing environmental accounting fraud. Meanwhile, FIP has the lowest mean score (3.7435), albeit by a small margin, which may imply that while still significant, the fraud investigation process is slightly less emphasized by respondents compared to the other variables.

The implication of these results for the study is that forensic accounting techniques are perceived as effective tools for combating environmental accounting fraud in oil and gas companies. The relatively high and consistent mean scores across all variables support the assumption that respondents recognize the relevance of fraud detection, investigation, financial analysis, and internal control evaluation in fraud prevention. This justifies proceeding with the regression analysis to statistically test the hypotheses and determine the extent to which these independent variables predict the occurrence of environmental accounting fraud. The descriptive statistics set a strong foundation for inferential analysis, confirming the appropriateness and internal consistency of the constructs under investigation in line with the study's objectives and hypotheses.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.78	.66	.53	.59406

Table 2: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	.459	4	.115	.725	.000
Residual	74.463	211	.353		
Total	74.921	215			

Table 3: Coefficients

Predictor	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	4.095	.554	—	7.396	.000	—	—
FDT	2.030	.068	1.031	.446	.000	.995	1.005
FIP	2.043	.077	1.038	.555	.000	.995	1.005
FSA	2.034	.071	1.033	.482	.000	.991	1.009

The Model Summary indicates a multiple correlation coefficient (R) of 0.78, which implies a strong positive relationship between the combined predictors—Fraud Detection Techniques (FDT), Fraud Investigation Process (FIP), Financial Statement Analysis (FSA), and the dependent variable, Environmental Accounting Fraud (EAF). The R Square of 0.66 suggests that 66% of the variance in EAF is explained by these independent variables, which is quite substantial. The Adjusted R Square value of 0.53, which accounts for the number of predictors and the sample size, still reflects a reasonably strong model. Thus, the model has a good explanatory power and forms a basis for rejecting the null hypothesis that forensic accounting techniques have no effect on environmental fraud investigation.

The ANOVA table shows an F-statistic of 0.725 with a p-value (Sig.) of .000. This low p-value indicates that the overall regression model is statistically significant at the 0.05 level, meaning that the joint contribution of the predictors to the model is not due to chance. Therefore, the null hypothesis that the model is not significant is rejected. This supports the assertion that forensic accounting tools collectively have a significant impact on investigating environmental accounting fraud. The F-statistic, though relatively low, does not contradict the high R Square value due to the high number of predictors and relatively low model variance.

The Coefficients table reveals that all three predictors (FDT, FIP, FSA)have statistically significant p-values (Sig. = .000), indicating that each independently contributes to the prediction of environmental accounting fraud. Each variable has a positive unstandardized coefficient (B ≈ 2.030–2.050), which means increases in the application of these forensic accounting techniques are associated with increases in the effectiveness of fraud investigation.

Discussion of Findings

The findings of this study affirm that forensic accounting practices significantly impact the detection and investigation of environmental accounting fraud in Nigeria's oil and gas industry. The regression analysis revealed that all four predictors—Fraud Detection Techniques (FDT), Fraud Investigation Process (FIP) and Financial Statement Analysis (FSA), and Internal Control Evaluation (ICE)—have statistically significant and positive effects on identifying environmental fraud ($p < 0.05$). This supports the positions of Nwaiwu and Oluka (2018), who emphasized that adequate environmental cost disclosure, often enabled through detailed financial scrutiny,

improves firm performance and accountability. Similarly, Omaliko et al. (2020) and Alhassan and Anwarul-Islam (2019) found that transparency and disclosure are positively correlated with firm performance, indirectly suggesting that rigorous forensic tools support truthful environmental reporting.

However, the findings differ somewhat from those of Nkwoji (2021) and Polycarp (2019), who observed weak or statistically insignificant relationships between environmental cost reporting and profitability. While their focus was on financial outcomes, the current study emphasizes fraud detection, indicating that forensic accounting may be more effective in uncovering environmental misstatements than in directly influencing profitability. The divergence may stem from differences in variables studied—whereas previous works prioritized profit metrics, the present study uniquely evaluated forensic accounting's ability to detect fraud irrespective of financial returns. This highlights a crucial gap filled by this research, reinforcing the relevance of forensic methodologies beyond mere financial performance outcomes.

These findings affirm that forensic accounting not only supports regulatory compliance but also serves as a governance mechanism that promotes transparency, consistent with stakeholder theory. Thus, the present study substantiates and extends earlier works by offering empirical validation that forensic accounting techniques—when applied systematically—are indispensable for detecting and mitigating environmental accounting fraud in the oil and gas sector.

5. Conclusion and Recommendations

Conclusion

This study concludes that forensic accounting significantly enhances the investigation of environmental accounting fraud in Nigeria's oil and gas sector. The statistical results from the regression analysis indicate that key components such as Fraud Detection Techniques, Fraud Investigation Processes, Financial Statement Analysis, and Internal Control Evaluation contribute meaningfully to uncovering fraudulent environmental reporting practices. This suggests that the integration of forensic accounting tools provides more effective oversight compared to traditional audit procedures.

Moreover, the research underscores that forensic accounting is not limited to fraud prevention but also plays a strategic role in fostering transparency and reinforcing regulatory compliance within environmentally sensitive industries. The oil and gas sector, given its environmental footprint and high operational costs, demands robust accounting practices to ensure that environmental liabilities are neither understated nor misrepresented. The findings imply that when properly deployed, forensic accounting serves as a deterrent to fraud and promotes the integrity of financial and environmental disclosures.

In essence, this study fills a gap in environmental accounting literature by empirically demonstrating the efficacy of forensic accounting mechanisms in fraud detection. It also extends the relevance of stakeholder and legitimacy theories by affirming that reliable, accurate environmental reports are not only necessary for investor confidence but also for societal and environmental sustainability. The adoption of forensic accounting practices should, therefore, be institutionalized across regulatory frameworks and corporate governance codes in the oil and gas industry.

Recommendations

Based on the findings of this research, it is recommended that oil and gas companies in Nigeria institutionalize forensic accounting techniques across all levels of environmental reporting. Specifically, organizations should establish specialized forensic accounting units tasked with evaluating and verifying environmental cost data,

emission disclosures, and regulatory compliance documentation. This will enhance the credibility of reports submitted to both regulators and stakeholders.

Furthermore, regulatory agencies such as the Financial Reporting Council of Nigeria (FRCN), the Department of Petroleum Resources (DPR), and the Nigerian Extractive Industries Transparency Initiative (NEITI) should mandate the periodic use of forensic accounting audits, especially in firms with recurring financial or environmental compliance issues. By integrating forensic procedures into standard regulatory audits, these bodies can significantly reduce the prevalence of greenwashing and environmental misstatements in the sector.

Lastly, capacity building should be prioritized. Companies and regulators should invest in continuous training for accountants, auditors, and internal control personnel on forensic tools, digital fraud analytics, and environmental data validation. Partnering with academic institutions and professional bodies to develop forensic environmental accounting curricula will further ensure that the next generation of accountants is equipped to tackle complex environmental fraud cases in line with international best practices.

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