



## ENVIRONMENTAL ACCOUNTING AS A CATALYST FOR IMPROVING THE OPERATIONAL PERFORMANCE OF OIL AND GAS CONGLOMERATES IN NIGERIA

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### Abstract

This study aims at highlighting environmental accounting as a catalyst for improving the operational performance of Oil and Gas Conglomerates in Nigeria. Environmental accounting is becoming increasingly relevant for organizations worldwide as they seek to integrate environmental concerns into their decision-making processes. The research was ex post facto research which made use of secondary data obtained from the annual reports and accounts of the oil and gas firms under study covering the period which spanned from 2008 to 2022. The main theory that underpinned the research was the stakeholder theory. The study firstly employed descriptive statistics and graphical representation using E-Views software to check for the trends, linearity or otherwise of the data. Regression model was applied in determining the extent of the effect exerted on corporate performance by environmental losses and environmental liabilities. The result of the analysis showed that environmental losses have significant negative effect on return on assets the sampled oil and gas firms in Nigeria. The study concluded that management, accountants and other stakeholders in the Nigerian oil and gas firms should take proactive role in the environmental protection process so as to minimize costs and enhance corporate performance. The study therefore recommends that management of oil and gas firms should endeavor to increase the level of awareness of environmental cost and comply with environmental laws so as to curtail environmental charges. This study recommends that environmental losses should be charged separately of other losses, this will give room for more accountability on its effect on the companies' corporate performance.

**Keywords** *Environmental Accounting; Operational Performance; Oil and Gas Conglomerate; Environmental Laws; Companies' Corporate Performance*

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## **Introduction**

In recent years, the increasing concern for environmental sustainability has led to a growing interest in environmental accounting as a tool for promoting sustainable business practices. The oil and gas sector are among the industries that have come under scrutiny due to their significant impact on the environment. As a result, oil and gas conglomerates in Nigeria are increasingly adopting environmental accounting practices to manage their environmental impacts and improve their operational performance (Adeyemi et al., 2021). Environmental accounting is a process of identifying, measuring, and reporting an organization's environmental impacts and costs. The purpose of environmental accounting is to provide information that supports decision-making and helps organizations to manage their environmental impacts effectively. In the oil and gas industry, environmental accounting can be used to measure and manage greenhouse gas emissions, waste management, water consumption, and other environmental impacts (Ogwueleka & Fagbemi, 2020). Accounting has recently become concerned in achieving new goals such as measuring and evaluating potential or actual environmental impacts of projects and firms' operational activities. These new goals are of great importance as they enable many users to take different developmental decisions which are economically and environmentally sound (Bala & Yusuf, 2003). The main reasons for the accountant's interest in the environment are obvious as there are increasing needs from different stakeholders (government, investors, lenders, banks, non-governmental organizations, among others) to have financial data on the environmental performance of different organizations. Proper environmental accounting system is a supporting measure for achieving Sustainable Development (SD) in the sense that it is the main tool for measurement, control and decision-making (Alao et al., 2020). However, many authors have uniquely described environmental accounting. Eyo, et al. (2013) emphasized that environmental accounting involves the identification, measurement and allocation of environmental costs, and the integration of these costs into business and encompasses the way of communicating such information to companies' stakeholders. Shil and Labal (2005) stated that environmental accounting is a tool to supplement environmental management. They claim that the disclosure of environmental data is important for developing an appropriate environmental report that will enable government agencies, companies and interested individuals get a clear understanding of the company's stance on environmental conservation issues. The research work agrees with the views of the above authors but noted that environmental accounting covers information relating to all aspects of the environment. It includes environmental related expenditure, environmental benefits of products and details regarding consistency of operations. The world at large has needs to evaluate and assess accounting reporting on raw materials, energy consumption and use of natural resources which have systematically depleted the environment. In the light of the background of increasing environmental attention, and the fact that the oil and gas sector have profound production impact on the environment, the study has explored the role of environmental accounting as a catalyst for improving the operational performance of oil and gas conglomerates in Nigeria.

## **Statement of the Problem**

The oil and gas sector are one of the major contributors to environmental degradation in Nigeria, with significant impacts on air and water quality, biodiversity, and human health. In response to growing concerns about environmental sustainability, oil and gas conglomerates in Nigeria are increasingly adopting environmental accounting practices to manage their environmental impacts and improve their operational performance. However, there is limited empirical evidence on the effectiveness of environmental accounting practices in improving the operational performance of oil and gas conglomerates in Nigeria. Additionally, there are challenges faced by oil and gas conglomerates in implementing effective environmental accounting practices, including limited resources, lack of awareness, and inadequate stakeholder engagement. Therefore, the problem addressed by this study is the need to examine the role of environmental accounting as a catalyst for improving the operational performance of oil and gas conglomerates in Nigeria. Specifically, the study will investigate the impact of environmental accounting practices on the operational performance of selected oil and gas conglomerates in Nigeria and identify the challenges faced by these organizations in implementing effective environmental accounting practices. The study will provide insights into the potential of environmental accounting to support sustainable development in Nigeria's oil and gas industry.

### **Objective of the Study**

The general objective of the study is to examine the effect of environmental accounting on operational performance of oil and gas conglomerate in Nigeria.

#### **The specific objectives are to:**

- I. Ascertain the effect of environmental losses on return on assets of selected oil and gas firms in Nigeria
- II. Ascertain the effect of environmental liabilities on return on assets of selected oil and gas firms in Nigeria

### **Research Hypotheses**

The following hypotheses will be formulated for the study:

- I. Ho: Environmental losses have not significantly and positively influenced return on assets of selected oil and gas firms in Nigeria.
- II. Ho: Environmental liabilities have not significantly and positively influenced return on assets of selected oil and gas firms in Nigeria

### **Review of Related Literature**

#### **Conceptual Framework**

The conceptual framework for this study proposes that environmental accounting practices serve as a catalyst for improving the operational performance of oil and gas conglomerates in Nigeria. The framework draws on the resource-based view of the firm, which emphasizes the importance of strategic resources and capabilities in achieving competitive advantage. The framework includes three main components: environmental accounting practices, operational performance, and moderating factors. Environmental accounting practices refer to the process of identifying, measuring, and reporting an organization's environmental impacts and costs. The practices include the adoption of environmental management systems, the development of environmental performance indicators, and the integration of environmental considerations into decision-making processes. The adoption of effective environmental accounting practices is expected to lead to reduced environmental impacts, improved resource efficiency, and enhanced regulatory compliance (Onuoha et al., 2020). Operational performance refers to the effectiveness and efficiency of an organization's operations. In the context of this study, operational performance is measured in terms of reduced environmental impacts, improved resource efficiency, and enhanced regulatory compliance. Operational performance is expected to be positively influenced by the adoption of effective environmental accounting practices. Moderating factors include the challenges faced by oil and gas conglomerates in implementing effective environmental accounting practices. These include limited resources, lack of awareness, and inadequate stakeholder engagement. These moderating factors are expected to influence the relationship between environmental accounting practices and operational performance. Specifically, the study will examine how oil and gas conglomerates can overcome these challenges and implement effective environmental accounting practices to improve their operational performance.

#### **Environmental Accounting**

Environmental accounting is a tool to supplement environmental management (Shil & Labal, 2005). Environmental accounting primarily also refers to the process of identification, measurement and disclosing the information with regard to the environmentally responsible performance of a business entity to allow economic conclusions (Eze et al., 2016). It is vital for any business entity to follow the concept of sustainable development as it will result into consideration of ecological activities of the entity in economic measurement of the overall results. This enhances more effective decision-making in order to promote environmental and economic sustainability. Environmental accounting is aims at achieving sustainable development, maintaining a favorable relationship with the community,

and pursuing effective and efficient environmental conservation activities. These accounting procedures allow a company to identify the cost of environmental conservation during the normal course of business, identify benefit gained from such activities, provide the best possible means of quantitative measurement (in monetary value or physical units) and support the communication of its results. Environmental conservation as indicated in the definition is the prevention, reduction and avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities. The environmental impacts are the burden on the environment from business operations or other human activities and potential obstacles which may hinder the preservation of a favorable environment. Field and Field (2002) explain pertinent aspects of environmental degradation and costs include emissions into the air, water and land. Pollution which includes airborne emissions from power plants by stack-gas scrubbing leaves a highly concentrated sludge and degradation which incorporates midnight dumping, illegal dumping along the sides of roads or in remote areas. The process of identification, measurement and allocation of environmental costs and their integration into business decisions is environmental accounting, and the subsequent communication of the information to the company's stakeholders is called as Environmental Accounting and Reporting as viewed by (Atul, 2015). Identification includes a broad examination of the impact of corporate products, services and activities on all stakeholders, after identifying the impacts on stakeholders, the entities have to measure those impacts (costs and benefits) as precisely as possible in order to permit informed decision-making by the stakeholders in general and the management of the organization in particular. Measurement might be quantified in physical units or monetized equivalents.

### **Concept of Environmental Losses**

Bradford (1972) and Starrett (1972) both observed that non-convexities are prevalent when losses traceable to environmental pollution are bounded. Starrett (1972) demonstrated that in the presence of such non-convexities, a competitive equilibrium simply does not exist: markets for pollution would be unable to equate demands to supplies. If the market price for pollution was negative (i.e., the polluter has to pay the pollute), pollutes' demand would be unbounded, while supply would be bounded. On the other hand, if the price was non-negative, demand would be zero, while supply, presumably, would be positive. Hence, Environmental losses are separately disclosed costs that provide no benefit or return to the enterprise. Such environmental losses according to Bebbington and Gray (1993) include: fines, penalties and damages arising from non-compliance with environmental laws.

### **Concept of Environmental Liabilities**

Mohamed (2002) opines that liability is a present obligation to make expenditure or to provide a product or service in the future. Accounting institutions define liability as a probable future sacrifice of economic benefits arising from present obligations to transfer assets or provide services in the future as a result of past transactions or events. Hence, environmental liabilities are obligations based on the principle that a polluting party should pay for any and all damages caused to the *environment* by its activities. In some countries, this is a strict *liability* if the damage can be attributed to a specific party. Liability has an important legal dimension as well. A liability is a legally enforceable obligation, whether it is voluntarily entered into as a contractual obligation, or is imposed unilaterally, such as the liability to pay taxes. The law both establishes liabilities and determines who is responsible for discharging them.

### **Benefits of Environmental Accounting**

The benefits of understanding an environmental accounting initiative are that the identification and greater awareness of environmental related costs often provides the opportunity to find ways to reduce or avoid these costs, whilst also improving environmental performance (Tapang et al., 2012). Richardson (1999) opined that environmental accounting is an effective tool for placing environmental issues firmly on top management agenda, providing useful data to inform environmental and financial manager's decision-making, and concretely demonstrating environmental commitment to stakeholders. The Environmental Protection Agency (EPA) adds the following benefits.

1. Many environmental problems can be significantly reduced or eliminated as a result of effective decisions.
2. Competitive advantages with customers can result from processes, products and services which can be demonstrated to be environmentally friendly.
3. Understanding of environmental accounting can promote more accurate costing and pricing of products.

### **Problems of Environmental Accounting**

Hecht (1999) opined that Building a nation's economic use of the environment (and environmental degradation) into its accounts is a response to several perceived flaws in the System of National Accounts (SNA). Hecht identifies the difficulties of environmental accounting in nations as:

1. Cost of environmental protection cannot be identified. It is cited for instance, that money spent to put pollution control devices on smokestacks will increase GDP, even though the expenditure is not economically productive.
2. Certain environmental goods are not marketed even though they provide economic value, for instance fuel wood gathered in the forests, meat and fish gathered for consumption. Water for drinking and irrigation are not priced in themselves apart from the technology applied to make the water available.
3. When certain nations include these resources in their System of National

Accounts, no standard practices exist for comparability.

### **Theoretical Framework**

#### **The Stakeholders Theory**

The study is theoretically underpinned on the stakeholder theory. Stakeholders are groups which are influenced by the corporate activities or which can affect the corporation. The basic proposition of the stakeholders' theory is that the company success is dependent upon the successful management of all the relationships that a company has with its stakeholders. In developing the stakeholders Theory, Freeman (1983) incorporates the stakeholders' concept into categories:

- I. A business planning and policy model and
- II. A corporate social responsibility model of stakeholder management.

He expressed that in the first model, the stakeholder analysis focus on developing and evaluating the approval of corporate strategies decisions by groups whose support is required for the company's continued existence. The stakeholders identified in this model include the owners, customers, public groups and suppliers. In the second model, the corporate planning and analysis extends to include external influences which may be adversarial to the firm. These adversarial groups may include the regulatory environmentalist and/or special interest groups concerned with social issues (Guthrie & Parller, 1990). This study generally discovered that the main concern of the stakeholders' theory in environmental accounting is to address the environmental cost elements and valuation and its inclusion in the financial statements.

## Empirical Review

Roberts (1992) examines the determinants of Corporate Social Responsibility Disclosure using correlation analysis. The study after taking the log of profit found a positive relationship between profitability level of a company and corporate social and environmental disclosure. Patten (2002) empirically evaluates the media exposure, public policy pressure, and environmental disclosure using ordinary least. The study fails to find any significant positive relationship between profitability and corporate social and environmental disclosure. Al-Tuwaijri, et al. (2004) employed simultaneous equations approach to investigate the relations among environmental disclosure, environmental performance and economic performance. They used proxy for environmental performance was the percentage of total waste generated recycled as identified using the Toxic Release Inventory (TRI) database and measure environmental disclosure using a content analysis in four categories, potential responsible parties' designation, toxic waste, oil and chemical spills, and environmental fines and penalties, disclosures which are largely non-discretionary. Based on these proxies, Al-Tuwaijri, et al. (2004) documented a positive association between environmental performance and environmental disclosure. Eyo, et al. (2013) examined the impact of Environmental Accounting and Reporting on Organizational Performance. The study used multiple regressions to determine the effect of environmental loss on performance. The study reveals that environmental losses exerts a negative impact on performance and concluded that environmental cost has a high degree of influence on performance of firms.

Thomas (2001) tests if the adoption of environmental policies, the prosecution by an environmental agency proxied by environmental losses affects corporate performance of firms. The empirical analysis that is conducted is focused in the UK and is separated in three distinct time periods, namely before 1991 (when John Major announced the setting up of the regulatory authority called the Environmental Agency), after 1996 (when the agency became fully operational) and the years in between. The study finds out that environmental losses have negative effect on performance. The study further finds that the pattern of returns to companies that have adopted an active environmental agenda changed over the period when the new government policy was being debated. Richardson and Holm (2008) studied the effect of environmental disclosure on investment decisions. The results suggest that environmental information disclosure influences investment allocation decisions. This finding would imply that companies that are apathetic to their environmental costs or responsibility might experience eventual crashes on their stock price if their investors are rational in considering the future value of the firm based on its present state of environmental responsibility.

## Methodology

### Research Design and Sampling

This study made use of *Ex-post facto design*. In the opinion of Onwumere (2009), an *Ex-post facto design* is the type of research involving events that have already taken place (historical).

### Model Specification

The simple and multiple regression models were used to estimate the effects of environmental accounting on operational performance of oil and gas conglomerate in Nigeria

$$Y' = f(x_1, x_2, \dots) \dots\dots\dots (1)$$

i.e.,  $Y'$  is a function of  $x_1$ ,  $x_2$  and  $x_3$

$$Y' = a + \beta_1 X_1 + \beta_2 X_2 + \epsilon_t \dots\dots\dots (2)$$

Were,

$Y$  = dependent variable

$X_1, X_2,$  = explanatory variables  
 $\beta_0$  = intercept of Y  
 $\beta_1, \beta_2,$  = slopes of coefficients  
 $\epsilon$  = error terms.

**Explicit representation of the model:**

$$ROA = \beta_0 + \beta_1 E_{Loss} + \beta_2 E_{Liability} + \epsilon_t \dots \dots \dots (3)$$

Were,

ROA = Return on Asset

EC = Environmental Loss

Eliability = Environmental Liability

$\epsilon_t$  = error terms

**Results and Discussion**

**Simple Regression**

**Hypothesis 1**

**Ho<sub>1</sub>:** Environmental losses have no significant influence on Return on Asset of selected oil and gas firms in Nigeria.

**Ha<sub>1</sub>:** Environmental losses have significant influence on Return on Asset of selected oil and gas firms in Nigeria.

**Table 1: Result of the Regression for Hypothesis 1**

5Dependent Variable: ROA				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ELOSS	-0.863976	0.258676	-3.339989	0.0013
C	0.085830	0.058944	1.456142	0.1496
R-squared	0.628226	Mean dependent var		0.488702
Adjusted R-squared	0.514914	S.D. dependent var		0.194127
S.E. of regression	0.192674	Akaike info criterion		-0.429334
Sum squared resid	2.709987	Schwarz criterion		-0.367534
Log likelihood	18.10002	Hannan-Quinn criter.		-0.404658
F-statistic	2.120350	Durbin-Watson stat		0.820840
Prob(F-statistic)	0.149641			

**Source:** Author's E-views Output, 2023.

In table 1, the regression result indicated that return on assets was influenced by environmental losses. The extent of the influence exerted on return on assets by environmental losses is significant and negative. This implies that a unit increase in environmental losses will exert a corresponding decrease in return on assets of the sampled oil and gas firms in Nigeria. The adjusted R<sup>2</sup> is 0.514914 and this reveals that about 51% of the variations in return on assets could be explained by environmental losses while 49% could be explained by other factors.



## Hypothesis 2

**Ho<sub>1</sub>:** Environmental liabilities have no significant influence on Return on Asset of selected oil and gas firms in Nigeria

**Ha<sub>1</sub>:** Environmental liabilities have significant influence on Return on Asset of selected oil and gas firms in Nigeria

**Table 2: Result of the Regression for Hypothesis 2**

Dependent Variable: ROA				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ELIABILITY	-0.482693	0.177304	-2.722396	0.0081
C	0.001413	0.041340	0.034172	0.9728
R-squared	0.700016	Mean dependent var		0.488702
Adjusted R-squared	0.617682	S.D. dependent var		0.194127
S.E. of regression	0.195450	Akaike info criterion		-0.400718
Sum squared resid	2.788656	Schwarz criterion		-0.338918
Log likelihood	17.02692	Hannan-Quinn criter.		-0.376042
F-statistic	0.001168	Durbin-Watson stat		0.860800
Prob(F-statistic)	0.972834			

**Source:** Author's E-views Output, 2023

In table 2, the regression results above indicated that return on assets was influenced by environmental liabilities. The extent of the influence exerted on return on assets by environmental liabilities is significant and negative. This implies that a unit increase in environmental liabilities will exert a corresponding decrease in return on assets of the sampled oil and gas firms in Nigeria. The adjusted  $R^2$  is 0.617682 and this reveals that about 62% of the variations in return on assets could be explained by environmental liabilities while 38% could be explained by other factors.

## Summary of Findings

Findings arising from this research were summarized as follows:

- I. Findings from test of hypothesis one shows that return on assets is influenced by environmental losses. The extent of the influence exerted on return on assets by environmental losses is significant and negative. This implies that an increase in environmental losses will lead to a decrease in return on assets of the sampled oil and gas firms in Nigeria. The adjusted  $R^2$  is 0.514914 and this reveals that about 51% of the variations in return on assets could be explained by environmental losses while 49% could be explained by other factors.
- II. Findings from test of hypothesis two reveals that return on assets is influenced by environmental liabilities. The extent of the influence exerted on return on assets by environmental liabilities is significant and negative. This implies that a unit increase in environmental liabilities will exert a corresponding decrease in return on assets of the sampled oil and gas firms in Nigeria. The adjusted  $R^2$  is 0.617682 and this reveals that about 62% of the variations in return on assets could be explained by environmental liabilities while 38% could be explained by other factors. This result is in consonance with the findings of Wayman (2008).

## Conclusion

The study appraises the effect of environmental accounting on operational performance of oil and gas conglomerate in Nigeria. From all literatures reviewed, the researcher deduced that the development and operation of Nigerian oil and gas companies such as Texaco Oil Company, Mobil Nigeria Ltd, Agip Petroleum Company, Chevron Petroleum Company and Total Petroleum Company have their return on assets affected by environmental losses and environmental liabilities. Specifically, this study has revealed that environmental losses and environmental liabilities have significant and negative effects on corporate performance of oil and gas firms in Nigeria. However, one common observation across the classifications of the sample companies is that their environmental losses are found to be the most influencing variables on the return on assets of the sampled oil and gas firms. The researcher



therefore concludes that accountants and other stakeholders should take proactive role in the environmental protection process so as to minimize costs and enhance corporate performance.

### Recommendation

In view of the findings above, this study recommends that:

- I. Environmental losses should be charged separately of other losses, this will give room for more accountability on its effect on the companies' corporate performance.
- II. Corporate organizations on their part should ensure that they comply with the environmental laws of the nation so as to minimize environmental liabilities as it will go a long way in enhancing their performance.

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