

Table Of Content

Journal Cover 2
Author[s] Statement 3
Editorial Team 4
Article information 5
 Check this article update (crossmark) 5
 Check this article impact 5
 Cite this article 5
Title page 6
 Article Title 6
 Author information 6
 Abstract 6
Article content 7

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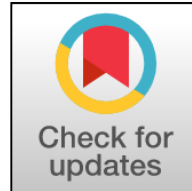
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Environmental Cost Disclosure and Financial Performance of Oil and Gas Firms

Pengungkapan Biaya Lingkungan dan Kinerja Keuangan Perusahaan Minyak dan Gas Bumi

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Abstract

General Background: The relationship between environmental cost disclosure and financial performance is essential in environmentally impactful sectors like oil and gas. **Specific Background:** This study focuses on listed oil and gas firms in Nigeria, examining health and safety costs and waste management costs as predictors of return on assets (ROA). **Knowledge Gap:** Existing research shows inconsistent findings on the effects of environmental disclosures on financial performance, necessitating further investigation. **Aims:** This study aims to clarify the impact of environmental cost disclosures on financial performance, particularly through health and safety and waste management costs. **Results:** Using ex-post-facto research design and secondary data analysis, the findings reveal a significant positive relationship between environmental cost disclosures and financial performance, highlighting the importance of these costs on ROA. **Novelty:** By applying legitimacy theory and focusing on specific environmental costs, this research fills a gap in Nigerian literature. **Implications:** The study recommends enhanced environmental policies for oil and gas firms, promoting accountability and aligning financial performance with ecological responsibilities.

Highlights:

- Significant positive relationship exists between environmental cost disclosures and financial performance (ROA) in Nigerian oil and gas firms.
- Health and safety costs and waste management costs are critical predictors of financial performance.
- The study emphasizes the need for enhanced environmental policies and corporate accountability in the oil and gas sector.

Keywords: Health, Safety Cost, Waste Management Cost, ROA

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Introduction

Economic accumulation can lead to negative environmental effects such as depletion of nonrenewable resources, climate change, loss of farmland, water acidification, and reduced water availability. Businesses must prioritize environmental protection and society improvement to ensure success. Environmental management procedures, such as environmental impact analysis documentation, help anticipate and address potential negative effects of business activities. Accounting firms can help by voluntarily disclosing environmental expenses in financial statements. Green accounting, an approach to financial reporting, includes information about a company's environmental impact. Businesses should adopt an environmental accounting practice that prioritizes efficiency and sustainable resource use.

For instance, public outcry over issues related to environmental concerns has greatly affected Nigeria's oil and gas business. Recent social unrest and disruptions to the economic operations of some multinational corporations have been traced to the oil and gas industries, which are a major source of income for the Nigerian government but also have negative effects on human health and the environment [1]. Growing awareness of environmental degradation challenges by stakeholders and the host community has contributed to rising concerns. These challenges include air and water pollution from large industrial equipment, a lack of clean, fresh water, a shortage of seafood due to an oil spill, and similar issues. The majority of nations and responsible business managements throughout the world are thus now concerned with and focusing on the need for long-term environmental cost management in the industrial production sector. Organisations have begun to recognise and address the environmental and social effects of their operations [2].

Environmental reporting practices have emerged among economic players due to various factors, including stakeholders' benefits, pressure from interest groups, and political and cultural contexts. Responding to voluntary environmental disclosures provides economic benefits at the macro level, such as building stronger relationships with suppliers, attracting moral investors, and breaking into new markets. Corporate environmental disclosure involves companies disclosing their environmental initiatives in financial statements, preserving accountability relationships, and revealing corporate conscience through moral disclosure. Publicizing environmental activities helps inform a wider spectrum of stakeholders about the role polluting businesses play in achieving a cleaner and greener environment.

1. Statement of the Problem

The effects of global warming have been found to be responsible for the destruction of the ozone layer, which has impacted on the land, water, and human resources of the world with a greater impact on the country under investigation which Nigeria [3]. According to Clementina *et al*, oil and gas firms have not shown much interest in proactive strategies with regard to the environment and sustainability, because they are not directly affected by the emissions and pollutions.

Stakeholders are concerned about polluting corporations in Nigeria not providing sufficient environmental disclosures in their annual reports. Businesses are under increasing pressure from investors, customers, shareholders, governments, NGOs, and the public to measure and report on their social and environmental performance. Businesses can demonstrate their commitment to environmental responsibility by including environmental disclosures in their annual reports. However, enterprises seeking profits can cause significant social harm and environmental damage.

To balance profit-maximizing goals with environmental impact control, nations and accountable corporate managements have begun prioritizing environmental cost considerations. Environmental Management Systems (EMS) have emerged as a technique to systematically apply business management to environmental costs. Issues such as biodiversity loss, freshwater scarcity, overfishing, climate change, extreme weather, pollution, and a lack of care for the environment's present or future state should be of great concern. Based on this backdrop, the researcher intends to examine the relationship between Health/safety, waste management cost on assets of oil and gas firms in Nigeria.

2. Conceptual Framework

The conceptual framework in Figure 1.1: below shows the relationship between environmental cost disclosure and financial performance of listed oil and gas firms in Nigeria. Environmental cost disclosure is the predictor variables while the financial performance is criterion variable.

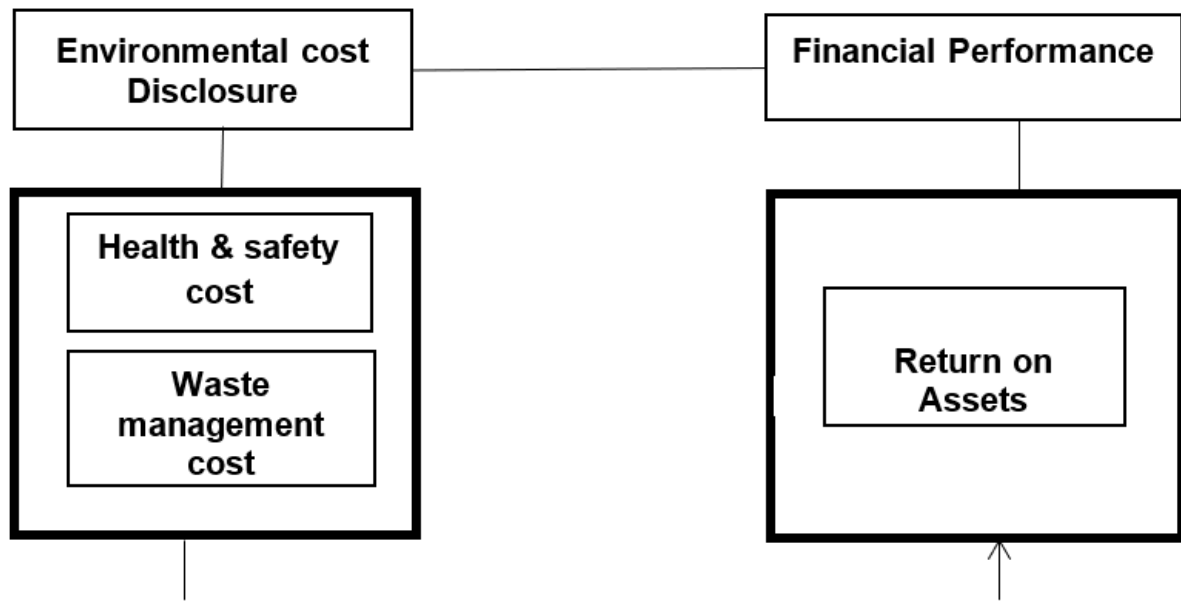


Figure 1. Conceptualized by the researchers 2023

3. Aims/Objective of the study

The aim of this study was to investigate relationship between environmental cost disclosure and financial performance of oil and gas firms in Nigeria. However, specifically, the study sought to:

- i. Analyse the correlation between health and safety expenses and the ROI of Nigerian oil and gas companies.
- ii. Research Nigerian oil and gas companies to find out how waste management costs relate to their return on assets.

4. Research questions

We found the answers to the following study questions:

- i. How do oil and gas companies in Nigeria compare in terms of return on assets and health and safety costs?
- ii. How do oil and gas companies in Nigeria manage their waste in relation to their return on assets?

5. Research Hypotheses

In this study, we examined the following null hypotheses:

H01: Oil and gas companies in Nigeria do not see a correlation between health and safety costs and their return on assets.

H02: Nigerian oil and gas companies' return on assets is unrelated to the cost of waste treatment.

6. Literature Review

a. Conceptual review

1) Environmental Cost Disclosure

The primary goal of environmental cost disclosure is to investigate and include in the company's annual reports issues that bother on environmental hazard that are not taken cognizance of in traditional or conventional accounting function, so that stakeholders can use this information to make informed decisions [4]. Corporate environmental disclosure highlighted the need for vigilant monitoring of natural resources and the company's potentially negative impact on the community in which it operates. Companies, especially those in the manufacturing, oil and gas, and finance sectors, are responsible for a wide range of negative environmental impacts.

The total amount spent on environmental protection and restoration is called the environmental cost. Capital expenses, development costs, and closure costs all fall under this category, as do the costs of recycling materials or reducing energy use. Environmental damage prevention, reduction, and repair, as well as resource conservation, are the causes of these expenses. Losses due to the environment, however, are an expense with no corresponding gain. This includes costs associated with assets that must be demolished or abandoned due to environmental harm [5], such as fines, penalties, compensation, and disposal losses.

Costs to the environment refer to any negative effects a company's activities have on the natural world and the people who live and work in it. Environmental cost reductions, decreased operational flexibility, and sluggish productivity are further areas of concern. According to Oraka, these expenses may also include compensation paid to workers who have suffered health problems as a result of the leak and the cost of cleaning up the plant. When problems arise outside of the control of an organization's management, this is known as an external failure activity. Cleanup expenses for polluted areas, monetary penalties for environmental harm, and lost revenue due to damaged reputation all belong to this category. Reduced waste and increased efficiency could lead to long-term cost savings thanks to environmental disclosure, which could be crucial to a company's viability.

2) Waste management cost

Management In order to lessen the negative effects on the environment, investments in production equipment may be undertaken. These expenditures are seen as environmental expenses. Most investments, meanwhile, are made to both improve the environment and expand capacity for use. These funds are viewed as conventional investments in addition to environmental ones. When an investment is only partially an environmental investment, just that portion incurs environmental costs [6]. It is common practise to treat waste generated in a process before discharging it into the environment. The corporation may be able to process some of the waste, while other types of waste are better off being dealt with by independent waste treatment firms. There are always environmental expenses associated with garbage management. Depletion of natural resources, noise, and visual consequences are all examples of environmental costs associated with trash transportation [7]. Long-term waste disposal that leaves pollutants in the air and water.

3) Employee Health and Safety Costs

Workers face environmental health risks such as pollution exposure in the course of doing their jobs. Therefore, it is imperative that businesses take measures to safeguard human life, prevent accidents, and eliminate environmental barriers to participation in society. Costs associated with ensuring the health and safety of employees, as well as the surrounding environment, are referred to as "environmental health and safety costs" [8]. The focus of health and safety expenditures is on protecting and enhancing workers' physical and mental well-being. Activity should be undertaken to safeguard the health of employees, subcontractors, and the general public [9] since "safe workplaces are profitable workplaces." The theory of stakeholders' emerged in response to this claim.

4) Financial performance

When assessing a company's health through time, financial performance is often looked at. Many metrics, such as return on investment, return on equity, and liquidity, can be used to define or assess a company's financial success. Growth in revenue and profit was used to evaluate financial performance [10]. Increasing sales acts as a barometer of a company's health and as a weapon against its rivals. A company's bottom line can benefit from its commitment to environmental sustainability through product differentiation. Similarly, a company can boost its earnings by cutting back on resources, regulatory expenses, capital, and manpower.

The relative performance of a company is measured by comparing its annual return to other companies in the same industry. The financial success of the organisation is the cumulative outcome of management's ongoing series of decisions. Therefore, it is vital to analyse the cumulative financial and economic repercussions of actions and to take them into consideration using comparative metrics in order to evaluate a company's financial performance [11]. To evaluate a company's ability to turn a profit, financial performance metrics must be established. That is to say, the degree to which a corporation is profitable is indicative of its financial performance. In this analysis, we will use ROA to evaluate financial performance.

5) Return on Asset (ROA)

According to Etale *et al.*, return on assets (ROA) is a ratio that characterises assets as a function of sales volume. The higher this ratio is, the better it is for the business. This implies a higher rate of return. Investors are more likely to purchase a company's stock if its Return on Assets (ROA) is high. It was explained that the ratio of earnings to total asset investments is what is meant by "return on assets." Here's a formula you may use to figure out your return on investment. ROA is calculated by dividing net income by total assets.

A greater ratio indicates that the company is making profitable use of its assets. Therefore, a larger ROA indicates better performance because of the greater rate of return. The company's appeal to potential investors will consequently rise as a result of this. When a firm becomes more desirable to invest in, it attracts more investors

because they know they stand to get a good return on their money. In other words, investors' willingness to accept returns on stocks will be influenced by ROA.

6) Theoretical Framework

The study was anchored on legitimacy theory which stipulates that the society where company is situated has some expectations from the firm, and that the firm should respect and respond to society.

a. Legitimacy Theory (Pfeffer 1975)

This theory was developed by Dowling and Pfeffer in 1975. This theory stipulates that the society where company is situated has some expectations from the firm, and that the firm should respect and respond to society. The legitimacy idea is useful when studying the interplay between businesses and their surroundings. The evaluation of an action in terms of shared or common values within the framework of the activity's involvement in social society is what Jufri calls legitimacy. Ten essays are included in this book. It's a formal organisation theory. Key concepts in the study of legitimacy are outlined below. It differentiates between terms like "authority" and "legitimation" and "authorization" to provide just one example.

According to Nwaiwu and Oluka, a company or organization's legitimacy is established when it demonstrates to its peers or superiors that it has the right to continue importing, transforming, and exporting energy, materials, or information. Organisational legitimacy, from which legitimacy theory is derived, is defined as "the condition or status that exists when an entity's value system is congruent with the value system of the large social system of which it is a part" [12]. When there is a discrepancy, actual or potential, between the two value systems, the legitimacy of the entity is at risk. They also noted that legitimacy is viewed as conformity between institution behaviour and societal norms, and legitimization as the measures institutions use to either signal value congruency or alter societal norms.

Although the stakeholder theory legitimacy theory, slack resources theory, and the theory of virtuous cycle theories have been evaluated, this study is grounded in Legitimacy Theory, which claims that organisations seek to guarantee that they operate within the bounds and norms of society. Voluntary social and environmental disclosures in corporate communication can be understood in light of these theories. According to the legitimacy theory, businesses use environmental and social reporting to establish, bolster, or restore their credibility. The concepts from legitimacy theory are helpful for environmental and social disclosures by businesses [13].

b. Empirical Review

In order to give reasonable findings that aided in the accomplishment of the stated objectives, this study reviewed a large body of literature, including both domestic and international works. Nwaiwu and Oluka analysed environmental cost disclosure and financial performance measures of Nigerian oil and gas businesses. The Central Bank of Nigeria's annual financial reporting and economic review served as the source of the time series data used in the subsequent Pearson product moment coefficient of correlation and multiple linear regression analysis using SPSS version 22. According to the analysed econometric outcomes, compliance with corporate environmental legislation and the disclosure of associated environmental costs has a positive and significant effect on financial performance indicators. As a result, the research urged stricter regulation to ensure accurate reporting and disclosure of environmental costs. In order to provide a conflict-free corporate atmosphere and thus increased corporate performance, the management of oil and gas businesses in Nigeria should design a well-articulated environmental costing system [14].

Oraka analysed the impact of environmental expenses on the stock prices of oil and gas firms listed on the Nigerian stock exchange [15]. The eleven (11) Oil and Gas firms have eleven (12) years of data collected from their publicly available financial statements. According to their research, the Tobin's Q of oil and gas firms trading on the Nigeria Stock Exchange is significantly affected by compliance and environmental remediation costs. This led them to conclude, among other things, that oil and gas firms should be environmentally friendly in order to gain a competitive edge, high liquidity, and reduced environmental cost in the long run because environmental remediation costs and financial performance are positively related.

Using panel series data and a regression analytic approach, Arumona *et al.* looked into how environmental disclosure affected the financial performance of Nigerian oil and gas businesses that were publicly traded. Twelve oil and gas businesses trading on the floor of the Nigeria Stock Exchange (NSE) provided the secondary data used in this study. The study spanned the years 2010 through 2019, covering the full range of available NSE data. The E-view was used for statistical analysis, with an emphasis on the Ordinary Least Squares (OLS) approach of regression. During the time period under consideration, the study concluded that publicly traded oil and gas businesses in Nigeria benefited financially from environmental disclosure. They arrived at the conclusion that environmental disclosures help Nigeria's oil and gas companies tremendously in improving their financial performance and profitability, and that this in turn can help the country as a whole become more environmentally friendly. Given the importance of the oil and gas industry to the Nigerian economy, it is recommended that all parties involved in the industry, oil and gas firms, the economy as a whole, and the citizens of Nigeria continue to insist on full compliance to every form of best practise in the oil and gas sector [16].

Dordum *et al.* looked into how the use of environmental accounting methods affected the bottom lines of publicly traded Nigerian industrial companies. The study, which used an ex post facto research methodology, analysed data from the Nigerian Stock Exchange between 2012 and 2019. The study found that environmental responsibility increased ROI by a small but positive amount. The results of their research showed that environmental accounting is not being adequately implemented in Nigeria's manufacturing sector. Therefore, they suggested that factories phase out climate- and forest-damaging operations in favour of environmentally friendly ones that recycle, reuse, and reduce waste for the greater good of society and the planet as well as the manufacturers' bottom lines.

Oshiole *et al.* looked into the impact of environmental disclosure on listed oil and gas companies in Nigeria by comparing the expenses of employee health and safety and environmental cleanup. The research hypotheses were examined using correlation and Panel Least Square (PLS) regression analysis. Their research demonstrated that the corporations' bottom lines benefited significantly from spending money on environmental health and safety and environmental cleanup.

Nwaimo used remediation and community development cost as proxy variables to analyse the impact of environmental costs on the performance of 64 industrial enterprises throughout South Africa, Nigeria, Ghana, and Tanzania between 2007 and 2016 [19]. The results of their analysis showed that RC and CDC had no appreciable impact on ROCE. However, Anselm and JaneFrances presented contrasting viewpoints supported by data showing that RC and CDC do, in fact, improve performance.

According to Ayu *et al.*, the financial results of international energy corporations in Indonesia are significantly and positively affected by environmental and social costs. This conclusion is based on an analysis of primary data using Smart Panel Least Square (PLS).

Chinedu *et al.* used environmental health and safety expense as an explanatory variable in their analysis of the effect of environmental disclosure on the profitability of Nigerian cement producers. Secondary data came from the companies' annual reports from 2006 to 2017. The results showed that the firms' performance suffered due to the costs associated with environmental health and safety.

Two publicly traded Nigerian cement companies had their financial results and environmental costs analysed [17]. Both primary and secondary sources were used to complete the analysis. The financial results of cement businesses in Nigeria were found to be significantly and favourably impacted by environmental expenses.

Onuora and Christian's research also showed that during 2017 and 2018, the ROCE of 11 Nigerian oil and gas businesses was negatively and insignificantly impacted by environmental expenditures. Analytical methods like correlation and OLS testing revealed this.

Iheduru and Chukwuma used data from annual reports and accounts from 2016 to analyse how environmental and social expenses affected the profitability of a sample of Nigerian manufacturing firms. Multiple regression models revealed a negative and statistically significant link between environmental and social costs and return on capital employed (ROCE).

Egbunike and Okoro looked into whether or not the profitability of ten non-consumer products firms listed on NSE between 2012 and 2016 was affected by green accounting, defined as costs associated with environmental health and safety and social costs. Environmental health safety cost and social expenses were used as surrogates for green accounting to compile data from the company's annual reports and accounts. The profitability of the tested banks was analysed using a canonical correlation, and the results showed no significant association between environmental health safety cost and social cost.

The connection between environmental accounting and oil firms in Nigeria was studied by Otu *et al.* The companies' audited financial statements from 2014-2016 served as the source for the secondary data utilised. Researchers found statistically insignificant positive associations between environmental accounting and measures of firm performance [18].

Using an ex post facto study design, Iliemena examined the effect of environmental accounting practises on the bottom lines of Nigerian listed oil and gas firms between the years of 2012 and 2018. Our research shows that environmental accounting has a significant positive effect on the financial results of companies who implement it. Therefore, it is recommended that firms incorporate environmental accounting into their management accounting and financial reporting systems as a means of ensuring the company's long-term economic viability.

c. Gap in Literature

Gap in Theoretical Review: The common theories adopted in most of the few existing works on environmental cost disclosures are anchored on the agency theory, triple-bottom theory, signalling theory etc. However this work is basically anchored on Legitimacy theory. The theory stipulates that the society where company is situated has some expectations from the firm, and that the firm should respect and respond to society. Analysing how businesses interact with their surroundings requires consideration of the concept of legitimacy.

Gap in variables: Most of the work performed on environmental cost disclosures considered its restoration activities, remediation and social cost. However this work is a little deviation from the norm as environmental waste management cost, health & safety cost will be incorporated in the model.

Methodology Gap: Time series data and a correlational research approach were used in earlier studies. Given Nigeria's huge annual revenue from oil and gas resources, the current study will use the E-view Econometric tool, with a focus on Ordinary Least Square, to analyse the panel data extracted from the annual reports of the company's Oil in Nigeria for the period of 10 years covering 2013-2022.

Result Gap: Precisely, a number of research were evaluated that looked at environmental cost disclosures, with varying outcomes. Some of the studies came to similar conclusions on the impact of environmental disclosure on financial performance, while others came to very different ones. Several articles have spent the better part of a decade analysing how environmental disclosure affects a company's bottom line. The findings of the studies have been conflicting. While some studies have found a positive relationship between environmental disclosure and financial success, others have not [19]. Given the mixed findings to far, the authors of this study set out to dig deeper into the impact of environmental cost disclosure on the bottom lines of Nigeria's publicly traded oil and gas firms.

Methods

A. Research Design

Both retrospective and descriptive methods will be used in this investigation. Researchers choose for these designs when they know they will have little say over some aspects of the study. This is a secondary data analysis, meaning that the data utilised in the analysis already exists.

B. Population of the Study

According to Appah, the study's intended audience includes everyone who could potentially benefit from the research. He pointed out that the full set of items the researcher is interested in studying and generalising about is the target population. The population of this study consisted of the nine (9) oil and gas companies listed in Nigeria [20].

| S/N | COMPANY | YEAR OF ESTABLISHMENT | LOCATION |
|-----|-----------------------------|-----------------------|--|
| 1. | Total Energy | 1956 | Herbert Macaulay Street, Yaba, Lagos |
| 2. | Corn Oil | 1927 | Lagos, Nigeria. |
| 3. | Eternal Oil | 13th of January 1989 | 5A, Oba Adeyinka Oyekan Avenue Lagos, Lagos Nigeria |
| 4. | MRS Oil | 1913 | 8 Macarthy Street Onikan Lagos Island Lagos, Nigeria |
| 5. | CAPITAL OIL PLC | August 29, 1985 | 43, Adeniyi Jones, Ikeja |
| 6. | JAPPAUL GOLD & VENTURES PLC | June 29, 1994 | Japaul House, Plot 8, Dr Nurudeen Olowopopo Avenue, Central Business District, Agidingbi, Ikeja, Lagos |
| 7. | OANDO PLC | August 25, 1969 | The Wings Office Complex, 17a Ozumba Mbadiwe Avenue, Victoria Island, Lagos |
| 8. | RAK UNITY PET. COMP. PLC | December 20, 1982 | BLOCK 5, WATER CORPORATION ROAD, IJORA GRA LAGOS |
| 9. | SEPLAT ENERGY PLC | June 17, 2009 | 16a Temple Road (Olu Holloway) Ikoyi, Lagos. |

Table 1. Population

1. Sampling Size and Sampling Technique

Sampling is a method for picking a subset of a population from which statistical conclusions can be drawn and characteristics of the entire population estimated. The researchers in this study used purposive sampling strategy since it was both cost-effective and pliable to an exploratory research approach. Total Energy, Corn Oil, Eternal Oil, MRS Oil, and are the five (5) oil and gas firms that made up the sample.

| S/N | COMPANY | YEAR OF ESTABLISHMENT | LOCATION |
|-----|-----------------|-----------------------|--|
| 1. | Total Energy | 1956 | Herbert Macaulay Street, Yaba, Lagos |
| 2. | Corn Oil | 1927 | Lagos, Nigeria. |
| 3. | Eternal Oil | 13th of January 1989 | 5A, Oba Adeyinka Oyekan Avenue Lagos, Lagos Nigeria |
| 4. | MRS Oil | 1913 | 8 Macarthy Street Onikan Lagos Island Lagos, Nigeria |
| 5. | CAPITAL OIL PLC | August 29, 1985 | 43, Adeniyi Jones, Ikeja |

Table 2. *Sample Size*

2. Sources of Data

The financial accounts of some Nigerian oil and gas businesses that are publicly traded were analysed for this research. The Nigerian exchange group website provided these reports. This is because it allows the researcher to conduct investigations using actual, existing facts that have already undergone some sort of refinement, this approach was chosen. As a result, the study's findings would have more weight in the real world.

C. Method of Data Analysis

With the aid of the Eview-9 programme, this investigation employed descriptive statistics and Ordinary least square (OLS) regression analysis. Descriptive statistics are an essential starting point for data analysis, helping researchers understand their data, while OLS regression analysis is a powerful tool for exploring the effects of relationships between variables and making predictions. Together, they provide a comprehensive approach to data analysis and modeling. The parameter estimate can be measured using the t-test, F-ratio, Durbin-Watson (DW), or another statistical test. The hypothesis is accepted at the 5% (0.05) level of significance. Some variables in the study were converted to their natural logs to mitigate the impact of extremely big numbers. This is how the model is written down:

$$ROA_{it} = \beta + \log \beta_1 \log EWMC_{it} + \beta_2 \log HSC_{it} + \epsilon_{it}$$

ROA = Return on assets

EWMC = Environmental waste management Cost

HSC = Health & Safety Cost

Results and Discussion

A. Data Analysis

The findings and analysis from the data were gleaned from the yearly reports of the Nigerian oil firms sampled. Data analyzed here were the properties of environmental cost disclosures (EWMC, HSC) and financial performance (ROA) of listed oil and gas firms in Nigeria. However, the raw data is shown in the appendices.

| | ROA | EWMC | HSC |
|-----------|----------|----------|----------|
| Mean | 7.774090 | 5.007148 | 5.517765 |
| Median | 0.893762 | 4.651840 | 5.661349 |
| Maximum | 123.4751 | 7.811407 | 6.918712 |
| Minimum | 0.081225 | 4.141073 | 4.262047 |
| Std. Dev. | 1.61216 | 0.881774 | 0.655605 |
| Skewness | 4.247732 | 1.248533 | 0.073378 |
| Kurtosis | 22.42634 | 3.968040 | 2.301568 |

| | | | |
|--------------|----------|----------|----------|
| Jarque-Bera | 936.5740 | 14.94259 | 1.061134 |
| Probability | 0.000000 | 0.000269 | 0.000271 |
| Sum | 388.7045 | 250.3574 | 275.8882 |
| Sum Sq. Dev. | 20818.20 | 38.09872 | 21.06110 |
| Observations | 50 | 50 | 50 |

Table 3. Descriptive Statistics

All of the model variables' time series characteristics are described in Table 4.1. From 2013 to 2022, we used cross-panel data to conduct descriptive statistics on the model's variables. The average ROA, EWMC, and HSC values were 7.774090, 5.007148, and 5.517765, respectively, according to the results. The long-term mean values of ROA, EWMC, and HSC are 1.61216, 0.881774, and 0.655605 standard deviations, respectively. All three variables—ROA, EWMC, and HSC—have greater total Jarque-Bera values and probability values that are less than the 0.05 level of significance, suggesting that they follow a normal distribution and are thus appropriate for investigation. There is a positive Kurtosis for all of the factors. A lengthy right tail is an indication of positive skewness, which is true for ROA, EWMC, and HSC as well. Unit root test of stationarity, however, will confirm this assumption.

1. Statement of hypotheses

H01: There exists no substantial correlation between health and safety expenditures and the return on assets of oil and gas companies in Nigeria. H02: There exists no substantial correlation between waste management expenses and return on assets of oil and gas companies in Nigeria.

Dependent Variable: ROA

Method: Panel Least Squares

Date: 06/22/24 Time: 10:52

Sample: 2013-2023

Periods included: 5

Cross-sections included: 10

Total panel (balanced) observations: 50

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---------------------------------------|-------------|-----------------------|-------------|----------|
| C | 21.3704 | 107.6387 | 1.982283 | 0.0558 |
| LOGWMC | 0.92830 | 11.21415 | -0.528645 | 0.0016 |
| LOGHSC | 0.43247 | 9.215344 | 0.459286 | 0.0020 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| Period fixed (dummy variables) | | | | |
| R-squared | 0.471128 | Mean dependent var | | 9.588230 |
| Adjusted R-squared | 0.314706 | S.D. dependent var | | 28.50828 |
| S.E. of regression | 25.26314 | Akaike info criterion | | 9.561054 |
| Sum squared resid | 21061.46 | Schwarz criterion | | 10.21114 |
| Log likelihood | -222.0264 | Hannan-Quinn criter. | | 9.808611 |
| F-statistic | 1.837312 | Durbin-Watson stat | | 2.449488 |
| Prob(F-statistic) | 0.001295 | | | |

Table 4. Dependent Variable ROA

Table 4 shows that the independent variables (WMC and HSC) and the dependent variable (ROA) are related to each other, with a correlation coefficient of (R2= 0.471128, Adjusted R2= 0.314706). "The R-Square coefficient showed how much of the variation in the dependent variable ROA could be explained by the model's independent variables, WMC and HSC. This meant that increases in WMC and HSC accounted for 31.5% of the ROA rise, while other, unaccounted-for variables accounted for the other 68.5%. As the overall goodness-of-fit statistical test was

satisfied by the model, the probability value was 00.001295. This means that ROA is able to forecast WMC and HSC for the listed Nigerian oil and gas businesses that were included in the sample". It appears that the model does not include serial correlation, as indicated by the Durbin-Watson Statistic of 2.449488 and F-statistics of 1.837312.

B. Discussion of Findings

First, a correlation coefficient of ($R^2 = 0.471128$, Adjusted $R^2 = 0.314706$) was found in table 4, indicating that the independent variables (WMC & HSC) and the dependent variable (ROA) are related. The R-Square coefficient showed how much of the variation in the dependent variable ROA could be explained by the model's independent variables, WMC and HSC. "This meant that increases in WMC and HSC accounted for 31.5% of the ROA rise, while other, unaccounted-for variables accounted for the other 68.5%. As the overall goodness-of-fit statistical test was satisfied by the model, the probability value was 00.001295. This means that ROA is able to forecast WMC and HSC for the listed Nigerian oil and gas businesses that were included in the sample. Nwaiwu and Oluka found that financial performance metrics were positively and significantly affected by compliance with corporate environmental legislation and sufficient disclosure of environmental costs. Our results are in line with theirs [21]. According to Oraka, Tobin's Q of oil and gas companies listed on the Nigeria Stock Exchange is significantly affected by compliance costs and environmental remediation costs". Environmental disclosure had a favourable and statistically significant impact on the financial performance of listed oil and gas businesses in Nigeria throughout the time under consideration [22]. Dordum found that there was a positive, but small, impact on ROA [23].

Conclusions

The study investigated the relationship between environmental cost disclosures and financial performance of listed oil and gas firms in Nigeria using descriptive and ex-post-facto research design. Literatures related to the present study were reviewed to validate the result of the study. The study disclosed that environmental cost disclosures and financial performance of listed oil and gas firms in Nigeria are positively related. Consequently, the researcher concluded that there is a significant relationship between environmental cost disclosures and financial performance of listed oil and gas firms in Nigeria. As a result, the researcher recommended that;

Right policies that will enhance the environmental cost disclosures should be put in place by the environmental management practitioners of Nigeria.

Oil and gas firms in Nigeria should continue to ensure that workers' safety is given proper attention to promote the safety and health of the personnel.

Companies should employ youths within the environment in a bid to mitigate incessant restiveness between the companies and the host communities.

Since environmental cost disclosures and financial performance are positively related, oil and gas firms should be environmentally friendly to enable them gain competitive advantage high liquidity and reduced environmental cost in the long run.

Corporate organizations should ensure that they comply with the environmental laws of the nation for improved and sustainable performance.

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